**Chapter 3**

**Implicit Coordination and Plural Reference**

The most important motivation for implicit coordination comes from split antecedent constructions, that is, constructions in which an element takes a plural antecedent which is composed of parallel parts that fail to be explicitly conjoined, as in (1):

(l) A man came and a woman left who know each other well.

In (l), the plural antecedent of the collective relative clause must somehow be composed of *a man* in the first conjunct and *a woman* in the second conjunct, or rather the nouns *man* and *woman*, which are to be interpreted together as a predicate of pluralities consisting of a man and a woman. While such a plural antecedent is unavailable on a two-dimensional syntactic structure, three-dimensional syntax makes such a plural antecedent available through implicit coordination. Given that implicit coordination is interpreted in the same way as explicit phrasal conjunction, in terms of plural reference, this allows the extraposed collective relative clause in (l) to take a plural antecedent and to be interpreted in the usual way without requiring any other special syntactic or semantic assumptions.

 (1) then involves both explicit and implicit coordination. The consequence of that is that the meaning of (1) is obtained in a more complex way, on the basis of two partial interpretations taking into account the explicit and the implicit coordination respectively. The 'combination' of these two partial interpretations yields the full sentence meaning. One partial interpretation evaluates (1) with respect to the clausal coordination and disregards the relative clause. The other partial interpretation evaluates (1) with respect to the implicit phrasal coordination and evaluates the collective relative clause. The two partial interpretations of (l) are based on two distinct construals of m-planes: first a construal of 'small' m-planes and second a construal of 'big' m-planes.

 This chapter will first show how an analysis in terms of implicit coordination explains a number of the linguistic properties of the spit antecedent constructions. It will then discuss further phenomena that are explained by the analysis: the behavior of simple plurals and relational adjectives in split antecedent constructions, a distinct behavior of arguments and adjuncts, a prohibition against collective predicates, and finally the treatment of NP conjunction and an identity condition on determiners imposed by multiply headed relative clauses. Finally, it will address the question of how general the construction is, that is, which elements are able to take implicitly coordinated plural antecedents. In an appendix, it will look at the properties of 'respectively'-sentences, showing that 'respectively'-sentences exhibit exactly the same behavior as sentences with implicit coordination, as well as gapping and bare argument ellipsis.

**1. The problem and the analysis**

There are various different kinds of elements that may take parallel parts of conjuncts as antecedents. Among those are extraposed relative clauses as in (2a-d) and relational adjectives such as *same* and *different,* which have to be contained in phrases in topic or Right Node Raising position, as in (3a, b). Furthermore, reflexives in *picture* NPs belong to the relevant class of elements, as in (4).[[1]](#footnote-1)

(2) a. A *man* came and a *woman* left *who know each other well.*

 b. a *man* and a *woman who know each other well*

 c. Every *professor* was praised and every *student* was criticized *who had published an*

 *article together.*

 d. every *boy* and every *girl who danced together*

(3) a. *John* praised and *Mary* criticized *different* people.

 b. On the *same* day, *John* died and *Mary* was born.

(4) Which pictures of *themselves* did *John* praise and *Mary* criticize?

(2)-(4) illustrates that the construction occurs with IP-conjunction in the same way as with DP-conjunction. The construction in (2-4) in which an element takes a plural antecedent composed of parts of conjuncts has often puzzled syntacticians working on coordination (see Perlmutter/Ross 1971, Jackendoff 1977, Sag et al. 1982) and semanticists working on plurals (see Link 1984, Hoeksema 1986). However, no general syntactic or semantic analysis of the construction had been developed. The semantic analysis of Link (1984) is restricted to collective relative clauses modifying conjoined NPs as in (2b) and (2d). The analysis of Hoeksema tries to account for sentences like (1) and could be generalized to the other constructions; but it is in many ways inadequate, as we will see. The problem that (1) raises is that standard two-dimensional syntactic structures does not provide an appropriate basis for semantic interpretation. To illustrate this, consider the example (3a). Given standard assumptions and assuming, for the sake of the argument, that Right Node Raising is movement, there are two syntactic representations on which the semantic interpretation of (3a) might be based, one as presented in (5a) and another one as presented in (5b).

(5) a. John praised different people and Mary criticized different people.

 b. [John praised t and Mary criticized t) different people.

It is clear that both of these representations are inappropriate for the semantic evaluation of (3a). (3a) clearly means something different from (5a). For instance, unlike (5a), (3a) cannot describe a situation in which John praised a single person x and Mary criticized single person y different from x. Similarly, (5b) cannot be the syntactic basis for the intended interpretation of (3a). Any interpretation of (5b) implies that John praised the same person or the same people that Mary criticized.

 In the syntactic structure that I propose for (3a), *John* and *Mary* as well as *praised* and *criticized* are implicitly coordinated. The syntactic structure of (3a) accordingly is as given in (6). Recall that a structure such as (6a) can be notated in a simplified way as in (6b).

(6) a.

 b.

Crucially, this structure has one 'reading' in which (3a) is equivalent to (7):[[2]](#footnote-2)

(7) John and Mary praised and criticized different people.

This 'reading' of the syntactic structure of (3a) will be semantically evaluated in exactly the same way as (7). The semantic evaluation of (7) is unproblematic, given an adequate general semantics of *different* and the generally held assumption that phrasal coordination may be interpreted by group formation. Adopting the semantics of *different* in Moltmann (1992), (7) can be paraphrased roughly as follows:

1. There is an event plurality ee and a plurality xx of people such that: ee is praising and criticizing of xx by John and Mary for which the following holds:

For all distinct parts e' and e" of ee, if there are parts z' and z" of the plurality of John and Mary, and parts x' and x" of xx such that z' is the agent of e' with respect to x' and z" is the agent of c" with respect to x", then x' and x" are distinct.

The syntactic effect of implicit coordination in (3a) can be described as follows. Expressions that take plural antecedents such as *different* in (3a) may take an implicitly coordinated antecedent that consists of constituents denoting individual entities. Thus, *different* in (3a) takes asits antecedent the implicit coordination of *John* and *Mary* as well as of *praised and criticized.*

Implicitly coordinated phrases in a context of an occurrence of *and* will be interpreted just like plurals, that is, in terms of plural reference. Thus, the implicit coordination of *John* and *Mary* in (3a) can be interpreted as a referential term plurally referring to John and Mary. The implicit coordination of *praised* and *criticized* will be interpreted as a three-place relation among event pluralities ee, agent pluralities xx and theme pluralities yy such that ee consists of a praising of some y of yy by x of xx and a criticizing of some y’ of yy by some x’ of xx. That is, semantic rules yield the same interpretation for the implicit coordination of *John* and *Mary* in (3a) as for the explicit coordination *John and Mary,* and they yield the same interpretation for the implicit coordination of *praised* and *criticized* in (3a) as for the explicit coordination *praised and criticized.*

 The evaluation of (3a) as (7), that is, the evaluation of the implicit coordinations in (3a), actually does not provide all the information that (3a) in fact provides. (7), for instance, leaves it open whether John did the praising and Mary the criticizing, or conversely. However, this information is provided by another 'reading' of the same syntactic structure of (3a), namely the evaluation of the clausal coordination of (3a). In the evaluation of the clausal coordination of (3a), however, certain elements are disregarded, in particular the elements taking an implicitly coordinated phrase as a plural antecedent. Instead, those elements are evaluated simply as free variables that will later be bound by a lambda operator. Thus, the evaluation of the clausal coordination of (3a) is equivalent to (9), where *them* refers to the people praised and criticized by John and Mary.

1. John praised some of them and Mary criticized some of them.

The evaluation of the implicit coordinations in (3a) and the evaluation of the clausal coordination in (3a) each constitute a partial interpretation of (3a). The union of these partial interpretation will give the full interpretation of (3a).

 The two partial interpretations of (3a) are based on two different m-plane assignment that are assigned to the phrase marker in (6a). These two m-plane assignments are both enforced as a matter of Full Interpretation.

**2. Implicit coordination**

**2.1. Implicit coordination and plural reference**

In the construction in (1-4) the parts that constitute the plural antecedent act as a unit syntactically and semantically, which is made possible by implicit coordination in three-dimensional syntax.

 Applying implicit coordination to (1a) repeated here as (10a) means that *man* and *woman* are coordinated by phrasal coordination, that is, they are dominated by a single splitting node, though this coordination lacks an explicit coordinator. (10a) accordingly has the syntactic representation given in (10b) in the abbreviated notation introduced earlier. Similarly, (3a) repeated here as (11a) has the representation in (11b).

1. a. A man came and a woman left who know each other.

b.

(11) a. John praised and Mary criticized different people.

 b.

Implicit coordination in split antecedent constructions is permitted by the same conditions as implicit coordination for the purpose of ATB extraction. Implicit coordination in general is enforced as a requirement of a semantic interpretation of an element requiring a plural antecedent. Sentences without the relevant implicit coordinations are ruled out because otherwise the element taking an implicitly coordinated antecedent would not receive an appropriate semantic interpretation. Note that in (10b) and (11b) both the NPs and the verbs are implicitly coordinated, which is needed in order to provide a syntactic basis for an interpretation of the element taking a plural antecedent.

**2.2. The construal of planes for sentences with implicit coordination**

The three-dimensional syntactic representations for (10a) and (1 la) in (10b) and (10b) provide an appropriate antecedent for the extraposed relative clause and for *different.* The compositional semantics of a three-dimensional tree such as (10b) or (11b) is not straightforward, however (as pointed out already in Chapter 2). Unlike two-dimensional syntactic structures, where (according to the most common assumptions) a compositional semantic interpretation proceeds from smaller constituents to larger constituents, three-dimensional syntactic structures such as (12) allow for more than one 'direction' for the composition of meanings:



There are two ways to proceed after A, B and C have been evaluated. After the

evaluation of A, B and C, either the syntactic unit consisting of A and B could be evaluated or else the constituents AC and BC could be evaluated. The first interpretation evaluates 'cross-planar', three-dimensional syntactic units; the second interpretation evaluates bigger planes first. In Chapter 2, the ambiguity in the direction of the compositional semantic interpretation of a three-dimensional tree was conceived as a matter of different construals of m-planes from a three-dimensional syntactic tree. The first direction of compositional interpretation applies when A and B are conceived as constituting 'small' m-planes(i.e., the two two-dimensional subtrees rooted in E). The second direction of interpretation applies when AC and BC are conceived as constituting 'big' m-planes(i.e., the two two-dimensional subtrees rooted in D).

 One of the m-plane assignments of (12) is represented by the set of pairs in (13a), which provides the basis of the first interpretation mentioned above. Another m-plane assignment of (12) is represented by the set of pairs given in (13b). As the first element of the complete m-plane pairs in (13a) and (13b), we get the empty set, since (12), as a structure of implicit coordination, does not contain an overt coordinator.

1. a. Pl ={<{}, {A, B}>}

b. P2 = { <{}, {AC, BC}>)

In (13a) and (13b), a plane is 'represented' by the sequence of terminal nodes of the plane, a two-dimensional subtree. This should not distract from the fact that a plane is really a tree.

 The 'direction' of the compositional interpretation of a three-dimensional tree thus depends on the assignment of m-planes. For a given tree, there may be several possible complete assignments of m-planes which will provide the basis of the semantic interpretation of the sentence. Two general questions then arise concerning the assignment of m-planes to a three­ dimensional phrase marker.

[l] Does the semantic interpretation of a coordinate sentence have to be based on a single complete m-plane assignment or may it be composed of the evaluations of several complete m-plane assignments?

[2] What determines whether a phrase marker permits a particular m-plane assignment, and what determines how many different m- plane assignment the phrase marker are allowed?

 Regarding the first question, the evaluation of a three-dimensional tree on the basis of several complete m-plane assignments is crucial in the case of sentences with implicitly coordinated antecedents as in (2)-(4). For instance, one of the complete m-plane assignments of (3a) contains small planes for the splitting NP node and for the splitting VP node. These planes are not associated with a coordinator. This small m-plane assignment allows for the evaluation of *different.* The other complete m-plane assignment of (3a) contains two big m-planes which are rooted in the IP-node. These m­ planes are associated with coordinator *and.* In the evaluation of (3a) with respect to this m-plane assignment, *different* will be disregarded. Thus, for (3a) we have the two complete m-plane assignments represented by Ml and M2 below:

1. M1 = {<{},{John, *and Mary}>, <*{*and*}, {*praised, and criticized*}>}

 M2 = {<{*and*}, {*John praised different people, and Mary criticized different people*}>}

The semantic interpretation of (3a) with respect to M1 willevaluate the pair <{}, *{John, Mary}>* and the pair <{*and*}, {*praised, and criticized*}*>* as a predicate holding of triples consisting of an event plurality of praising and criticizing, a (plural or single) agent, and another (plural or single) participant.The semantic interpretation of (3a) with respect to M2 will evaluate the pair *<*{*and*}*,* {*John praised different people, and Mary praised different people}>* roughly as a conjunction of *John criticized xx* and *Mary praised* xx, for a plural variable ‘xx’.

 The evaluation of a three-dimensional tree may in principle be based on an unlimited number of complete m-plane assignments. The evaluation of a tree relative to a given m-plane assignment will always be a partial interpretation of the sentence, in the sense below:

(15) Let *F* be a functional assignment of a sentence *S* with respect to a three-dimensional

 phrase marker *T*. *I* is *a partial interpretation*of S relative to *T* iff there is a complete m-

 plane assignment *M* in *F* such that *I* is the semantic interpretation of S relative to M and T.

There are certain conditions that determine how many m-plane assignments are allowed for a given three-dimensional phrase marker. One condition is that a sentence with an overt coordinator *j* should be assigned at least one m-plane assignment which contains a complete m-plane pair with j as the element of the first argument (a set of coordinators). We have seen the necessity of this condition with gapping, which requires 'big' m­ planes for an adequate interpretation. The condition is necessary also for implicit coordination construction, where big m-planes are needed to yield a partial interpretation which gives the right association of the predicate conjuncts (of the implicit predicate coordination) with the argument conjuncts (of the implicit NP-coordination). Thus, the following condition obtains for m-plane assignments:

(16) For a sentence *S* with a phrase marker *T* containing a coordinator *j*, *S* has to be assigned an m-plane assignment containing a complete m-plane pair in which j is an element of the first argument.

As a consequence of (16), a sentence such as (11a) has to have a complete m-plane assignment with planes rooted in the IP-node since this node dominates the overt coordinator. That is, the second plane assignment given earlier, the big m-plane assignment, is obligatory for (11a), in order to enforce the right association of the predicate with the conjuncts. (16) does not have to be stipulated, however, but rather it follows from the requirement that the coordinator *j* be interpreted, namely through an assignment of m-planes.

 Why are small m-planes required for implicit coordination structures such as those for (1-4)? Small m-planes are likewise required by Full Interpretation. The element taking the split antecedent must be interpreted and hence must stand in the relevant anaphoric relation to its antecedent, which requires that there be a plural antecedent, and only small m-planes can represent the relevant parts of the conjuncts as plural terms.

 As is reasonable for meaningful syntactic relations in general, m-plane assignments are governed by the following principle. A sentence is assigned only so many m-plane assignments as to allow for an interpretation of all the elements in the sentence, that is, to allow for the satisfaction of the Principle of Full Interpretation. Thus, the condition on m-plane assignments in () is an instance of the more general condition in (18).

(17) Minimality Condition on M-Plane Assignments

 Assign an m-plane assignment *M* to a sentence S relative to a phrase marker *T* iff S contains

 an element *X* such that *X* can be interpreted only on the basis of a relation in *M* or a relation

 to a complete m-plane set in *M*.

(18) Minimality Condition on Functional Assignments

 A functional assignment to a sentence *S* relative to a phrase marker *T* should contain

 only those relations that are required to provide a semantic evaluation of all constituents

 in *S.*

**2.3. The simultaneous partial interpretation of implicit coordination** **constructions**

Let me now present a formal semantic analysis of a sentence with a three-dimensional phrase marker based multiple m-plane assignments. The interpretation of a sentence on the basis of a complete m-plane assignment has to be conceived as a partial sentence meaning in such a way that it can be appropriately combined with the interpretations of the sentence on the basis of another m-plane assignments. There are various ways one can conceive of such partial simultaneous interpretations. I will choose a particular way of construing partial interpretations of a sentence. This conception of partial sentence meanings is mainly motivated by simplicity, rather than any deeper theoretical considerations. In this conception, partial interpretations of a sentence are simply relations between participants and events. There are a number of other formal proposals in the literature for partial interpretations of sentences for other purposes. I will briefly discuss these proposals and their applicability to the present concern in the next section.

 Recall from Chapter 2 that in the present conception the syntactic basis of the interpretation of a three-dimensional phrase marker are meaningful syntactic relations such as argumenthood which may be established among three-dimensional syntactic units. The way meaningful syntactic relations among three-dimensional syntactic units are established is via the ordinary syntactic relations among constituents in the individual f-planes. Thus, for instance *<John, and Mary>* is an argument of *<praised, and criticized>* because *John* is an argument of *praised* in one f-plane and *Mary* of *criticized* in another f-plane. Similarly, the shared constituent *different people* is an argument of *<praised, and criticized>* because *different people* is an argument of *praised* in one f­plane and of *and criticized* in another f-plane. The following condition on syntactic relations among three-dimensional syntactic units thus obtains:

(19) Condition on syntactic relations among three-dimensional syntactic units

 For a (two-place) syntactic relation *R*, a three-dimensional phrase marker T, three-

 dimensional syntactic units *X* and *Y* in *T*, R(X, Y) iff for each X' which is a member

 of X or is X itself (if X is a shared node) there is a Y' such that Y' is a member of Y

 or is Y itself (if Y is a shared node) such that R(X', Y') in some f­ plane of T, and

 conversely for each Y' which is a member of Y or is Y itself, there is an *X'* with the

 same specification.

The following two semantic rules account for conjunction of referential NPs (20a) and for expressions denoting relations, for instance verbs (20b). ‘+’ as usually is a functor building a plural term from two plural terms:

(20) a. For referential singular DPs Xl and X2, [<{*and*}, {X1, X2}>] = Xl + X2

 b. For two-place place predicates N1 and N2, [<{*and*}, {N1, N2}>] =

 {< xx+yy, x’x’+y’y’ > / (N1(xx, yy) & N2(x’x’, y’y’)}

How should three-dimensional syntactic units with implicit coordination be interpreted? In the constructions discussed, the implicit coordination is always evaluated as if it were *and-* coordination. There are two possible reasons why this should be so.

 The first one is that *and* is the implicit coordinator for the phrasal coordinators because *and* is the explicit coordinator for the clausal coordination. More generally, the interpretation of implicit phrasal coordination always corresponds to the coordination of the clauses containing the phrases. The second possibility is that implicit coordination is, as the default case, always interpreted as conjunction. The proper choice between the two possibilities can be decided when coordinate constructions other than *and* coordination are considered. If other types of clausal coordination allow for implicit coordination and this implicit coordination is always interpreted by the same semantic operation as the coordinator of clausal coordination, this would be evidence for the first possibility. However, as we will see in Chapter 4, there are a number of clausal coordinate structures with coordinators other than *and* that allow for implicit coordination; but the implicit coordination in these structures is never interpreted by the same semantic operation as the clausal coordination. Rather the implicit coordination is always interpreted by plural reference, i.e., as *and*. This is captured by the following condition:

(21) The Interpretation of Implicit Coordination

 Let <{}, X1, ..., Xn}> be a complete pair of m-planes of an m-plane assignment

 to a three-dimensional phrase marker T of a sentence S. Then [<{}, {X1, ..., Xn}>]

 = [*<*{*and*}*,* {X1,..., Xn}>]

As will be argued in Chapter 4, every clausal coordinate structure allows for implicit coordination syntactically. However, many potential implicit coordination structures are ruled out because the evaluation of implicit phrasal coordination by plural reference is incompatible with the overall interpretation of the sentence.

 We can now evaluate (22a) with respect to the small plane assignment in (22b).

(22) a. John and Mary praised and criticized Bill.

 b. {<{*and*}, ( *John, and Mary}>,* <{*and*}, {*praised, and criticized*}>}

The syntactic relations on the basis of which (22a) is evaluated are given in (23a). Based on the evaluation of these relations, the semantic interpretation then is the proposition in (23b).

(23) a. *<and, praised, and criticized>* is a finite verb form in (T, M),

 *<Bill, <and, praised, and criticized>*∈ARG2,2(T, M),

 *<and, John, Mary>, <<and, praised, criticized>, Bill>>* ∈ ARG1,1(T, M).

 b. λee[[<*and*, *praised*, *and criticized*>](ee, John + Mary, Bill)]

However, for the purpose of partial interpretation, I will assume that, generally, the evaluation of a sentence with respect to a complete m-plane assignment is a relation between events and participants, rather than a proposition. That is, the relations of argumenthood and the function of finite verb forms must be evaluated only after the various partial interpretations on the basis of the different m-plane assignments have been unified. This will become clearer in the following.

 For the internal reading *same/different* let us adopt the analysis in Moltmann (1992), according to which a sentence such as (24a), has an interpretation consisting of two parts: (24b), which specifies the meaning of (24a) while disregarding the contribution of *different,* and (24c), which represents the contribution of *different.* Applying existential closure to the event variable and the variable standing for the *different-*DP as well as lambda conversion to the variable standing for the *different* NP yields (24d) as the meaning of (24a) before existential closure with respect to the event and object variables applies.

(24) a. John and Mary praised and criticized different people.

 b. λeexxyy[([<{*and*}, {*praised, and criticized*}](ee,xx, yy) & people(yy)]

 c. λeexx[∃x’x'x"x"y’y'y"y"(x'Px & x"Px & ¬x' = x" & y < y' & y < y" & ∃e'e"(e' < ee

 & e" < ee & agent(e', x', y') & agent(e", x", y")))

 d. λeey[([<{*and*}, {*praised, and criticized*}](ee*,* [*<*{*and*}*, John ,and Mary>*]*,* yy) &

 people(y)] & ∀e'e"x'x"y'y"(e' < e & e" < e & agent(e'. x', y') & agent(e", x", y") &

 x' < [John *and Mary*]& x" < [<and, *John, and Mary*]& ¬x' = x" & y < y' & y < y"

 🡪 ¬y' = y"))

Clearly, (24c) is identical to the evaluation of (l la) with respect to the first plane assignment given in (16a) and repeated in (25):

(25) M1 = {<{ }, *{John,* Mary}>,<{}, {*praised, criticized*}>}

Now let us tum to the interpretation of (11a) with respect to the second plane assignment, namely M2:

(26) M2 = { <{*and*}, *{John praised different people, and Mary criticized different*

 *people*}>}

Clearly, the planes in (26) cannot be interpreted literally. Rather, as was suggested earlier, *different people* in (26) will simply be evaluated as a variable. Such a reevaluation of a constituent in a plane is possible in exactly those cases in which the constituent takes a 'crossplanar' antecedent, that is, an antecedent consisting of constituents in different planes. This is captured by the following condition:

(27) For any constituent x in a three-dimensional tree T, if x enters an anaphoric relation

 to an antecedent that is a complete set of m-planes in a plane assignment M of T,

 then for any plane assignment M' distinct from M, [x]T, M' = y for an appropriate

 variable y.

Furthermore, the planes in (26) have to be evaluated in such a way that the event of the John's praising is a subevent of the complex event of praising and criticizing by John and Mary. This can formally be done by having the existential quantifier over the events of praising be restricted to the parts of the event represented by a variable bound by a lambda operator. This event variable will later be bound by the existential quantifier over complex events of praising and criticizing by John and Mary in the interpretation of (11a) with respect to the small plane assignment.

 We now have syntactic relations for the first m-plane of (11a) with respect to the m-plane assignment M2 as in (28) and a semantic interpretation of this plane in (29):

(28) a. *<.John* , *praised>* ∈ARG2, 3(T', M2)

 b. *<different people, praised>*∈ ARG3, 3(T', M2)

(29) λe'y'[praise(e', John, y'))]

Thus, an IP is evaluated as a relation, with respect to the m-plane assignment M2. Therefore, we can apply the rule in (20b) to the complete m-plane pair in M2. Thus, the evaluation of the clausal coordination in (11a) will be:

(30) [*<and, John praised different people, and Mary criticized different people*>]T, M2 =

 λeeyy[praise(e', John, yy) & criticize(ee, Mary, yy))]

(30) is the partial interpretation of (11a) with respect to the second plane assignment. The combination of the two partial interpretations of (11a) is now easy to do: it is simply the union of the two relations in (24d) and (30). Only after the union of the partial interpretation do certain other operations apply which will eliminate the variables bound by the lambda operator. Thus, we get (31) as the complete interpretation of (11a):[[3]](#footnote-3)

(31) ∃eeyy[([*praised and criticized*](ee,[*John and Mary*]*,*yy) & people(yy)] &

 ∀e'e"x'x"y'y"(x' < [John *and Mary*] & x"< [*John and Mary*] & x' ≠ x" & y' < y &

 y" < yy & e' < ee & e" < ee & e' ≠ e" & agent(e', x', y') & agent(e", x", y") 🡪 y’ ≠ y")

 & ∃y'e'(e' < e & y' < y & praise(e', John, y')) & ∃y'e'(e' < ee & y' < yy &

 criticized(e', Mary, y'))]

We will see that this account explains a number of syntactic and semantic peculiarities of the construction, given certain general assumptions about syntactic relations in three­ dimensional trees.

**3. Syntactic properties of split antecedent constructions**

The implicit coordination analysis can explain a number of peculiarities of split antecedent constructions. These peculiarities basically follow from general conditions on how meaningful syntactic relations are established in three-dimensional trees.

**3.1. The restriction to coordination**

Split antecedent constructions generally restricted to coordination; that is, the constituents that together form a plural antecedent have to be belong to different conjuncts. The restriction to coordination is illustrated for extraposed relative clauses below:

1. a. \* Mary met *a man* with *a dog who were quite similar.*

b. \* *A man* met *a woman who came from the same country.*

c. \* John showed *a man a woman who know each other.*

The following examples illustrate the restriction to relational adjectives:

1. a. • During the same period of time *John* claimed that *Mary* played piano.

b. • At the same time *John* laughed because *Mary* tried to play piano.

(33a) cannot have a reading in which *same* compares the time of John's claim and Mary's playing piano. (33b) cannot have a reading in which *same* compares John's laughing and Mary's attempt of playing piano.

 The restriction to coordination follows from the fact that implicit coordination - the only way such plural antecedents can arise - is possible only among nodes that belong to different planes.[[4]](#footnote-4)

**3.2. Parallel constraints on implicit coordination and on ATB movement**

Plural antecedents composed of parts of conjuncts are subject to the same constraints as ATB movement and thus justify a parallel treatment of the two constructions.

 The conditions on parallelism imposed by the ATB format on elements undergoing syntactic movement seem to match those on elements acting as plural antecedents for expressions taking implicitly coordinated antecedents. This holds for all cases of parallelism that have been observed in the literature (cf. Williams 1977). Though, as mentioned in Chapter l, the parallelism phenomena are not uncontroversial, the source of parallelism constraints or the lack of them may be seems to be the same for ATB extraction and for implicitly coordinated antecedents.

 First, let us consider the case of objects and subjects in embedded clauses. As with ATB wh-movement, objects and subjects may not form a plural antecedent for an element requiring a plural antecedent:

(34) a. *\*A woman* came and John met *a man who knew each other well.*

 b. • John gave *Bill* and *Sue* received two presents *each*

Williams' case (35a), where ATB is possible from the object position of a main clause and the subject position of the embedded clause, also finds a parallel with split antecedent constructions:

(35) a. Who did John see t and Mary say t will come tomorrow?

b. John sent *the article* and Mary said that *the book* will be sent to two professors *each,*

c. John sent *Max* and Mary said *Sue* will be sent two pictures of *themselves* the *same*

 picture.

There are certain apparent exceptions:

(36) a. \* At the *same* time John saw *Mary* and Bill believes *Sue* arrived.

b. \* Mary met *a man* and John said *a woman* arrived *who know each other quite well.*

c. \* Pictures of *themselves* impressed Mary and showed that Sue has been beautiful.

However, the unacceptability of these examples can be attributed to the fact that the locality conditions on the syntactic relation between the antecedent and *same/different,* extraposed relative clauses or reflexives are not satisfied in all conjuncts. For instance, *same* cannot take an antecedent in an embedded clause:

(37) \* At the *same* time, John said that *Bill* and *Sue* arrived.

(36a) is bad since the condition is violated in the second conjunct. (36b) is bad for the following reason. The extraposed relative clause would have to be adjoined higher in the tree than the embedded clause in the second conjunct in order to take part of its antecedent in the first conjunct, as seen in (38).

(38) [IP[IP John met a man t and Mary said [CP that a woman t arrived]] who know each other well].

But this is impossible for relative clause extraposition, as can be seen below, where the relative clause takes an antecedent inside the subject clause.

(39) \* That *a child* solved the problem was very impressive *who had never studied*

 *mathematics.*

(36c) is bad because reflexives cannot take an antecedent in a deeper embedded clause:

(40) \* A pictures of *herself* showed that *Sue* was beautiful.

Thus, ATB extraction and implicit coordination for the purpose of providing a plural antecedent seem to be governed by the same conditions. These conditions appear to be syntactic, not semantic in nature: even if the semantic or pragmatic context creates semantic or pragmatic parallelism, implicitly coordinated antecedents are excluded if conditions on syntactic parallelism are not satisfied, as in the examples below:

1. a.?\* *A woman* left and John kicked out *a man who knew each other quite well.*

 b. ?\* Mary brought along *a man* and *a woman* appeared *who know each other quite*

 *well.*

 c. ?\* *A man* left and John asked *a woman* to leave *who know each other quite well.*

 d. \* John just wrote *a novel* and *a book* has recently been published *that are quite*

 *similar.*

Thus, the same construction of implicit coordination uniformly underlies ATB extraction and split antecedents in the relevant construction.

**3.4. The Coordinate Structure Constraint for implicitly coordinated antecedents**

A further condition on implicitly coordinated antecedents corresponds to the ATB condition on extraction and deletion. That is, if one conjunct in a coordination contains a part of an implicitly coordinated antecedent, then every conjunct of this coordination must provide a part of the antecedent. Thus (42a) and (42b) are excluded because the third and first conjuncts respectively do not provide a part of the antecedent of the collective extraposed relative clause.

(42) a. \* John met *a woman,* Mary met *a man* and remained alone *who have known*

 *each other for a long time.*

b. \* John, *a man* and *a woman who are married.*

(43) John said, *Mary* wrote and *Sue* shouted *different* things.

Given three-dimensional syntax, derive the ATB principle for extraction from the Principle of Full Interpretation (cf. Chomsky 1986), more precisely the prohibition against vacuous quantification (Goodall 1987 and Muadz 1991). For instance, in (4 d), the principle is not satisfied because the *wh*-operator does not bind a variable in the second plane.

(44) a. • Whom did John see and Mary became ill?

b. plane 1: Whom did John see t

plane 2: Whom did Mary become ill

The same holds for implicitly coordinated antecedents; the element requiring a plural antecedent has to stand in the relevant syntactic relation to an (ordinary) antecedent in each f-plane of the phrase markerof the sentence. In (42a) and (42b), this condition would not hold for one of the two f-planes.

 Note that the syntactic relation that, for instance, the relative clause in (42a) has to enter to an ordinary antecedent in each given f-plane is not directly related to the semantic evaluation of the relative clause. The semantic evaluation is based only on the syntactic relation of the relative clause to the implicitly coordinated NP. However, the relation to the implicitly coordinated antecedent has to be syntactically established.

The general principle is that semantically relevant syntactic relations involving an implicitly coordinated phrase have to be established in each f­ plane. Below the principle is given with some reformulations on the basis of the earlier condition on ATB extraction. The notion of 'correspondent' in (45) is defined in (46).

(44) Condition on semantically relevant syntactic relations among three-dimensional

 syntactic units

 For syntactic units X and Y belonging to several planes of a tree T and a meaningful

 syntactic relation R (such as 'is anaphor to'), R(X, Y)iff for each f-plane p of T there

 is a correspondent X' of X in p and a correspondent Y' of Yin p such that R(X'. Y').

(45) Definition of correspondent

X' is a **correspondent** of X in a plane p iff X is a shared node and X' *=* X or X' is a

 member of the first member of X.

Of course, the syntactic relations holding in the individual f-planes between an antecedent part and the collective relative clause cannot be exactly the same as the syntactic relation between an ordinary antecedent and a collective relative clause*.* In the latter case. the antecedent has to be in the plural. But in the case of an implicitly coordinated plural antecedent, the antecedents in the individual planes may be singular. Thus, conditions on number should not play a role in establishing the syntactic relations in the individual f-planes (that is because conditions on number are not part of the syntactic conditions on the syntactic relation, but rather are a semantic requirement).[[5]](#footnote-5)

**3.5. The position of the element taking an implicitly coordinated antecedent**

The element that takes an implicitly coordinated antecedent can occur only in certain positions. The following positions are possible: SPEC(CP) with ATB movement, adjunction to IP, the position of phrases that have undergone Right Node Raising, and extraposition. These four possibilities are illustrated below:

(46) a. How many pictures *each* did *John* buy and *Mary* sell?

b. On the *same* day, *John* died and *Mary* was born.

 c. John *saw* and Mary *wants to see* the *same* man.

d. *A man* came and *a woman* left *who know each other well.*

Other positions are not possible, for instance those in (47):

(47) a. \* *John* died on the same day and *Mary* was born

 b. \* *A man* came *who know each other well* and *a woman* left

The difference between the positions of the elements taking implicitly coordinated antecedents in (47) and in (48) clearly is that in (47) the element belongs to each plane defined by a conjunct, that is, in (47) it is a shared node; in contrast, in (48) it can belong to only one plane. The requirement that the element taking the implicitly coordinated antecedent be a shared node follows from another general principle about syntactic relations in three-dimensional trees. This principle says that a node can stand in a meaningful syntactic relation to another node only if it belongs to the same f-planes:

(48) Condition on syntactic relations and shared planes

 Two syntactic units X and Y in a three-dimensional syntactic tree can stand in a

 meaningful syntactic relation only if X and Y belong to the same f-planes.

(49) X and Y **belong to the same f-planes** if every f-plane that X or a member of X is

 part of is an f-plane that Y or a member of Y is part of.

**3.6. Establishing the antecedent-anaphor relationship with implicit coordination**

Syntactic relations with implicit coordination, that is, syntactic relations among three­ dimensional syntactic units, raise another question. How are syntactic conditions on a syntactic relation satisfied if that relation holds among three-dimensional syntactic units? As is expected, such conditions are satisfied via the satisfaction of the syntactic conditions in individual f-planes. For instance, Condition A of Binding Theory is satisfied with the relation between an anaphor and an implicitly coordinated antecedent in the following way. Each conjunct must satisfy Condition A; it is not sufficient if only one conjunct does, as the following example illustrates:

(50) ?? *John* sold and *Bill* wants Mary to sell pictures of *themselves I* self-portraits.

In the first sentence of (51), Condition A is satisfied only with respect to the relation between *John* and *themselves* in one f-plane; it is not satisfied with respect to the relation between *Mary* and *themselves* in the other f-plane.

 This also holds for any other expression taking an implicitly coordinated antecedent, for example binominal *each*, as in (52)*,* which imposes a condition clause-boundedness in each f-plane:

(52) John bought and Mary discovered that Bill will sell two books *each.*

The requirement that conditions on syntactic relations be satisfied in individual planes is another consequence of a principle that was introduced earlier, namely that a (meaningful) syntactic relation holds among three-dimensional syntactic units only if the syntactic relation holds in the ordinary way among correspondents of the three-dimensional units in individual f­planes.

**4. Further consequences and applications of the account**

**4.1. Differences between simple plurals and NPs modified by relational adjectives**

There is a fundamental difference between NPs modified by relational adjectives such as *the same book* or *related problems* and what I will call 'simple plurals' such as *the children.* This difference manifests itself in differences in the interpretation of sentences with implicit coordination.

 The difference between NPs with relational adjectives lies in the availability of a certain type of distributive reading in certain contexts. This distributive reading of a plural NP is illustrated below with the NP *the two books*:

(53) John and Mary read the two books.

In the relevant distributive reading of *the two books* in (53), (53) means that John read one of the two books and Mary the other one of the two books, where neither John or Mary need to have read the book the other one has read.

 Generally, the distributive reading of simple plurals is restricted to the minimal clause containing the plural, as we can see in (54):

(54) John and Mary believe that Bill read these two books.

(54) cannot have the meaning in which John (only) believes that Bill read one of the books and Mary (only) believes that Bill read the other one of the two books. (54) implies that both John and Mary have a believe about the two books.

 I take distributive readings of simple plurals to be due to a general property of verb meanings. Accordingly, a verb on a distributive reading holds of a plurality just in case it holds of the individuals making up the plurality. More generally, two-place verbal predicates in natural language are subject to the following general meaning postulate, applicable to both distributive and collective predicates.

(55) For any two-place predicate V, if V(xx, yy) and V(xx', yy'), then V(xx+xx’, yy+yy’).

The clause-boundedness of the distributive reading now follows, since (56) allows only for distributivity among co-arguments.

 In contrast to simple plural NPs, NPs with relational adjectives such as *same, different, equal, related* and *neighboring* may receive a non-clause­bound distributive interpretation, based on a special syntactic relation that relational adjectives may enter (and which is again subject to certain locality conditions). Consider the following examples:

(56) a. John and Bill want to live in different / neighboring villages.

 b. John and Mary want Sue to learn the same language / related languages

 c. John and Bill expect that they will work in adjacent buildings.

In (56a-c) the relational adjectives may have a ‘broad distributive’ reading on which (56a), for instance, can describe a situation in which John wants to live in village A and Bill wants to live in village B such that A and B are different or neighboring.

 In the same construction, an analogous reading is not available with simple plural NPs such as *two villages*:

(57) John and Mary expect that they will live in two remote villages

(57) implies that John wants to live in two remote villages and that Mary wants to live in two remote villages. *Two remote villages* cannot receive a broad distributive reading in which one village relates to John and the other one to Mary.

 Crucially, the same restriction on distributive readings with simple plurals holds for NPs with relational head nouns, as seen in the following contrasts:

1. a. John and Mary want Sue to visit neighboring countries.

b. John and Bill want Sue to visit neighbors.

(58a) allows for a broad distributive reading of *neighboring.* In contrast, (58b) cannot mean that John wants Sue to visit x and Bill wants Sue to visit y, whereby x and y are neighbors. This means that the broad distributive readings of the examples in (58) cannot not just be due to the relational nature of the adjectives.

 Now when we return to simple plural NPs, we see an important difference to NPs with relational adjectives. In general, simple plural NPs may not receive an interpretation in which the group is divided into subgroups or group members each of which relates to a different conjunct of an implicitly coordinated phrase in the same clause. I will call this the **'split interpretation'** of plurals. To illustrate this reading, consider the following contrasts:

1. a. John married and Bill proposed to these (two) women.

b. John married and Bill proposed to different women.

1. a. John painted and Bill composed these two masterworks.

b. These two masterworks, John painted and Bill composed.

c. John painted and Bill composed different / similar masterworks

(59a) does not allow for the split interpretation in which John married one of the two woman and Bill proposed to the other woman. (59a) implies that John married the two women and Bill proposed to the two women. In contrast, (59b) allows for interpretations with monogamous relationships, even with the plural *women.* Similarly, (60a) and (60b) would only make sense if each of the two masterworks could have been both composed by John and painted by Bill.

 *Wh*-plural phrases pattern with other simple plurals:

(61) a. Which two women did John marry and is Bill engaged to?

 b. Which two masterworks did John paint and Bill compose?

(61a) has the same implication as (59a), and (61b) has the same one as (60a) and (60b).

 Plurals with relational head nouns tend to pattern with simple plurals, rather than with NPs modified by relational adjectives:

(62) a. John married and Bill proposed to these two sisters/ two sisters.

b. These two sisters John married and Bill proposed to.

c. Which two sisters did John marry and is Bill engaged to?

(62a- c) can hardly have a reading in which John married (only) x and Bill proposed (only) to y, whereby x and y are sisters. The sentences imply that John married two women one of whom is the sister of the other and Bill proposed to the same two women.

 The same pattern can be observed with NP-conjunction. Speakers generally have difficulties getting the split reading of simple plurals as arguments of conjoined NPs:

1. a. the editor and the author of these two books

b. the husband and the fiancée of these two women

c. the portrait and the sketch of these two women

Thus, (63a) cannot refer to the editor of one of the two books and the author of the other book. It implies that the two books each have an author and an editor. (63b) is not compatible with monogamous relationships. Finally, (63c) seems impossible if the portrait represents one woman and the sketch the other woman.

 The split interpretation of plurals in conjoined NPs becomes again available with relational adjectives, as in the following examples from Jackendoff (1977):

(64) a. three students and two teachers of different languages / the same language

 b. three members and two vice-chairmen of interlocking committees

The difference between simple plurals and NPs modified by relational adjectives follows from the general ability of relational adjectives to take a split antecedent and the general semantics that goes along with split antecedent constructions. A sentence such as (. a)is interpreted on the basis of implicit coordination (that is, a small m-plane assignment), where the semantic evaluation of *different* takes place. The sentence then is again evaluated with respect to the clausal conjunction (or with respect to a 'big m-plane assignment'). Here *different* is disregarded and the sentence is roughly interpreted as *John married some of them and Bill proposed to some of them* (where the plural *some* is to be understood as referring to single women also).

 In contrast, a sentence with a simple plural such as (. b) will be interpreted first with respect to a minimal m-plane assignment, on which the sentence comes out as roughly equivalent to *John and Bill married and proposed to these two women.* The interpretation with respect to this plane assignment would still allow for the split interpretation of *these two women* in relation to fohn and Bill. However, such an interpretation will be ruled out by the interpretation of the large m-plane assignment (interpreting *and*) on which the sentence comes out as equivalent to *John married these two women and Bill married these two women.* The same holds for plurals with relational head nouns.[[6]](#footnote-6)

**4.2. Adjuncts and arguments and the split interpretation**

The distinction between arguments and adjuncts bears on the availability of the split reading. Unlike plural arguments, plural adjuncts permit the split reading of plural NPs. Thus, a split reading is available in (65) and (66), where a simple plural NP is contained in an adjunct, rather than an argument.

(65) a. the man and the woman with the two black dogs

 b. the blue carpet and the red carpet in the bedroom and the living room

 c. the article and the book about John and Mary

 d. a man and a woman from two remote islands

(66) a. In these two rooms, John died and Mary was born.

 b. I can't remember in which two rooms John died and Mary was born.

(65a) can refer to a man who has one of the two black dogs and a woman who has the other dog. (65b) is fine in a situation in which the blue carpet is in the bedroom and the red carpet in the living room. (65c) is fine if the article is about John and the book about Mary. Finally, (65d) is fine if the man comes from a different island than the woman. Most speakers, moreover, get the reading of (66a) and (66b) in which John died in one of the two rooms and Mary was born in the other one.[[7]](#footnote-7)

 Why should arguments behave differently from adjuncts with respect to the split reading? [[8]](#footnote-8) An answer can be obtained straightforwardly from a planar theory of coordination, namely a plausible general condition on m-plane construals.

 There are two possible approaches to the argument-adjunct distinction one can take within the planar theory of coordination. On the basis of a further empirical fact, I will argue that the second approach is superior to the first one that I will present.

 In the first approach, the notion of an m-plane is modified in such a way that an m-plane need not be a maximal sub-phrase marker (in the sense of Chapter 2), but may be a sub­phrase marker from which certain nonobligatory elements have been taken away. In particular, a plane need not contain adjuncts which are not required by anything else in the subtree. Thus, in (67a) the big planes may simply correspond to *John died* and *Mary was born.* They need not contain *in these two rooms. In these two rooms* may enter the relation of adjunct-hood only to the implicitly coordinated verbs *died* and *was born,* and thus be evaluated only with respect to assignment of minimal planes.

 Of course, as an option, also the big planes for (66a) may each contain the adjunct. That is, (66a) allows for the construal of the two planes *John died in these two rooms* and *Mary was born in these two rooms.* In this case, we get the second, absurd, reading of (67a), namely the reading in which John died in two rooms and Mary was born in two rooms. An m-plane thus need not include elements that are not required by other elements in the subtree. There is the following problem with this account of the distinct behavior of arguments and adjuncts: the split reading is unavailable when the adjunct 'has undergone' ATB-Right Node Raising, as in (67):

(67) John died and Mary was born in these two rooms.

(67) can only mean that John died in these two rooms and Mary was born in these two rooms.

 A plausible approach to the argument-adjunct distinction which immediately accounts for the special case of RNR is the following. In the construal of an m-plane, adjuncts that are in SPEC(CP) or adjoined to IP can be disregarded since the sub-phrase marker rooted in the lower IP node would already be an admissible plane in a sense to be made precise. In contrast, adjuncts that have undergone RNR cannot be disregarded simply because they are part of any sub-phrase marker including, let us say, the minimal IP. In this approach, nothing has to be subtracted from a sub-phrase marker in order to account for the distinctive behavior of arguments and adjuncts. The difference would simply be due to the fact that arguments in SPEC(CP) have to be included in the construal of an m-plane if this plane should include the lower IP.

 This inclusion of arguments in an m-plane can be made to follow from a general condition that all required meaningful syntactic relations have to hold in a plane - this simply is a correlate of the Principle of Full Interpretation applied to m-planes. Adjuncts in SPEC(CP) or adjoined to IP would not have to be included in an m-plane that includes the lower IP. because they do not enter required meaningful syntactic relations to anything else in the plane. This is captured by the following condition on the construal of m-planes:

(68) Modified Notion of an M-Plane

 An m-plane of a phrase marker T is a subphrase marker of T as defined in chapter l

 except that it is maximal only in the sense that all required meaningful syntactic relations

 can be established.

Further support for this modification comes from the fact that extraposed adjunct PPs with simple plural complements disallow a split reading:

(69) John met *a man* and Mary talked to *a woman from two European countries.*

(69) is impossible on a reading in which the man came from a different European country the women. The explanation is the same as for adjuncts with RNR**,** based on (68).

**4.3. The prohibition against collective predicates**

Another general property of implicit coordination is that implicitly coordinated DPs do not permit collective predicates:

(70) a. John eagerly became and Mary reluctantly became excellent in mathematics /

 \* similar.

 b. \*How similar/ How tall does John want to be and Mary want to become?

The prohibition against collective predicates follows from the same principles as the prohibition against the split reading of simple plurals. Sentences with implicit coordination require an assignment of big m­ planes in order to semantically evaluate *and*. In the interpretation of big m-planes only elements such as relational adjectives, *a total of* etc. which enter a special relation to an antecedent can be disregarded. Other elements such as collective predicates and simple plural arguments cannot. The evaluation of the second sentence of (70a) with respect to the big plane assignment would render it equivalent to (71):

(71) # John eagerly became similar and Mary reluctantly became similar.

(71) is of course unacceptable.

**5. DP coordination with split antecedents**

**5.1. The semantics of DP coordination with split antecedents**

Elements requiring a plural antecedent may take an implicitly coordinated antecedent not only in coordinate clauses, but also in coordinate DPs:

(72) a. every man and every woman who had danced together.

 b. an author and an editor of different books

 c. an author and an editor of a total of ten books

Such constructions were discussed in the literature, for instance, by Vergnaud (1974), Jackendoff (1977), and Link (1984). Constructions with DP coordination as in (72) can be treated semantically and syntactically in essentially the same way as clausal coordinations. On the basis of implicit coordination, the construction in (72b) can be analysed asinvolving implicit NP-coordination, as in (73a), with m-plane assignments as in (73b):

(73) a.

 b. M1 ={<{},{an, an}>,<{}, {*author, editor*}*>*}

 M2 = {<{*and*}*,* {*an author of different books, and an editor of different books*}>}

In order to evaluate the implicit coordination of the N', the rule ( ) can be applied. The part of the interpretation of the (72b) where *different* is disregarded then evaluates (73b) *as* (74a) and gives (74b) *as* the meaning of (72b):

(74) a. an author and an editor of different books

 b. λx[∃yy∃ee(books(yy) & author and editor(x, ee, yy) & ∀ee’ee’’(ee’ < ee &

 ee’’ < ee 🡪 ∃yy’yy’’(yy' < yy & yy" < yy & different(yy’, yy’’)))

In (74a) *author* and *editor* take Davidsonian event arguments, which *different*, again, will relate to.

 The analysis still leaves open how the implicit coordination of the determiner should be evaluated. I will simply assume that the implicit coordination of the two determiners receives the same semantic interpretation as a single determiner, that is, in (75b) the implicit coordination of the two occurrences of *a* would be evaluated as a simple *a.* The interpretation of two implicitly coordinated determiners *as* a single determiner is generally made possible syntactically because of a general syntactic condition on formal identity of the determiners, a condition I will come to shortly.

**5.2. The condition on the determiners in DP-coordination with split antecedent**

Multiply headed relative clauses are subject to certain conditions on the determiners of the head DPs: the determiners of the head NPs must be identical or at least similar in certain ways.[[9]](#footnote-9) This condition, as we will see, is purely formal one, as suggested already by Vergnaud (1974), and it obtains both for implicit clausal coordination and implicit DP coordination. It

 The condition requires that the head DPs must either be both definite or indefinite:[[10]](#footnote-10)

(75) a. \* a man and the woman who met last year

 b. \* the father of John and a woman who know each other quite well

 c. \* A man entered and the woman left who met last year

 d. \* John saw the man and Mary saw a woman who met last year

This does not hold for simple conjoined NPs, as noted by Vergnaud (1974):

(76) a. John met a man and the woman he saw yesterday.

 b. John met that man and a woman

The examples in (75) cannot be excluded on semantic grounds. (75a) could be perfectly interpretable and could be (almost) equivalent to (72a) and similarly for (75c) and (75b):

(77) a. a man and the woman that he met last year

 b. A man entered and the woman left who met him last year

 Vergnaud (1974) interprets the facts given in (80) as a condition that the determiners in question must agree in the syntactic features [+/-definite], arguing that the co joined DPs are linked to a single determiner of the complex DP. On this proposal, conjunction of DPs with a multiply headed relative clause have the same syntax as N'-conjunction such as (85).

(78) the men and women who danced together

One problem with the proposal is that is that it does not carry over to multiply headed relative clauses with conjoined clauses as in (77c). Another problem is that DP-conjunction and NP-conjunction modified by relative clauses are not always equivalent. On a three-dimensional analysis, the determiner condition can straightforwardly be derived given that (certain) syntactic features such as [± definite] should percolate from the head of a DP to the maximal projection, the DP node itself. Given that with multiply headed relative clauses a single DP node dominates both determiners, the two determiners have to agree in the relevant feature. The agreement condition simply follows from the planar theory of coordination.

 The agreement condition is accounted for in the very same way for clausal conjunctions as in (77c), given that the determiners also need to be implicitly coordinated and thus have to share the [±definite] feature.

 Quantified antecedents of multiply headed relative clauses exhibit the agreement condition as well. In such constructions, a quantifier and an indefinite or definite determiner may not cooccur:

(79) a. \* every man and the / a woman who met yesterday in this room

 b. \* Every man came and the/ a woman left who danced together.

Again, as in the case of definite and indefinite determiners, this cannot simply be a matter of semantic interpretation. Examples such as (79a) and (70b) are perfectly acceptable and would be (almost) equivalent to (80a) and (80b) respectively.

(80) a. every man and the / a woman that he met yesterday

 b. Every man came and the/ a woman left who danced with him.

Moreover, quantifiers with different quantificational forces are excluded:

(81) a. \* all men and most women who danced together

b. \* every man and almost every woman who danced together

(82) a. \* John saw all men and Mary saw most women who danced together.

b. \* John greeted every man and Mary greeted almost every man who danced together.

Again, it is logically not impossible to construe interpretations for the DPs in (81a). (981a) could refer to the subset of the set of men and women who danced together such that it contains all the men in that set and most of the women in that set. (81a) would then be equivalent to the perfectly interpretable (83a), and similarly for (81b) and (83b).

(83) a. all men and most women who danced with them

 b. every man and almost every woman who danced with him

Are (81a, b) therefore to be excluded because of a condition that the quantifiers have to have the same quantificational force? It seems that there is an independent principle which excludes proportional quantifiers for NPs with multiply headed relative clauses, i.e., quantifiers which specify a quantity of entities relative to the set denoted by the N'. Thus, *many* is allowed as a determiner of NPs with multiply headed relative clauses as in (84) only when it has a nonproportional reading:

(84) three men and many women who danced together

The prohibition against proportional quantifiers holds independently of whether the quantifiers of the antecedent NPs are identical or not. Thus (84a) is as bad as (81a) with the proportional reading of the quantifier *many* (both with a proportional reading in the first conjunct and with a proportional reading in the second conjunct). Similarly, the inherently proportional quantifier *most* is excluded even when it occurs in both conjunct DPs in (85b).

(85) a. many men and many women who danced together

 b. # most men and most women who danced together

It is a consequence of the prohibition against proportional quantifiers that the conjunction of NPs with the same determiners is not always semantically equivalent to the conjunction of the corresponding N's with a single determiner. Let us contrast (85b) with (86):

(86) most men and women who danced together

The question now is, how can a proportional reading be excluded in which the quantifiers of the antecedent. NPs receive a combined interpretation which specifies the quantity of a subset of a set of pairs? In such a reading, (85b), for instance, would mean 'most pairs of men and women who danced together'. Such a reading is (for most speakers) available only for the construction with N'-conjunction as in (86). The reason for this difference might be the syntactic identification of the constituent that refers to the set *most* relates to. It is reasonable to assume that this constituent has to be c-commanded by *most* (see also Higginbotham's (1985) government condition on theta­ identification). In (85a), this constituent is *men and women who danced together,* whereas in (85b) it is *men* and *women* for each occurrence of *most.* This condition on the relation between *most* and the constituent denoting the set *most* relates to itself is independent of whether the coordination is NP or N'-coordination. Therefore, it is not surprising that a similar contrast is found with the construction *almost every,* where no N'-coordination is involved. Thus (87a) is perfect, but (87b) is impossible:

(87) a. almost every man and every woman who danced together

 b. \* almost every man and almost every woman who danced together

However, the condition is not quite unproblematic when the possibilities of a three­ dimensional theory of coordination are taken into account, where the two occurrences of *most* and *men* and *women* are implicitly coordinated, i.e., they are dominated by one and the same Q or NP-node. As a consequence, the Q-node c­ commands both *men* and *women (and possibly* who danced with each other).

 Furthermore, it is not unnatural to assume that the structure of implicit coordination allows for a single application of the semantic operation for the implicitly coordinated occurrences of *most.* Then, the structure of implicit coordination would yield a reasonable interpretation on the basis of syntactic relations identified in the usual way But still (87b) might be excluded on the basis of the interpretation of the assignment of big planes. *Most* may simply not be an element that may be disregarded in the construal of these planes. The reason, of course has to be that it enters a required syntactic relation in these planes.

 But now, setting the prohibition against proportional quantifiers aside, it appears that quantifiers do in fact provide evidence that the determiners of the antecedent NPs of multiply headed relative clause must meet a condition of formal identity. It appears that even quantifiers that have the same quantificational force are excluded if they differ in a relevant syntactic feature, for instance number. The determiner combinations *every-every* and *all-all* are allowed, but not the combinations *every-all* or *all-every.*

(88) a. ?? every man and all women who dated each other

 b. every man and every woman who dated each other

 c. all men and all women who dated each other

(89) a. ?? John met every professor and Mary greeted all students who worked with each

 other.

 b. John met every professor / all professors and Mary greeted every student/ all

 students who worked together.

The agreement condition on number seems to also holds for definite or indefinite NPs.Antecedent DPs that disagree in number generally seem to be worse with implicit coordination than with explicit coordination:

(90) a. ?? The men came and the woman left who had met before.

 b. The meu and the woman left who had met before.

(91) a.?? Several men came and a woman left who had met before.

 b. Several men and a woman left who had met before.

This confirms the thesis that the cooccurrence of the determiners is indeed governed by a syntactic, rather than a semantic condition, the requirement of sharing syntactic features such as those of (in)definiteness and number, a consequence of implicit coordination of determiners

 A further question arises, namely does this condition hold for any other constructions involving implicit coordination as well (which will in detail be discussed in the following sections)? This should be so if the implicit coordination involves determiners.

 An apparent counterexample is *same/different* and its antecedent. The following examples seem completely acceptable, where the NPs do not match with respect to definiteness or number.

(92) a. John praised and a student/ every student criticized the same picture.

 b. Every professor praised and all students criticized the same picture.

However, as Carlson (1987) has argued, the antecedents of *same* in (92) should be events, rather than NP referents, which means implicit coordination concerns the verbs *praised* and *criticized, but not determiners.* In fact, cases in which the antecedent of *same/different* can only be conjoined DPs**,** the agreement condition on determiners must be satisfied:

(93) a. A man and a / \* the woman from the same country

 b. every man and every / \* the woman with the same accent

 c. every professor and every student/ \* all students of the same language

 d. the boy and the girl / ?? the girls with similar backgrounds

As with relative clauses, the bad examples in (93) cannot be ruled out simply on semantic grounds.

 Another case that is potentially problematic is plural reflexives in picture DPs:

(94) a. An athlete praised and the coach criticized pictures of themselves.

 b. Every professor praised and all students criticized pictures of themselves.

However, plural reflexives in picture NPs as in (94) do not necessarily require implicit coordination when they take split antecedents, as the following makes clear

(95) John showed Mary pictures of themselves.

The examples in (94) thus need not involve implicitly coordinated antecedents.

The other constructions that will be discussed in the later sections, for instance *a total of, together,* and *simultaneously* all involve propositions or events as antecedents and thus do not require implicitly coordinated NPs.

Let me conclude this section with an interesting observation made by Link (1984). Partitive NPs allow for relative clauses with multiple heads regardless of the determiners. The same holds for clauses.

1. a. all of the students and several of the professors who have met in secret

b. \* all students and several professors who have met in secret

c. John saw all of the students and Mary met most of the professors who have met in secret.

But, of course, the syntactic identity condition is met in this case, since the NPs *the students* and *the professors* share definite determiners. In this case, the relative clause relates to the definite NP rather than to the entire partitive DP.

**6. The range of constructions involving implicit coordination with conjunction**

In this section, I will discuss the range of elements that take implicitly coordinated antecedents. I then address the question of how general the ability of elements taking implicitly coordinated antecedents is cross­ linguistically. Finally, I discuss another syntactic relation that exhibits an interesting behavior in the relevant respects, namely the relation between plural pronouns and their antecedents. This entire chapter, however, is restricted to phenomena involving implicit coordination only for sentences coordinated by *and.* l will examine other types of coordination with respect to the possibility of implicit coordination in Chapter 4.

**6.1. Collective adverbials**

Jackendoff (1977) has noted with the following example that the adverb *together* may take an antecedents composed of parallel elements in a coordinated structure:

(97) John *whistled* and Mary *hummed together.*

The antecedent of *together* arguably is a complex action. Given Davidson's (1967) event semantics, in (97) this action is described by the implicitly coordinated verb consisting of *whistled* and *hummed.*

 How do other adverbials of this sort, i.e., adverbs that take complex events or actions as antecedents, behave in English? Examples of such adverbs are *simultaneously, separately, consecutively* and *independently.* (98) shows that they all allow for implicitly coordinated antecedents in English.

(98) John *sang* and Mary *played simultaneously / separately / consecutively /independently.*

A related adverbial is *one after the other.* Interestingly, this adverbial allows for an implicitly coordinated antecedent, but not *each other* - even in semantically similar constructions:

(99) *John* sang and *Mary* played *one after the other* /\* after *each other's* graduation.

This indicates that the ability of taking an implicitly coordinated antecedent is syntactically, rather than semantically conditioned. Reciprocals generally do not take implicitly coordinated antecedents, as we will see in the next section.

 To conclude, it seems the generalization is valid that all collective adverbials allow for implicitly coordinated antecedents in English.

**6.2. English reflexive and reciprocal pronouns and split antecedents**

English plural reflexives seem to take an implicitly coordinated antecedent:

(100) a. *Bill* bought and *John* sold pictures of *themselves.*

b. *John* saw and *Bill* wants to see *themselves* sleep.

However, the evidence for implicit coordination with plural reflexives is not particularly strong. First, the construction is restricted to plural reflexives in *picture*-NPs. Simple reflexives do not allow for an implicitly coordinated antecedent:

(101) \* *Bill* admired and *Mary* despised *themselves.*

Furthermore, plural reflexives in *picture*-NPs may also take split antecedent without coordination being involved:

(102) *John* showed *Mary* pictures of *themselves.*

Note also that implicitly coordinated NPs cannot serve as the antecedent of a reciprocal:

(103) a. *Bill* bought and *John* sold pictures of *each other.*

b. *John* saw and *Bill* wants to see *each other* sleep.

(103a) could mean, but does not mean, that Bill bought pictures of John and John sold pictures of Bill. (103a) is only acceptable if *each other* has the interpretation of a simple plural reflexive. In such a reading, (103a) means Bill bought pictures of John and Bill and John sold pictures of John and Bill.

 Plural possessive pronouns, though, do allow for implicitly coordinate antecedents:

(104) *John* lost and *Bill* found *their* key.

In (104), *their* can take the implicit coordination of *John* and *Bill* as antecedent.

**6.3. *A total of* with split antecedents**

In English, *a total of NP* (or, equivalently, NP *in all)* can appear in split antecedent constructions. It contrasts in that respect with simple plural NPs, as seen in (105) and (106):

(105) a. John painted and Mary drew ten pictures.

b. John painted and Mary drew a total of ten pictures.

c. John painted and Mary drew ten pictures in all.

(106) a. a composer and a painter of ten masterworks

b. a composer and a painter of a total of ten masterworks

(105a) implies that John painted ten pictures and Mary drew ten pictures, whereas (105b) can be true if John painted five pictures and Mary drew five pictures. Similarly, (106a) can only refer to the painter of ten masterworks and a composer of ten masterworks. It cannot refer to a composer of five masterworks and a painter of five masterworks. But this reading is available for (106b).

 Like relational adjectives, *a total of* differs from simple plurals in that it enters a special syntactic relation for its interpretation. In particular, unlike relational nouns and simple plurals, it does not have a local semantic contribution. For instance, the semantic contribution of *a total of* in *John and Mary drew a total of ten pictures* consists in specifying the quantity of a maximal group of pictures that John and Mary drew. The meaning of this sentence can be represented as follows, where *ten* holds of the maximal plurality of pictures that John and Mary drew:

(107) ten(the xx l ∃ee(drew(e, John + Mary, xx) & pictures(xx)}))

Thus, in order to evaluate *a total of* the meaning of the entire clause has to be evaluated in some way. However. the scope of *a total of* issubject to certain locality conditions. It is not generally the entire clause, but generally has to be the minimal clause. In (108), for most speakers a reading is unavailable in which *a total of ten* counts the maximal group of pictures x that John wants Sue to see and that Mary wants Sue to see.

(108) John and Mary want Sue to see a total of ten pictures.

The semantics of *a total of* can now be sketched for (108a) as follows. With respect to the assignment of small m-planes, the sentence is evaluated as (109),

(109) ten(supP({xlEe drew and painted(e, John and Mary, x**)** & pictures(x)}))

As in the case of extraposed relative clauses and relational adjectives, the occurrence of *a total of ten* is disregarded in the interpretation with respect to the assignment of big m­ planes, and the sentence is interpreted roughly as (110), where the occurrences of *them* are pronouns with appropriate antecedents:

(110) John drew *some of them1* and Mary painted *some of them2.*

*As* with reflexives, the locality condition on *a total of* must be obeyed by all conjuncts. Thus, the following sentence is ruled out in the relevant reading because *o. total of* is not clause-bound in the second conjunct:

(111) \* John painted and Mary wants Sue to paint a total of ten pictures.

Like plural reflexives and DPs with relational adjectives, the construction *a total of* differs from simple plurals in that it involves a special syntactic relation involving plural antecedents. Such a plural antecedent may be an implicit coordination of several singular DPs. This relation is responsible for the fact that the plural NP following *a total of* may receive an interpretation in which the group denoted by the NP is partitioned into subgroups each of which relates to a conjunct.

**6.4. Binominal *each***

There is one other construction in English that may involve an implicitly coordinated antecedent, namely binominal *each,* a construction illustrated in (112) (for a detailed syntactic discussion of this construction see Safir/Stowell 1987 and also Moltmann 1989):

(112) *John and Mary* painted two pictures *each.*

*Each* is a binary quantifier that is associated with two NPs: a 'D-NP' (cf. Safir/Stowell 1987), the NP immediately preceding *each,* i.e., in (112) *two pictures,* and an 'R-NP'(cf. Safir/Stowell 1987), which is *John and Mary* in (112). The R-NP has to be a plural NP. But the R-NP may also be an implicit coordination of several singular NPs. This is shown in (113a) and (113b) and (114a) and (114b), in which *each* has the same function relating to John and Mary, and in (115a), which contrasts with the corresponding sentences (115b) with a simple plural:

(113) a. John and Mary painted four pictures.

 b. *John* drew and *Mary* painted two pictures *each.*

(114) a. Four pictures were painted by John and by Mary.

 b. Two pictures *each* were painted by *John* and drawn by *Mary.*

(115) a. How many pictures did John draw and Mary paint?

b. How many pictures *each* did *John* draw and *Mary* paint?

(113a) can only be a question asking for the entire number of pictures that John drew or Mary painted. In contrast, in (113b) *each* is a distributor relating to John and Mary as a group.

 We have seen with five constructions in English that elements \hat take a plural antecedent may take an implicitly coordinated antecedent consisting of several singular elements. The question then raises: Does this hold for all constructions that involve a plural antecedent in English? Are there constructions in English that involve a plural antecedent, but disallow an implicitly coordinated antecedent? A construction for which this does not seem to hold are floated quantifiers:

(116) \* *John* is and *Mary* was *each* / *both* reading a hook.

However, (116) can presumably be ruled out independently, given that floated quantifiers involve movement of a plural NP from VP-internal position {cf. Sportiche 1987).

**6.5. Exception phrases**

Exception phrases do not involve split plural DPs as antecedents, but they may relate to split quantifier restrictions. Let us first note that exception phrases as in (134) may be extraposed as in ( ).

(117) Every boy except John entered.

(118) a. Every boy entered except John.

 b. John met every professor today except Professor Miller.

Extraposed exception phrases may relate to split quantifier restrictions, both in phrasal conjunctions, as in (119a) (noted by Hoeksema 1989) and in clausal conjunctions, as in (119b) and (119c) (meaning ‘students as well as professors in Germany’):[[11]](#footnote-11)

(119) a. every man and every woman except John and Mary/ the parents of Bill

 b. *Every man* entered and *every woman* left *except John and Mary / except the*

 *parents of Bill.*

 c. *No student* may write his dissertation in Latin and *no professor* may lecture in

 *Latin except the ones in Germany.*

Exception phrases with split restrictions exhibit same syntactic constraints as other split antecedent constructions. (120) show that coordination is crucial; (121) shows that the antecedent NPs have to occupy parallel positions in the conjuncts (though (121) may be ruled out independently by the constraint on multiple antecedents of exception phrases in object position mentioned above):

(120) a.?? *Every man* left, whereas *every woman* stayed, *except John and Mary.*

b. \* *Every man* said that *every woman* was beautiful *except John and Mary.*

(121) \* Bill greeted *every woman* and *every man* greeted Sue *except Mary and John.*

The semantic interpretation of sentences with exception phrases with multiple antecedents requires that the split restrictions are implicitly coordinated and then interpreted by plural formation as given in Section 1.1. Unlike the cases discussed earlier, exception phrases with split restrictions involve universal plural quantification. Thus, the exception phrase ranges over pairs consisting of a man and a woman.

 Exception phrases with multiple antecedents can be compared to *same/different* with quantified antecedents, which likewise relate to quantifier restrictions, not referential DPs:

(122) *Every man* said and *every woman* is about to say the *same* thing.

On the reading relevant in the present context, every man said the same thing as every woman as well as every other man. Here, *same* takes an implicitly coordinated antecedent consisting of *man* and *woman,* and(122) the domain of quantification associated with *same* consists of arbitrary pairs of men and women. Such pairs may be further restricted by a multiply headed relative clause, as in these examples:

(123) a. *Derselbe* Professor *lobte jeden Studenten* und kritisierte jede *Studentin, die*

*zusammen einen Aufsatz verfasst haben.*

‘The same professor praised every male student and criticized every female student that had written an article together.'

 b. (?) In the *same* apartment, *no woman* lives and *no man* works *who are not*

 *married.*

A similar reading is also available for relational adverbials:

(124) *Every man* talked and *every woman* sang *simultaneously.*

 (124) has a reading on which any talking by a man was simultaneous with any singing by a woman.

**6.6. The generalization**

Given that the discussion of split antecedent constructions so far, it seems that the following generalization holds for English:

(125) Generalization about plural antecedents and implicit coordination in English

 If an element x takes a plural antecedent, then it also takes an implicitly coordinated phrase as plural antecedent.

This generalization may suggest that explicitly coordinated phrases and implicitly coordinated phrases play an equivalent role in natural language. However, it appears that the generalization (125) cannot be right for English, since reciprocals and simple plural reflexives do not allow for implicitly coordinated DPs as antecedents.

 Furthermore, the constructions that we examined for English behave differently in other languages. Often the equivalent constructions allow only for a true plural antecedent, not an explicitly coordinated antecedent. For instance, German presents a very different picture concerning the equivalence of plural antecedents and implicitly coordinated antecedents consisting of singular constituents. In German, plural reflexives may never take an antecedent consisting of implicitly coordinated singular DPs, as seen with the reflexive *sich* (which itself is neutral with respect to singular and plural):

(126) a. *Hans* kaufte und *Maria* verkaufte Bilder von *sich.*

 'John bought and Mary sold pictures of self.'

b. Diese Bilder von *sich* lobte *Maria* und kritisierte *Hans.*

 'These pictures of self Mary praised and John criticized.'

c. *Sich selbst* lobte *Hans* und kritisierte *Maria.*

 Self, John praised and Mary criticized

The only interpretation available for (126a) is the one in which John bought pictures of himself and Mary sold pictures of John (or possibly, for some speakers, herself), and similarly for (126b) and (126c). German possessive pronouns, though, allow for implicitly coordinated antecedents, though preferably in a position in which they have the status of a pronominal, rather than an anaphor in Chomsky’s (1981) sense:

(127) a. ? *lhren* Schluessel verlor *Hans* und fand *Andreas.*

 'Their key John lost and Andreas found.'

b. *Hans* glaubt und *Andreas* behauptet, dass man *ihren* Schluessel gefunden hat.

'John believes and Andreas claims that one has found their key.'

Also the German equivalent of *a total of, insgesamt* or *eine Gesamtheit von,* does not allow for implicitly coordinated antecedents:

(128) a. Hans las und Maria schrieb *insgesamt* zehn Buecher / *eine Gesamtheit von* zehn

 Buechern.

 'John read and Mary wrote a total of five books.'

 b. \* der Autor und der Herausgeber von *insgesamt* zehn Buechern.

 'the author and the editor of a total of ten books'

(128a) can only be understood such that John read ten books and Mary wrote ten books; (128a) is false if John read only five books and Mary wrote only five books. Similarly, (128b) cannot refer to two people one of whom is the author of only five books and the other one the editor of only five books.

 Finally, adverbs like *together* never take an implicitly coordinated antecedent in German:

(129) a. Hans spielte Klavier und Maria sang \* zusammen / \* zugleich / zur selben Zeit.

'John played piano and Mary sang together/ simultaneously/ at the same time.'

 b. \*Simultan / Zur selben Zeit erreichte Hans das Ziel und fing Maria an zu rennen.

 'Simultaneously/ At the same time John reached the goal and Mary started (to

 run).'

However, extraposed relative clauses, the equivalent of binominal *each* and exception phrases pattern in German just as in English:

(130) a. *Hans* las und *Maria schrieb jeweils* zehn Bucher.

 'John read and Mary wrote ten books'

 b. der *Herausgeber* und der *Autor von jeweils* zehn Buechern

 'the editor and the author of ten books'

(131) *Ein Mann* erschien und *eine Frau* kam, *die einander sehr gut kannten.*

 'A man appeared and a woman came who know each other very well.'

(132) *Jeder Mann* kam *und jede Frau* ging *ausser Hans und Maria.*

 'Every man came and every woman left except John and Mary.'

 There are other constructions in English that may take a plural antecedent. but which exhibit a lot of speaker variation with respect to whether they allow for an implicitly coordinated antecedent or not. Examples are the antecedent of PRO and the broad antecedent of *each other.* Some speakers allow the implicit coordination of *John* and *Mary* as the antecedent of PRO, others do not:

(133) a. *John* wants and *Mary* also wants PROto live together.

 b. *John* wants and *Mary* actually suggested PRO to separate.

Similarly, some speakers get a reading of (151) in which the implicit coordination of

*John* and *Mary* is the evaluative antecedent of *each other,* others do not:

(134) *John* knows and *Mary* in fact regrets that they hate *each other.*

PRO in adjunct controlled clauses seems to be generally better able to take a split plural antecedent:

(135) *John* sang and *Mary* played before *PRO* talking to each other/ in order PRO not to

 have to talk to each other.

 Two general conclusions can be drawn regarding implicit coordination. First, the ability to take an implicitly coordinated antecedent is not, at least not only, semantically governed. For instance, in English some reciprocal expressions take an implicitly coordinated antecedent *(one another),* others don't *(each other*), as in the following contrast.

(136) a. \* *John* played and *Bill* sang without *each other.*

 b. (?) *John* played and *Bill* played *one* without *the other.*

Furthermore, the same elements may take an implicitly coordinated antecedent in English, but not in German, for instance *a total of* and *together.* If the ability to take an implicitly coordinated antecedent was semantically governed, there should not be such a crosslinguistic variation.

 Second, the ability to take an implicitly coordinated antecedent is not governed syntactically in a systematic way either. There does not seem to be a specific syntactic property designating the set of elements taking an implicitly coordinated antecedent in English - only certain subsets of this set seem to be so designated, for instance all collective simple adverbials in English allow for implicitly coordinated antecedents. The ability to take an implicitly coordinated antecedent thus seems to be a feature of particular lexical items or or of particular classes of lexical items.

**6.7. The bound plural pronoun relation**

There is another syntactic relation that involves plural antecedents which has not been discussed so far. This relation is interesting because it exhibits a special behavior with respect to the possibility of an implicitly coordinated antecedent. This relation holds between a plural pronoun and a plural antecedent, whereby the plural pronoun is interpreted as an individual variable ranging over the elements denoted by the group that the plural antecedent stands for. The relation holds between *John and Mary* and *they* in (137) in the reading in which John thinks that he is sick and Mary that she is sick and neither one has any thoughts about the health of the other.

(137) *John and Mary* think that *they* are sick.

This interpretation of (137) cannot be due to an implicit distributor. (138) with the overt distributor *both* is still ambiguous:

(138) *John and Mary* both think that *they* are sick.

The same relation arguably is involved in the evaluation of a possessive plural pronoun when it receives the interpretation of an individual variable, as in (154).

(139) a. *John and Mary* found *their* passport / *their* passports.

 b. *John and Mary* greeted *their* spouses.

The crucial observation is that in this relation the plural antecedent cannot be the implicit coordination of singular DPs:

(140) a. *John* thinks and *Mary* firmly believes that *they* are sick.

b. *John* just found out and *Mary* knew for a long time that *they* are sick.

c. That *they* are sick, *John* believes, but *Mary* does not believe.

The thoughts of John and Mary in (140a) can only be about them as a group.

 Consider now the cases with a plural pronoun as in (141) and plural reflexives as in (142):

(141) a. *John* found and *Mary* lost *their* key.

b. *John and Mary* lost *their* key.

c. *John* found and *Mary* lost *their* keys.

(142) a. *John* praised and *Mary* criticized *their* children.

b. *John* and *Mary* praised *their* children.

c. Which ones of *their* children did *John* praise and *Mary* criticize?

In contrast to (140b), the much preferred reading of the examples in (141a) and (141c) is the one in which John and Mary have common keys. Similarly, in contrast to (142b), the preferred reading of (142a) and (142c) is the one in which John and Mary are parents of the same children. Further examples are given in (143) - (145):

(143) a. Which of Sue's pictures of *them* did *John* like and *Mary* hate.

b. *John and Bill* likes Sue's pictures of *them.*

(144) a. Which pictures of *themselves* did *John* like and *Bill* hate?

b. *John* liked and *Bill* hated these pictures of *themselves.*

c. *John and Bill* liked these pictures of *themselves.*

(145) a. *John and Bill* accept criticisms of *themselves.*

b. *John* accepts and *Bill* rejects criticisms of *themselves.*

(143a) and (143b), and (144a) and (144b) suggest that each of the pictures represents both John and Bill. (159c) does not have this implication. (145a) may be about individual criticism of John and individual criticism of Bill; (145b) can only be about criticism of John and Bill as a group. Apparently, the syntactic relation involving bound plural pronouns in the individual variable interpretation can only be established in individual planes, not with respect to implicit coordination. But why this should be so still has to be explained, in particular since the phenomenon seems to occur crosslinguistically.

**7. Commonalities and differences between gapping and ‘respectively’-sentences**

In Chapter 2, we have seen that 'respectively'-sentences have a syntactic structure that allows for a 'global' construal of planes, but in principle also allows for the construal of small m-planes. Thus, (146a) thus can have the complete m-plane assignment in (146b) and the complete m-plane assignment in (146c):

(146) a. John and Mary met Sue and Bill respectively.

b. {*<*{*and, and*}*, John met Sue, Mary met Bill>*}

c. {<{*and*}, {*John, Mary*}*>,* <{*and*}, {*Sue, Bill*}>}

Given that, 'respectively' constructions should behave parallel to constructions involving implicit coordination: explicit and implicit coordination are instances of the same construction type, namely, simply, multidominance.

 This generally seems to hold. For example in the following respectively-sentences, relational adjectives take implicitly coordinated antecedent:

(147) a. In adjoining laboratories, John and Mary examined himself and herself (respectively).

 b. John and Mary watched himself and herself (respectively) with the same interest /

 with equal curiosity.

 c. John and Mary bought himself and herself respectively the same book/ different

 books.

 d. John and Mary improved himself and herself respectively with the help of related

 techniques.

All the examples in (147) allow for a split reading of the phrase containing the relational adjective. (147d), for example, can describe the situation in which John improved himself with the help of technique x and Mary improved herself with the help of technique y, where x and y are related. These examples contrast with corresponding sentences with simple plurals or relational head nouns, where a split reading is impossible:

(148) a. John and Mary bought himself and herself respectively two books/ these two books.

 b. John and Mary improved himself and herself respectively with the help of

 relatives.

(148a) cannot describe a situation in which John bought himself only one book and Mary bought herself only one book. (148b) cannot describe a situation in which Mary improved herself with the help of x and John improved himself with the help of y, where x and y are relatives. Each one John and Mary must have achieved the improvement with a group of relatives. (148b) thus forms a minimal pair with (148d).

 Furthermore, like implicit-coordination sentences, 'respectively'-sentences permit binominal *each,* as in (149):

(149) *John* and *Mary* reminded *himself* and *herself* respectively about two books *each.*

(149) shows most clearly that the conjuncts of a phrasal conjunction may play a twofold role in the same sentence with one and the same interpretation. *John* and *Mary* in (149) may act simultaneously as individual antecedents for reflexives and as a single syntactic unit as a plural antecedent for binominal *each.*

Similarly, *a total of* allows for an interpretation that takes into account the evaluation of all conjuncts:

(150) *John* and *Mary* bought *himself* and *herself* (respectively) *a total of* ten books.

(150) may describe the situation in which John bought himself only five books and Mary bought herself only five books.

 'Respectively'-sentences pattern with sentences involving implicit coordination also in that they disallow reciprocals with the 'true reciprocal interpretation' relating to the conjuncts of a phrasal conjunction as a unit:

(151) *John* and *Mary* reminded *himself* and *herself* respectively about books about

 *each other.*

The only reading that (151) can have is the one in which *each other* simply refers to John and Mary as a group.

 A final question concerns the interpretation of bound plural pronouns. It appears that 'respectively'-sentences behave exactly the same way as sentences with implicit coordination in that bound plural pronouns disallow a reading as individual variables:

(152) a. *John* and *Mary* bought *himself* and *herself* (respectively) books about *themselves.*

 b. *John* and *Mary* reminded *himself* and *herself* (respectively) of *their* keys.

(152a) preferably has the interpretation in which the books are each about John and Mary. (152b) suggests that John and Mary live together.

 The data above show the true double nature of phrasal coordination. Conjunct in a phrasal coordination may either play an independent role in individual big planes, or they may act together with the other conjuncts as plural antecedents. This double nature is particularly transparent with reflexive binding, as we will see now.

 sentences such as those in (153) show that anaphor binding established in individual planes.

(153) John and Mary watched himself and herself respectively.

 On the other hand, there are clear cases where 'respectively'-sentences allow plural reflexives to take an explicitly coordinated antecedent:

(154) *John* and *Mary* told Sue and Bill respectively about books about *themselves.*

But both phenomena are possible in the same respectively sentences:

(155) a. *John* and *Mary* bought *himself* and *herself* (respectively) books about *themselves.*

 b. *John* and *Mary* saw himself and herself respectively and pictures of themselves.

 c. *John* and *Mary* compared *himself* and *herself* (respectively) to *themselves*

 (as a group) and decided they better work together.

This means that the conjuncts of a phrasal coordination may be part of big and small m-plane assignments at once, both of which are the basis for semantic interpretation.

 Like sentences with implicit coordination, 'respectively'-sentences also disallow collective predicates on the relevant reading:

(156) John and Mary consider himself and herself as excellent / \* similar.

The restriction against collective predicates follows in the same way as for implicit coordination structures.

**Other types of coordinated structures: gapping and bare argument ellipsis**

As was discussed in Chapter 2, the three-dimensional syntactic representation of a gapped sentence such as (157a) is as in (157b):

(157) a. John bought apples and Mary pears

It differs from implicit coordination structures discussed in this chapter only in that (171b) does not contain implicitly coordinated verbs. This raises the question whether gapped sentences also permit split antecedent constructions. The answer is not always yes. Correspondents in a gapped sentence cannot always serve as plural antecedents, for instance not in (158).

(158) a. \* John bought apples at the same time/ simultaneously / together and Mary pears.

b. \* John bought apples for themselves and Mary pears.

c. John bought apples for a total of ten dollars and Mary pears.

But there are cases where it is possible:

(159) a. At the same time / Simultaneously / Together, John bought apples and Mary

pears.

* 1. In order to entertain themselves, John hired a musician and Mary a dancer.
	2. For a total of ten dollars John bought apples and Mary pears.
	3. For five dollars each John bought apples and Mary pears.

Apparently, what is crucial is whether the phrase taking the antecedent is in clause-initial position or in a clause-final position in the first conjunct. Notice that clause-initial adjuncts as in (160) are possible also when the conjuncts are full clauses:

(160) a. At the same time, John bought apples and Mary sold pears.

* 1. In order to entertain themselves, John engaged a musician and Mary hired a dancer.
	2. For a total of ten dollars, John bought apples and Mary bought pears.
	3. For five dollars each, John bought apples and Mary bought pears.

However, being clause-initial is not a strict requirement. It suffices that the element taking the plural antecedent precede the correspondent that forms part of the split antecedent, as in the examples below:

(161) John wrote the same person a letter in the morning and a postcard in the evening.

Gapping allows remnants and correlates to form plural antecedents *same* and *a total of*, but only when the element taking the antecedent precedes the relevant correlate. This is unexpected if gapping, we have assumed, involves the same sort of three-dimensional structure as constructions as 'respectively'-sentences. What distinguishes gapping, however, from the latter kind of sentences is that it involves a different kind of linearization, which may play a role in establishing the antecedent-anaphor relationship.

1. Note that the conjunction of predicates generally does not allow an interpretation in terms of plural reference (see Chapter 1). Thus (1) implies that John and Mary both sat on the floor and lay on the bed. It is hard to get an interpretation *in* which John sat on the floor and Mary lay on the bed.

(i) John and Mary sat on the floor and lay on the bed. [↑](#footnote-ref-1)
2. The construction with relational adjectives corresponds to the internal reading of

*same/different* discussed in Carlson (1987), *as* in (i).

(1) a. The same man / Different men met John and Mary.

 b. John and Mary live in neighboring villages.

 c. John and Mary trust related methods.

Carlson (1987) argued that *same/different* in the internal reading (without quantified antecedent) takes uniformly a complex event as an antecedent. Such an event may be described as a complex event (or group event) in various ways: by plural NP arguments, which indirectly determine complex events, conjoined verbs, and conjoined adverbials, as illustrated in (3).

(3) a. John and Mary met the same man.

 b. John met and invited the same man.

 c. John played the same sonata slow and fast

In certain cases, though, *same/different* must take individuals as antecedents, namely when they apply a modifier of an NP referring to individuals, as in (4).

(2) the man and the woman from the same country

The sale is possible with relational adjectives, noted by Jackendoff (1977):

(5) The boy and the girl with the same birthday/ with mutual interests *I* with different-colored eyes *I* with a common background.

Examples with clausal conjunction were noted again by Jackendoff (1977) with subject ATB-movement and with Right Node Raising (see also Abbott 1975).

(6) a. The same man got drunk and was arrested by the police.

 b. The same man is rarely easy to be please and eager to please.

 c. The same man praised you and seemed to hate you .(lackendoff 1977)

(7) a. John avoided and Bill ignored similar issues/ the same man/ men with the same birthday.

 b. John whistled and Mary hummed the same tune/ at equal volumes. [↑](#footnote-ref-2)
3. There other phenomena in natural languages that require a treatment based on several partial interpretations that have to be combined to yield the complete meaning of a sentence or other linguistic expression. A prominent case is assertive and presuppositional parts of sentence meanings. Typically, multiple partial interpretations of a sentence raise the problem of how they should be combined. In particular, they raise the problem that a quantifier in one partial interpretation often has to bind a variable in another partial interpretation. The logical problem that usually arises is the following. If the 'combination' of the two partial interpretations is conjunction, the quantifier would take wider scope than it ordinarily does. This is an example of the relevant sort with presuppositions from Karttunen/Peters (1979).

(i) Some woman managed to get the job.

Roughly, the presupposition of (31) is that it was hard for some woman to get the job, and the assertion of (31') is that some woman did get the job. However, the woman the presupposition is about has to be the same as the one the assertion is about. Thus, the existential quantifier representing *some woman* has to somehow take scope over both the assertion and the presupposition.

 There are various formal proposals in the literature to solve those scope problems as they arise in other contexts ('donkey'-sentences), in particular with indefinite NPs. However, in the present case, takes wide scope over the conjunction, need not be an existential quantifier, but may be a universal quantifier:

(ii) Every man came and every woman left who had met before.

Thus, the proposals to account for 'donkey'-sentences cannot generally be adopted for the partial interpretations arising with implicit coordination. [↑](#footnote-ref-3)
4. Hoekstra (1986) claims that the split antecedents of a relative clauses do not have to occupy identical positions in a sentence. The example he invokes to support this claim, taken from de Haan (1979), given in (1).

	1. We always let those girls play with those boys who know one another from elementary school.I could not find any speakers who accept this example. If there are any, then presumably because the predicate is symmetric with respect to the two positions occupied by the NPs. The construction seems to become more degraded with a predicate that is not symmetric in this respect, as in (2):

	1. \* We always let those girls play without those boys who know each other from elementary school.This shows that relative clauses with split antecedents cannot simply receive a semantic treatment such as the one within DRT that Hoekstra proposes, but requires specific syntactic relations for the application of the rules of semantic interpretation. [↑](#footnote-ref-4)
5. It seems that conditions on number and agreement always involve three-dimensional units, rather than being established in individual planes. Thus, what one has to distinguish between three sorts of syntactic relations, syntactic relations that can only be established *in* individual planes, syntactic relations that can be established both in individual planes and among three-dimensional syntactic units and syntactic relations that can only be established in among three-dimensional syntactic units such as number agreement. [↑](#footnote-ref-5)
6. The split reading is for many speakers available in relative clauses:

(i) a. ('!) These are the two masterworks that Bill painted and John composed.

 b. These are the masterworks that Bill painted and John composed.

 c. The two masterworks that Bill painted and John drew are in this room.

 d. Bill painted and John composed these two masterworks.

 e. These two masterworks Bill painted and John composed.

(ii) These are the two women that Bill married and John proposed to.

There is a straightforward explanation for this difference between plural arguments und plurals as heads of relative clauses. Williams (1986) has noted that the N' of the head of a relative clause undergoes reconstruction (though not the full NP). This is shown in the following contrast:

(iii) a. picture of himself that John likes

b. the pictures of each other that John and Mary like

c. each other's pictures that John and Mary like

The anaphors in (3a) and (3b) are contained in the N' and thus can undergo reconstruction, in contrast to the anaphor in (3c) in SPEC(NP) position. Returning now to (la), it is reasonable to assume that a subconstituent not containing *two* undergoes reconstruction. Independent evidence of this comes from relative clauses with quantified subject in which the numeral of the relative clause head must take 'wide scope' over the subject, as in (4):

(iv) the two masterworks that everybody likes.

(iv) (only) has a reading in which the NP refers to two masterworks. It cannot refer to a group consisting of two masterworks per person. Thus, in (4a) and b. only *masterworks* would be able to undergo reconstruction. Then the availability of the partitioned interpretation immediately follows. The structure of the NP with relative clause in (4a) after reconstruction would be as in (5):

(v) the two t [that Bill painted masterworks and John drew masterworks]

It is natural to assume (and it has often been assumed) that a plural such as masterworks may as a marginal case also refer to individuals, rather than groups. Then the relative clause in the structure in (5) refers to the group consisting of the masterwork that Bill painted and the masterwork that John drew. This group then will be further specified by *two.*

The cases in (i) differ from the cases discussed in the text crucially in that (i) involves reconstruction of N', whereby the numeral counts sums 'across the board', whereas the other cases could involve only reconstruction of the entire NP, which contains the numeral specification of the entire group. [↑](#footnote-ref-6)
7. Directional PPs have an intermediate status:

(i) a. On these two shelves Mary put a book and John put a newspaper.

 b. I can't remember on which two shelves Mary put the book and John put the newspaper.

The partitioned interpretation is not excluded in (l)a. and b.; but it is worse than in true adjuncts. [↑](#footnote-ref-7)
8. There are certain exceptions to the possibility of a partitioned reading of simples in NP adjuncts. In the following b.-examples such a reading seems impossible:

(i) a. the woman with the blue jeans

 b. \* the man and the woman with the (two) blue jeans/ with the blue eyes

The impossibility of (ib) presumably has to do with a semantic constraint on extraposed PPs in general. The relation of possession involved in (ib) seems to disallow even extraposition of PPs to clause final position:

(ii) A man arrived \* with bluejeans / \* with hue eyes / from England. [↑](#footnote-ref-8)
9. This phenomenon was discussed for conjunction of NPs first by Vergnaud (1974) and later also by Link (1984). [↑](#footnote-ref-9)
10. Numerals do not have to be identical (as was noted in Link 1984):

(i) two men and three women who know each other.

This can be traced to the common assumption that numerals are not determiners, but have the status of adjectives, involving an empty determiner, which would be the same in (i). [↑](#footnote-ref-10)
11. For some reason, multiple antecedents of exception phrases seem to be restricted to subject position:

(i) \* John saw *every woman* and Mary noticed *every man except Sue and Bill.*

Notice that exception phrases do extrapose from object position, as we have seen earlier. [↑](#footnote-ref-11)