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# THE SEMANTICS OF *DIFFERENT*: COMPARISON OPERATOR AND RELATIONAL ADJECTIVE

## 1. INTRODUCTION

In this paper, I discuss various uses of *different*. My main focus will be on data like (1) and (2):

(1)    Detmar and Kordula live in different cities.

(2)    Every girl read a different book.

The sentence in (1) has a reading that can be paraphrased as in (1′). The NP *Detmar and Kordula* determines which comparisons are made with *different*.

(1′)    The city Detmar lives in is different from the city Kordula lives in.

Similarly, (2) has a reading that is paraphrased in (2′), where the universally quantified NP *every girl* determines what is compared with *different*.

(2′)    Every girl read a book that was different from the book that every other girl read.

I will refer to these readings as NP dependent readings of *different*. An obvious hypothesis is that the role of the NPs in (1) and (2) is the same, and that the same mechanism should bring about the NP dependent readings of the two sentences. This hypothesis has been pursued in the literature, in particular in Carlson (1987) and Moltmann (1992). I propose that two different *differents* are involved in deriving those readings. One is a relational adjective that induces a hidden reciprocal, the other is a comparison operator. A first motivation for making this distinction is the fact that German uses two distinct lexical items (*anders* and *verschieden*) corresponding to

English *different* in the two constructions, as illustrated by the translations of (1) and (2) given in (1″) and (2″):

(1″)     Detmar und Kordula wohnen in *verschiedenen* Städten.
          *Detmar and Kordula live      in different         cities*

(2″)     Jedes Mädchen hat ein *anderes* Buch gelesen.
          *every girl       has a   different book  read*

I provide an analysis of the plural NP dependent reading in terms of the relational adjective *verschieden*, and an analysis of the universal NP dependent reading in terms of the comparison operator *anders*. Giving different analyses of the two cases is supported by empirical differences in the availability of the dependent readings. In English, too it can be seen that the linguistic contexts that license the two NP dependent readings are distinct.

The structure of the paper is as follows. In section 2, I will examine the linguistic contexts in which *different* can occur, and the readings they license. We will see a clear distinction between the *anders* correlate of *different* and the *verschieden* correlate. The conceptually simplest cases are those in which syntax provides an overt item of comparison. I will take those as my starting point and propose semantic analyses of *anders* and *verschieden* in section 3. Section 4 uses the semantics of *verschieden* in conjunction with a partially pragmatic analysis of plural predication to explain the plural NP dependent reading. This predicts plurality to be a crucial factor concerning the availability of those readings, a prediction examined in section 5. The data show a clear contrast between plural and universal NPs, supporting my view that the respective readings are licensed in different ways. In section 6 I come back to the universal NP dependent reading. I use the semantics of *anders* from section 3 in terms of a comparison operator to present an analysis of the universal NP dependent reading. This finds further support from parallels to comparatives. I conclude that two distinct but independently motivated semantic analyses of *different* suffice to derive the NP dependent readings.

## 2. DIFFERENT *DIFFERENTS*

### 2.1. *Data*

#### 2.1.1. *Overt Items of Comparison*

Intuitively, *different* makes a comparison between individuals, and states either non-identity of individuals or non-identity of the kinds they belong

to. This is most obvious in cases where there is an item of comparison provided in the syntax. English can do this either with a *from*-phrase as in (3) or with a *than*-phrase as in (4):

(3)   Our last car was different from this one.

(4)   Luise had a different example than this one.

(4) can be translated into German either as in (5) using *verschieden*, or as in (6) using *anders*.

(5)   Luise hatte ein von  diesem *verschiedenes* Beispiel.
      *Luise had  a   from this     different      example*

(6)   Luise hatte einen *anderes* Beispiel als  dieses.
      *Luise had  a      different example than this*

### 2.1.2. *No Overt Item of Comparison*

When there is no overt item of comparison, there are various possibilities for the interpretation of *different*, i.e., for how to determine the things to be compared (note that I make a terminological distinction here: an 'item of comparison' is some syntactic constituent that provides a description of one of the semantic entities that are being compared; to those entities I refer with 'objects compared' or the like). (7) has an interpretation I will call discourse anaphoric: the sentence means that Frank bought a book that is different from some previously mentioned or otherwise salient book.

(5)   Frank bought a different book.
      discourse anaphoric: Frank bought a book different from some
                           salient book.

The sentence in (8) also has such a reading; in addition we get a reciprocal interpretation.

(6)   Frank likes different books.
      discourse anaphoric: Frank likes books different from some
                           salient books.
      reciprocal:          Frank likes books that are different from
                           each other.

Finally, there are the NP dependent readings that are the main issue of this paper. (9), with a definite plural NP, can mean that the books that Frank

bought are different from the books that Bärbel bought. And (10) with a universal NP can mean that every boy bought a book that is different from the book that every other boy bought. In addition, (9) has a reciprocal and a discourse anaphoric reading, and (10) has a discourse anaphoric reading. I will refer to the universal NP dependent reading also as the Q-bound reading, following Johnson (1996).

(7)     Frank and Bärbel bought different books.
    NP dependent:        The books that Frank bought are different from the books that Bärbel bought.
    reciprocal:            Frank and Bärbel bought books that are different from each other.
    discourse anaphoric:  Frank and Bärbel bought books different from some salient books.

(8)     Every boy bought a different book.
    Q-bound:             Every boy bought a book different from the book that every other boy bought.
    discourse anaphoric:  Every boy bought a book different from some salient book.

Interestingly, German allows the discourse anaphoric reading and the Q-bound reading only with *anders*. The translations of (7) and (10) given in (7′) and (10′) that use *verschieden* are in fact ungrammatical.

(7′)    Frank hat ein *anderes* (*\*verschiedenes*) Buch gekauft.
    *Frank has a   different          book bought*
    discourse anaphoric: Frank bought a book different from some salient book.

(10′)   Jeder Junge hat ein *anderes* (*\*verschiedenes*) Buch gekauft.
    *Every boy   has a  different        book bought*

    Q-bound:             Every boy bought a book different from the book that every other boy bought.
    discourse anaphoric: Every boy bought a book different from some salient book.

This is because *verschieden* without an overt item of comparison, when it occurs NP internally, cannot be singular. We will find an explanation for this later. Notice, however, that even if we replace the singular NP *ein verschiedenes Buch* with the corresponding plural *verschiedene Bücher*,

we cannot get a discourse anaphoric or Q-bound reading. We can only get a reciprocal interpretation in (7″) and (10″).

(7″)    Frank hat *verschiedene* Bücher gekauft.

*Frank has different    books   bought*

reciprocal: Frank bought books that are different from each
            other.

(10″)    Jeder Junge hat *verschiedene* Bücher gekauft.

*Every boy    has different    books   bought*

reciprocal: Every boy bought books that are different from
            each other.

On the other hand, a reciprocal interpretation as well as a plural NP dependent reading is only possible with *verschieden*. (8′) and (9′) are grammatical with *anders*, but as the '#' indicates, they don't have the relevant reading. Both are understood discourse anaphorically.

(8′)a.    Frank mag *verschiedene* Bücher.

*Frank likes different    books*

reciprocal: Frank likes books that are different from each
            other.

   b. #Frank mag *andere*   Bücher.

*Frank likes different books*

discourse anaphoric: Frank likes books different from some
                     salient books.

(9′)a.    Frank und Bärbel mögen *verschiedene* Bücher.

*Frank and Bärbel like    different    books*

NP dependent: The books that Frank bought are different
             from the books that Bärbel bought.
reciprocal:  Frank and Bärbel bought books that are differ-
             ent from each other.

   b. #Frank und Bärbel mögen *andere*   Bücher.

*Frank and Bärbel like    different books*

discourse anaphoric: Frank and Bärbel like books different from
                     some salient books.

Hence, German has two clearly distinguished lexical items where English has *different*. My strategy is to treat this distinction as real, that is, I assume that it corresponds to a genuine semantic distinction. I will give a semantic analysis of both *anders* and *verschieden*, and I assume that English *different* simply has both possibilities. I regard the data with an overt item of comparison as the basic case and take them as my starting point. The semantics I suggest for them will generalize to the other cases.

## 2.2. *A Comment on Previous Approaches*

This paper is not the first attempt to make sense of the variety of interpretations available with *different*, of course. In this subsection, I will briefly comment on previous approaches. I focus not so much on a comparison of the formal analyses offered, but on how the empirical domain is structured by the various authors.

Heim's (1985) paper on comparatives includes a note on *different* as a comparison operator (data like (4) above). This analysis is extended to plural NP dependent readings. Hence she groups (4) and (9) together. She does not discuss Q-bound readings and reciprocal *different*.

Dowty (1985) proposes an analysis that relates the discourse anaphoric interpretation to the Q-bound reading. Both are analyzed as cases of anaphora in an extended sense, with much of the interpretation being determined pragmatically. He does not relate these interpretations to cases in which we have an overt item of comparison.

Carlson (1987) and Moltmann (1992) offer analyses that treat the the Q-bound reading and the plural NP dependent reading in an analogous way, and neither relates those cases to data with overt items of comparison.

Obviously, none of my predecessors is interested in exactly the same range of data as I am. I propose to base the analysis of the more fancy data in section 2.1.2. on the ones that are obviously comparison constructions, from section 2.1.1. The only paper that proceeds in this way is Heim (1985). But since she relates the 'anders' *different* to the plural NP dependent reading construed with *verschieden*, I will not follow her either. Since the other authors do not relate their analyses to the basic cases, it will be clear that I pursue a different strategy than all of these papers. In addition, I differ from Carlson and Moltmann in distinguishing the plural NP dependent reading from the Q-bound reading.

Carlson's and Moltmann's proposals are the best worked out analyses of the semantics of *different* that I am aware of. Since I argue against certain aspects of both in pursuing a non-uniform analysis of NP dependent readings of *different*, let me explain their analyses in some more detail.

Carlson would assign to (9) and (10) (repeated below) roughly the LFs given in (11a,b) for the relevant readings.

(9)     Frank and Bärbel bought different books.

(10)    Every boy bought a different book.

(11)a.  [different books x] ($\lambda$x[Frank and Bärbel bought x])

    b.  [a different book x] ($\lambda$x[every boy bought x])

The idea is that the licensing NP has distributive force and pluralizes an event. It is such pluralized events that *different* operates on. Hence, (11a) should be read as something like 'there is a plurality of events of Frank and Bärbel buying something, and those events involve different books'. The motivation for discussing the semantics of *different* in terms of pluralities of events comes from the wide range of licensing environments for such readings. The comparisons made by *different* can be determined, not just by NPs, but also by conjunctions of verbs, VPs, PPs etc. Some of Carlson's examples are given in (12).

(12)a.  Different people discovered America and invented bifocals.

    b.  John saw and reviewed different films.

    c.  Max put different plates on the table and in the cupboard.

(12a–c) have the dependent readings paraphrased in (12′a–c):

(12′)a. The person who discovered America is different from the person who invented bifocals.

    b.  The films John saw are different from the films John reviewed.

    c.  The plates Max put on the table are different from the plates Max put in the cupboard.

These data show that the interpretation of *different* can depend on pluralities other than pluralities of individuals. They are the motivation for Carlson and Moltmann to discuss the semantic contribution of *different* in terms of events.

Moltmann's (1992) analysis of plural NP dependent readings is similar to Carlson's in that she also takes *different* to distribute over plural

events. Also similarly to Carlson, *different* corresponds to an operator on the whole sentence on both NP dependent readings (although it is not formally exactly the same operator for the two readings). The result of applying such an operator will give (13) and (14) for (9) and (10) (I report here Moltmann's formalization and not Carlson's because Carlson does not actually offer a fully formal interpretation of (11a, b)).

(13)    $\exists ex[\text{buy}(e, \text{Frank \& Bärbel}, x) \& \text{books}(x)$
        $\& \forall e'e''x'x''y'y''[e' \leq e \& e'' \leq e \& x' \leq x \& x'' \leq x$
        $\& y' \leq \text{Frank \& Bärbel} \& y'' \leq \text{Frank \& Bärbel}$
        $\& e' \neq e'' \& \text{buy}(e', y', x') \& \text{buy}(e'', y'', x'')$
        $\rightarrow \text{different}(x', x'')]]$

(14)    $\forall x[\text{boy}(x) \rightarrow \exists ey[\text{book}(y) \& \text{buy}(e, x, y)$
        $\& \forall x'x''y'y''[\text{boy}(x') \& \text{boy}(x'') \& x' \neq x''$
        $\& \text{book}(y'') \& \exists e'[\text{buy}(e', x', y')] \& \exists e''[\text{buy}(e'', x'', y')]$
        $\rightarrow \text{different}(y', y'')]]]$

I will not deal with cases like (12) in this paper. The pluralities involved in these cases are less understood than pluralities of individuals, i.e., the denotations of plural NPs, which is my excuse for only coming back to these data briefly in section 7. Since they were an important motivation for Carlson and Moltmann, I should point out here that we are not trying to cover exactly the same ground. My critique should be seen as limited to those aspects of their analyses that I explicitly address.

Nonetheless, there are certain other aspects of Carlson's proposal I will argue more specifically against, besides disagreeing with him in that I do not want to analyze (9) along the lines of (10). Notice that the NP containing *different* takes scope over the licensing NP in both (11a) and (11b). We will see in section 5 that the plural NP dependent reading does not seem to be a case of one of the NPs taking scope over the other at all, not being sensitive to the usual constraints on scope. Rather, the crucial factor here is plurality. In contrast, scope is a relevant notion in the case of the universal NP dependent reading. However, the empirical evidence indicates that the universal NP needs to take scope over *different*, and not the other way around.

Moltmann's analysis, on my view, shares Carlson's problems concerning predictions about scope.

Both papers focus on dependent readings, disregarding other comparison constructions with *different*. This leads the authors to postulate a special semantics of *different* to account for those dependent readings. We will see that including 'simple' comparison constructions with *different* leads to a different perspective on what *different* does semantically.

## 3. OVERT ITEMS OF COMPARISON

### 3.1. *'verschieden' with Item of Comparison*

The semantically most trivial case is something like (15):

(15)    Our last car was different from this one.

I translate *different* into a constant different' whose meaning is sketched in (16) (I simplify in ways that I take to be irrelevant for the point of the paper).

(16)    [[different']] (a, b) = 1 iff (i) or (ii):
         (i) $a \neq b$
         (ii) a and b belong to kinds a' and b', and $a' \neq b'$

This is what I take to be the semantic contribution of *verschieden*. It is simply a relational adjective like *proud*. Hence (15) will be translated as in (17a) – I generally ignore tense, intensionality etc. and simplify translations as far as possible.

(17)a.    different'(our_last_car', this_one')

     b.    *verschieden von, different* $\rightarrow \lambda y \lambda x [$different'$(x, y)]$

If this is the meaning of *verschieden*, we expect the *von*-phrase to have to denote itself the object whose identity is being compared. This is correct, as (18) and (19) show. When the item of comparison is not the object whose identity we compare, we have to use *anders* plus *als*-phrase.

(18)a.    Luise hat heute eine *andere*  Katze gefüttert als   gestern.
          *Luise has today a    different cat    fed       than yesterday*

     b.    *Luise hat heute eine von  gestern    *verschiedene* Katze
          *Luise has today a     from yesterday different      cat*
          gefüttert.
          *fed*
          Luise fed a different cat today than yesterday.

(19)a.    Luise hat ein *anderes*  Buch gelesen als   Griselda.
          *Luise has a    different book  read       than Griselda*

b. *Luise hat ein von Griselda *verschiedenes* Buch gelesen.
   *Luise has a from Griselda different      book read*
   Luise read a different book than Griselda.


### 3.2. *'anders' with Item of Comparison*

As (18) and (19) already indicate, *anders + als* behaves more like a comparative, in that the item of comparison is able to provide a more indirect description of the object that is going to be compared. In fact, we find the ambiguities familiar from comparatives also with *different*: in the same way that (20b) is ambiguous between (22a) or (22b), (20a) can mean either (21a) or (21b).

(20)a.  Luise met a different man than Otto.

   b.  Luise met a taller man than Otto.

(21)a.  Luise met a man who was different from Otto.

   b.  Luise met a man who was different from the man Otto met.

(22)a.  Luise met a man who was taller than Otto.

   b.  Luise met a man who was taller than the man Otto met.

In (23), I give examples without an overt item of comparison. Both with the comparative and with *different*, we get an interpretation that amounts to what I have called discourse anaphoric.

(23)a.  Luise saw a different movie.

   b.  Luise saw a better movie.

A final parallel to comparatives I would like to mention is an odd restriction on determiners of NPs containing a comparison operator. As (24) indicates, only indefinite NPs are grammatical. This is not because the resulting interpretation would not make sense: I provide a paraphrase of what (24b) would mean with *every* in (24c). This amounts to the proposition that the easiest problem that Charles solved was harder than the easiest problem

that Emily solved – not an interpretation that is intuitively available in (24b).

(24)a.  Charles solved a harder problem than Emily.

b.  *Charles solved every harder problem/most harder problems than Emily.

c.  The degree d such that every problem Charles solved was d-hard is greater than the degree d' such that every problem Emily solved was d'-hard.

Interestingly, the same constraint can be observed with *different*, cf. (25a) vs. (25b). While comparing individuals might indeed not make much sense here, the kind-comparing interpretation of *different* would amount to the prefectly sensible (25c).

(25)a.  Charles solved a different problem than Emily.

b.  *Charles solved every different problem/most different problems than Emily.

c.  The kind x such that every problem Charles solved was of kind x was different than the kind y such that every problem Emily solved was of kind y.

I will not offer an explanation for this effect. The following is what I take to be the relevant generalization: a comparison operator cannot be contained in an NP headed by a quantificational determiner if it needs to take scope over the determiner. See e.g., Lerner (1992, 1993) and Lerner and Pinkal (1995) for discussion of the comparative data.

The parallels we observe indicate that one would want to look for a semantic analysis of *different* that captures the similarity. In fact, Heim (1985) extends her analysis of phrasal comparatives to *different* with *than*-phrases. I will now briefly introduce this analysis, and in section 6 use it to account for the Q-bound reading.

A sentence like (26a) should mean something like (26b): there is a degree d such that Luise owns a d-big car, and d is greater than the largest degree d' such that Otto owns a d'-big car. The semantics for the maximality operator used here is given in (27).

(26)a.  Luise owns a bigger car than Otto.

b.  $\exists d \exists x [car(x) \ \& \ owns(Luise, x) \ \& \ d\text{-}big(x) \ \&$
    $d > max(\lambda d' \exists y [car(y) \ \& \ owns(Otto, y) \ \& \ d'\text{-}big(y)])]$

(27)     Let S be a set ordered by the relation $\leq$. Then $\max(S) = \iota s[s \in S \ \& \ \forall s'[s' \in S \rightarrow s' \leq s]]$

Heim suggests that the comparative morpheme is a relation between a pair of individuals and a relation between an individual and a degree, as defined in (28). (26a) would then have a Logical Form like (29). We compare Luise and Otto with respect to how big a car they own.

(28)     $[[\text{-er}']] \ (x, y) \ (D_{\langle e, \langle d, t \rangle \rangle})$ iff $\exists d[D(x)(d) \ \& \ d > \max(\lambda d'[D(y)(d')])]$

(29)     $\text{-er}'(\text{Luise, Otto})(\lambda z \lambda d \exists y[\text{car}(y) \ \& \ \text{owns}(z, y) \ \& \ \text{d-big}(y)])$

Analogously, (30a) means something like (30b): there is a car that Luise owns, and that is different from the car that Otto owns (I use the maximality operator here to capture uniqueness for the singular case).

(30)a.     Luise owns a different car than Otto.

   b.     $\exists x[\text{car}(x) \ \& \ \text{owns}(\text{Luise}, x) \ \& \ \text{different}'(x, \max(\lambda y[\text{car}(y) \ \& \ \text{owns}(\text{Otto}, y)]))]$

The comparison operator associated with *different*, which I call *anders'* here, expresses a relation between a pair of individuals and a relation between two individuals, as defined in (31a). Hence, (30a) has (31b) as its Logical Form. We compare Luise and Otto with respect to what car they own.

(31)a.     $[[\text{anders}']] \ (x, y) \ (R_{\langle e, \langle e, t \rangle \rangle})$ iff $\exists u[R(x)(u) \ \& \ \text{different}'(u, \max(\lambda v[R(y)(v)]))]$

   b.     $\text{anders}'(\text{Luise, Otto}) \ (\lambda z \lambda v[\text{car}(v) \ \& \ (\text{owns}(z, v)])$

Thus, I propose that there are two different *different*s. One (*verschieden*) denotes a relational adjective, the other (*anders*) is a comparison operator. The plot is to reduce the other cases to those basic ones. In particular, I will give an analysis of the Q-bound reading in which I use the *anders*-different, the comparison operator, and an analysis of the plural NP dependent reading in which I rely on the *verschieden*-different, the relational adjective. I discuss *verschieden* in the next section.

## 4. NO OVERT ITEM OF COMPARISON: *VERSCHIEDEN*

In this section I will analyze plural NP-dependent *different* as a special case of reciprocal *different*. This is possible with an analysis of reciprocal *different*, and reciprocity in general, that allows the interpretation to depend on context, in a sense to be made precise. The work of Roger Schwarzschild (1996) on plural predication provides us with the relevant notion of context. I dicsuss his proposal and arguments for it in section 4.1. The analysis combines naturally with a Heim, Lasnik and May (1991a, b) analysis of reciprocity. This is done in section 4.2, and it is demonstrated that reciprocals are context dependent in the way predicted by this analysis. I proceed to apply this analysis to reciprocal *different* in section 4.3. The plural NP dependent reading falls out naturally from the context dependency introduced into reciprocal interpretation, and I show that this analysis makes desirable predictions about when this reading is available.

### 4.1. *Covers and Distributivity*

Consider (32) from Schwarzschild (1996):

(32)a.  The cows and the pigs filled the barn to capacity.

     b.  The female animals and the male animals filled the barn to capacity.

(32a) can mean that the cows filled the barn to capacity, and so did the pigs. This is a distributive reading of the sentence. (32b) cannot normally be understood in this way, i.e., it is not naturally taken to mean that the cows filled the barn to capacity and so did the pigs. Actually, this is unexpected. Suppose that the cows and the pigs are all the animals there are, and this is the same group as the female and the male animals, that is assume (33):

(33)    [[the cows and the pigs]] = [[the female animals and the male animals]] = [[the animals]]

The two subjects in (32a) and (32b) then refer to the same group. The two VPs are obviously identical. But then, it is rather mysterious where the interpretational difference between the two should come from. Notice that the difference is which subgroups we distribute down to. (32b) is much more naturally taken to mean that the female animals filled the barn to capacity, and so did the male animals. That is, we divide up the group denoted by the subject NP in different ways, and how we divide up seems to depend on how we mention the group.

Schwarzschild suggests therefore that distribution is sensitive to a division of the universe of discourse into salient subgroups, a cover. The definition of cover is given below.

(33)    C is a cover of P iff
    C is a set of subsets of P
    Every member of P belongs to some set in C
    { } is not in C

I implement distribution via the * operator familiar from Link's (1983) work, cf. (34):

(34)    – *distribution:*
    * is that f: $D\langle e, t\rangle \rightarrow D\langle e, t\rangle$ such that for any h in $D\langle e, t\rangle$ and any x in D: $[*h](x) = 1$ iff $[h(x) = 1$ or $\exists u, v[x = u \& v$ & $[*h](u)$ & $[*h](v)]]$

Note that I use '&' to indicate group formation. I will talk about groups as if they were sets of individuals throughout the paper. I propose to restrict the * operator by the contextually salient cover. This is also proposed in Heim (1994) and Sauerland (1998). A free variable ranging over covers will appear at LF whenever there is a * operator, representing the sensitivity to context. The LF for (32) is given in (35). The free variable Cov occurs in the sister of the * operator. It is interpreted intersectively with the predicate 'fill the barn to capacity'. The result is the set of all salient groups that filled the barn to capacity. Hence, the new *-ed predicate will apply to the cows and the pigs just in case these animals can be divided into salient subgroups that filled the barn to capacity.

(35)    [[The cows and the pigs] [*[Cov [ filled the barn to capacity]]]]

Obviously, what exactly this means depends on what the context assigns as an interpretation to the free cover variable. Suppose the salient cover is as in (36a). Then (35) means that the cows filled the barn to capacity, and so did the pigs (37a). Suppose on the other hand that the contextually salient cover was as in (36b). We would then get the reading that is prominent in (32b), (37b).

(36)a.  Cov[the animals] = {[[the cows]], [[the pigs]]}

  b.  Cov[the animals] = {[[the female animals]], [[the male animals]]}

(37)a. $\forall x[x \in \{[[\text{the cows}]], [[\text{the pigs}]]\} \rightarrow x$ filled the barn to capacity]

b. $\forall x[x \in \{[[\text{the female animals}]], [[\text{the male animals}]]\} \rightarrow x$ filled the barn to capacity]

Assume that mentioning the cells in a particular cover explicitly is enough to make that cover salient. We then have an account of the interpretational difference in (32): The way we mention the subject group makes different partitions into subgroups salient. Distribution is to those salient subgroups, because the * operator is restricted to salient covers.

Schwarzschild's theory replaces one in which the interpretational difference between (32a) and (32b) is captured directly in compositional semantics by giving the conjoined NPs different denotations (see in particular Landman (1989a, b)). Schwarzschild argues that his indirect analysis, which relies on pragmatic salience, is preferable because it covers a greater range of data. (38) is an example (taken from Heim (1994)). Imagine the produce section in a grocery store; the artichokes are sold in packets containing five artichokes each:

(38)     The artichokes cost a dollar

This can be understood to mean that each packet costs a dollar. Here it is the physical arrangement of the artichokes that provides a partition. But even when it is linguistic material that makes a particular cover salient, this could not always be captured easily by compositional semantics. Consider (39):

(39)a. The books that Sue and Molly bought would fill the whole trunk.

b. $[[\text{the books that Sue and Molly bought}]] \in$
$*\lambda x[\text{Cov}(x) \& x \text{ would fill the whole trunk}]$

c. $[[\text{the books that Sue and Molly bought}]] =$
$\max(\lambda y[\text{books}(y) \& **\text{bought}(y)(\text{S\&M})])$

d. $\text{Cov}[\text{the books that Sue and Molly bought}] =$
$\{\text{the books that Sue bought, the books that Molly bought}\}$

The reading of (39a) that I'm interested in is one in which the sentence claims that the books that Sue bought would fill the whole trunk, and the books that Molly bought would, too. In this reading, the NP 'Sue and

Molly' indirectly provides the cover over the books that distribution in the matrix clause is sensitive to. Covers allow an analysis of this sentence that leaves the conjoined NP inside the relative clause. Note that this reading presupposes that 'the books that Sue and Molly bought' is read as 'the set of books each of which was bought either by Sue or by Molly'. This is a cumulative reading of *buy*, as the more careful formalization in (39c) indicates. Cumulation is definied in (40), following Sternefeld (1998). I mention this because it will play an important role later in the paper. The example indicates that the way we pluralize influences which covers will be available: Only a cumulative reading of the relative clause is conceptually compatible with the 'Sue and Molly' – induced cover in the matrix predication.

(40)    – *cumulation:*
        $**$ is that function: $D\langle e, \langle e, t \rangle \rangle \rightarrow D\langle e, \langle e, t \rangle \rangle$ such that for any R: $[**R](y)(x) = 1$ iff $R(y)(x)$ or $\exists x1x2y1y2[x = x1\&x2 \&\ y = y1\&y2 \& **R(y1)(x1) \& **R(y2)(x2)]$

These data indicate that it seems preferable to relieve compositional semantics of having to say something very specific about which subgroups distribution is down to. Rather, we will leave a slot in the interpretation of plural predication through which contextual information can enter and influence the reading that we get for a sentence in a given context. We have seen three types of cases for determining a cover:

(i) a noun phrase provides its own cover by virtue of being mentioned in a particular way – cf. (32);

(ii) information external to the sentence itself provides a cover (this might be extralinguistic context or preceding discourse) – cf. (38);

(iii) linguistic material in the same sentence as the noun phrase being partitioned indirectly determines a cover, but there is no simple mentioning of the cells in the cover – cf. (39).

## 4.2. *Reciprocals*

The above analysis of distribution will combine easily with a theory of reciprocity in which certain semantic properties of reciprocity are reduced to the semantic effects of distribution. I will introduce a version of Heim, Lasnik & May (1991a, b) (henceforth HLM) that is such a theory.[1] HLM's

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[1] Schwarzschild (1996) proposes a theory of reciprocity that also makes use of context dependent distribution. I used his theory in Beck (1998). In section 4.3. I discuss data for which the analysis presented here is more suitable.

theory is guided by the paraphrase in (41b) of (41a), or more precisely, (41c), which amounts to (41d).

(41)a.  Mary and Bill saw each other.

    b.  Mary and Bill saw the other one among Mary and Bill.

    c.  Each of Mary and Bill saw every other one of Mary and Bill.

    d.  $\forall x[x \in M\&B \rightarrow \forall y[y \in M\&B \,\&\, y \neq x \rightarrow x \text{ saw } y]]$

Let's blame distribution for the two universal quantifiers in those paraphrases. The idea is then that the reciprocal denotes a group that contains all the members of the antecedent, minus the individual we are looking at in terms of distribution (Mary must have seen everyone among Mary and Bill minus Mary, Bill everyone minus Bill). The reciprocal incorporates two anaphoric dependencies: one is coreference with the antecedent, the other is dependence on the variable bound in the distribution over the antecedent. If $x1$ is the variable and Pro3 is the hidden pronoun coreferent with the antecedent, this can be represented as in (42).

(42)  each other = the other one(s) among them
    $[[ \,[\text{each other } x1 \text{ (of) Pro3}] \,]] = \max(^*\lambda z[z \neq x1 \,\&\, z \leq x3])$

Thus (41a) has a Logical Form as in (43b), which is interpreted as in (43c) and amounts to (43d).

(43)a.  [Mary and Bill]3 saw [each other1,3]

    b.  [Mary and Bill]3 [* [ 1 [each other1,3 [* [2 [t1 saw t2]]]]

    c.  $M\&B \in \,^*\lambda x[\, \max(\lambda z[x \neq z \,\&\, z \leq M\&B] \in \,^*\lambda y[x \text{ saw } y]])$

    d.  $\forall x \,[x \in M\&B \rightarrow \forall y[y \in M\&B \,\&\, y \neq x \rightarrow x \text{ saw } y]]$

While we used the * operator to capture distribution in (43), we ignored our discovery from the last section that this operator is sensitve to a cover of the universe of discourse, making distribution sensitive to contextually salient subgroups. This will matter when the antecedent of the reciprocal denotes a group with more than two members. HLM provide an explicit analysis of reciprocals with two-membered antecedent groups only. Once we extend their analysis to apply to larger antecedents, the same context dependency

emerges as in ordinary distribution. Schwarzschild (1996) provides many persuasive examples, including (44) below.

(44)a. The cows and the pigs talked to each other.

    b. The young animals and the old animals talked to each other.

While (44a) can naturally be taken to mean that the cows talked to the pigs and vice versa, this is not a natural interpretation of (44b); (44b) is more likely taken to mean that the young animals talked to the old animals and vice versa. I will combine the above theory of distribution with the HLM theory of reciprocals to capture this contrast. (45) is another example that illustrates the same cover dependency (on the reading described in (45b)), but avoids the problem of how many individuals have to talk to each other in order for (44) to be true.

(45)a. The defense players and the offense players complement each other

    b. The defense players (as a group) complement the offense players (as a group) and vice versa.

    c. ([[the defense players and the offense players$_3$]]) $\in$ *$\lambda$x[Cov(x) & (max(*$\lambda$z[x $\neq$ z & z $\leq$ Pro3 & Cov(z)]) $\in$ *$\lambda$x[Cov(y) & x complements y]]

With the cover given in (46) this amounts to (47), which is the reading in (45b).

(46)      Cov[the defense players and the offense players] = {the defense players, the offense players}

(47)      $\forall$x[x $\leq$ P & x $\in$ Cov $\rightarrow$ $\forall$y[y $\leq$ P & y $\in$ Cov & y $\neq$ x $\rightarrow$ x complements y]]
           (where P = [[the defense players and the offense players]])

The examples looked at so far were parallel to the original cows and pigs example (32) in that an NP in the same sentence as the distributive operator provided the cover that that operator was sensitive to (type (i) data that would be amenable to an analysis that blames compositional semantics for the effect). Let's see whether we can find reciprocal data that are parallel to cases (ii) and (iii), external and indirect covers.

Example (48) comes with the situation sketched in (49):

(48)   The test subjects cannot see each other.

(49)
```
|    x    |      x    |
| x x   ˜ | x     x   |
|   x x   |  x x   x  |
```
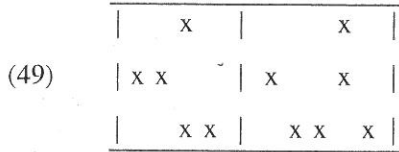
The sentence can be taken to mean that the test subjects on one side of the room cannot see those on the other side, and vice versa. The physical arrangement provides a cover to which the reciprocal construction is sensitive.

Finally let's look at some examples in which linguistic material in the same sentence determines a cover, but in a more indirect way than in (45). (50a) (which obviously inspired (48) above) is from Schwarzschild; the cover of the pertinent reading (50b) is given in (50c).

(50)a.   The prisoners on the two sides of the room can see each other.

b.   The prisoners on one side of the room can see the prisoners on the other side of the room and vice versa.

c.   Cov[the prisoners]={{x: x is a prisoner on side 1}, {x:x is a prisoner on side 2}}

(51) and (52) are relative clause examples parallel to (39) in the preceding section:

(51)   The books that Diane and William discussed complement each other.

(52)   Diane and William discussed books that complement each other.

The interpretation for (52) I have in mind is one in which the books that Diane discussed complement the books that William discussed (and vice versa). This is captured by the analysis in (53), assuming that we have a cover as in (53c).

(53)a.   $\exists X[books(X)$ & $^{**}discuss(D\&W, X)$ & $X$ complement each other]

b.   $\exists X[books(X)$ & $^{**}discuss(D\&W, X)$ & $\forall x[x \leq X$ & $x \in Cov \rightarrow \forall y[y \leq X$ & $y \in Cov$ & $x \neq y \rightarrow complement(x, y)]]]$

(53)c. Cov[X] = {the books that Diane discussed, the books that William discussed}

Notice that for the availability of the 'Diane and William' dependent cover, the relation *discuss* needs to be understood cumulatively, just as in (39) *bought* needed to be understood cumulatively to make the cover in (39d) possible.

(51) is parallel – interpretation and cover are as indicated in (54).

(54)a. $\forall x[x \leq$ [[the books that Diane and William discussed]] & $x \in$ Cov $\rightarrow \forall y[y \leq$ [[the books that Diane and William discussed]] & $y \in$ Cov & $x \neq y \rightarrow$ complement(x, y)]]]

b. [[the books that Diane and William discussed]] = max($\lambda y$[books(y) & **discussed(y)(D&W)])

c. Cov[the books that Diane and William discussed] = {the books that Diane discussed, the books that William discussed}

To summarize, reciprocal interpretation is dependent on contextually salient covers in the same way as distribution. The theory of reciprocity sketched here captures this by making distribution, and covers, a part of how reciprocals are interpreted.

### 4.3. *Different*

#### 4.3.1. *Reciprocal Different*
We have already observed that one reading of (55a) and the only reading of (55b) is the reciprocal (55c):

(55)a. London and Pfrondorf are different.

b. London und Pfrondorf sind verschieden.

c. London and Pfrondorf are different from each other.

Compare this to (56a, b), where the same thing happens: when one argument slot of a relation is not overtly realized, we get a reciprocal interpretation with respect to that argument slot.

(56)a. The children were separated.

b. The children were separated from each other.

Other relation-denoting expressions that illustrate this phenomenon would be the verbs *compare* and *meet*, and the adjective *similar*. I have nothing to say about this process. I simply assume that the covertly reciprocal data are analogous to the corresponding overtly reciprocal ones, that is, I treat (55a) and (55c) as identical. (57) is the semantic analysis of (55) in terms of the above theory of reciprocity.

(57)a. London and Pfrondorf are different (from each other).

b. $\forall x[x \leq [[\text{London and Pfrondorf}]] \ \& \ x \in \text{Cov} \rightarrow$
$\forall y[y \leq [[\text{London and Pfrondorf}]] \ \& \ y \in \text{Cov} \ \& \ x \neq y \rightarrow$
$\text{different}(x, y)]]$

c. $\forall y[y = \text{London or } y = \text{Pfrondorf}$
$\Rightarrow y \text{ is different from the other of London and Pfrondorf}]$

d. $\text{Cov}[\text{London and Pfrondorf}] = \{\{\text{London}\}, \{\text{Pfrondorf}\}\}$

In (57), it turns out that due to the restrictions introduced by *each other*, the only possible cover over London and Pfrondorf is the one in (57d), hence (57b) amounts to (57c), the desired meaning. In (58), notice that when *different* occurs within an NP, the anaphoric antecedent of the reciprocal is the subject variable of the NP.

(58)a. Luise saw different (from each other) movies.

b. $\exists X[\text{movies}(X) \ \& \ \text{Luise saw } X \ \& \ X \text{ are different from each other}]$

c. $\exists X[\text{movies}(X) \ \& \ \text{Luise saw } X \ \& \ \forall x[x \leq X \ \& \ x \in \text{Cov} \rightarrow$
$\forall y[y \leq X \ \& \ y \in \text{Cov} \ \& \ x \neq y \rightarrow \text{different}(x, y)]]$

This explains why data like (59) with a singular *different* NP are ungrammatical in German (and don't have a reciprocal interpretation in English).

(59)a. *Hans hat ein verschiedenes Buch gelesen.
*Hans has a    different       book  read*
Hans read a different book.

(58) is most naturally interpreted as claiming that Luise saw movies that were different from each other according to some previously established

criterion (e.g., she saw science fiction movies, action thrillers and come-
dies). That is, we imagine that the preceding discourse provides us with
some way of partitioning Luise's movies. That is a type (ii) cover.

### 4.3.2. *Plural NP Dependent Readings*

We are now equipped to analyze the plural NP dependent reading. Recall
that we need to derive an interpretation for (60a) that can be paraphrased as
(60b). What we have said so far reduces (60a) to (60c). Does (60c) allow
us to derive a reading that corresponds to (60b)?

(60)a.   Frank and Bärbel read different books.

    b.   The books that Frank read are different from the books that
       Bärbel read.

    c.   Frank and Bärbel read books that are different from each other.

In (61), I have formalized (60c)=(60a), first somewhat sloppily ((61a)),
and in (61b) making use of the above analysis of reciprocity. Notice that
we need to pluralize the relation *read* to apply also to plural objects. I have
chosen to pluralize via cumulating the relation, as the ** operator indicates.

(61)a.   $\exists X[books(X)$ & $^{**}read(F\&B, X)$ & $X$ are different from each
       other]

    b.   $\exists X[books(X)$ & $^{**}read(F\&B, X)$ & $\forall x[x \leq X$ & $x \in Cov \rightarrow$
          $\forall y[y \leq X$ & $y \in Cov$ & $x \neq y \rightarrow different(x, y)]]]$

(61b) says that there is a set of books that have been read by either Frank
or Bärbel, and all salient subgroups of those books are different from each
other. What exactly this means depends once more on the value of the
cover variable. Suppose that (restricting our attention to the set of books
we are looking at), the cover was as indicated in (62):

(62)   $Cov[X] = \{$the books that Frank read, the books that Bärbel
      read$\}$

Then, (61b) says that each element of the set in (62) is different from –
well, the other member of the set in (62). In other words, there is a set of
books read by Frank and Bärbel, and the ones read by Frank are different
from the ones read by Bärbel. This is the plural NP dependent reading. This
means that the reciprocal interpretation captures the NP dependent reading
as one particular cover choice. If it is plausible that such covers are salient,

we have an analysis for the NP dependent reading in terms of reciprocity. It should be obvious that (62) is a type (iii) case of cover choice – the way in which the pertinent cover is determined is exactly parallel to example (52) repeated below as (63):

(63)a. Diane and William discussed books that complement each other.

   b. Cov[X] = {the books that Diane discussed, the books that William discussed}

If we need to assume the cover (63b) for the analysis of (63a), the corresponding cover must be available to derive the plural NP dependent reading of (60). As far as I have been able to determine, it is generally the case that plural NP dependent readings track normal reciprocal covers. Hence I think that the covers we need to describe the plural NP dependent reading in this way are needed independently, and that the conclusion is inescapable that this must be one way of getting the NP dependent reading.

I will make the stronger claim that this is the only way to get that reading. Evidence for this comes from the fact, for example, that the plural NP dependent reading is never the only possible reading of these sentences. A sentence like (60a) always also has a reading in which the books are different from each other along some other dimension, i.e., Frank and Bärbel each read books that are different from each other according to some independent criterion. We can capture this in terms of different cover choices. Putting it differently, this analysis of the plural NP dependent reading leads us to expect that various factors are in principle available to determine the cover relevant to the reciprocal associated with *different*. The plural NP is one such factor, but if other covers are salient, other readings should be available. This is indeed the case, as the following data illustrate. (64) naturally has a plural NP dependent reading, paraphrased in (64b). On the other hand, imagine the sentence in a discussion about which areas people work in (e.g., acquisition and semantics). (64c) becomes a salient reading, determined by a cover that divides conferences according to the areas they are in. In our terms, we can get for (64a) a type (iii) cover as well as a type (ii) cover.

(64)a. Sue and Penelope go to different conferences.

   b. The conferences Sue goes to are different from the conferences Penelope goes to.

   c. Both Sue and Penelope go to conferences in more than one area.

Thus we find the flexibility that we expected.

For completeness, remember that type (i) covers are ones in which the way you mention an NP provides itself a cover of the referent of that NP. An example where that is possible with *different* is (65):

(65)a. The syntax students and the acquisition students are different.

b. The syntax students are different from the acquisition students (and vice versa).

Another point in favour of this explanation of the plural NP dependent reading is that it is only possible when the NP containing *different* is plural. There is no such reading available in (66), for example, even though (60a) is compatible with Frank and Bärbel only having read one book each.

(66) *Frank und Bärbel haben ein verschiedenes Buch gelesen.
    *Frank and Bärbel have a different book read*
    #Frank and Bärbel read a different book.

This contrasts with the Q-bound reading, which is available with both a singular and a plural *different* NP. We predict this because the NP dependent reading is a reciprocal reading, hence (66) would have to be reduced to 'Frank and Bärbel read a book that is different from each other' – which of course is just as bad as 'John likes each other', the reciprocal having a singular antecedent.

Before we proceed to examine the predictions that this analysis makes with respect to linguistic contexts licensing the plural NP dependent reading, let me draw the reader's attention to certain aspects of this formalization and my motivation for them. Notice that I have formalized the NP dependent reading in terms of strong reciprocity (compare Langendoen (1978), Sternefeld (1998)) – that is, each salient subplurality is different from each other salient subplurality. This seems to me to be the most plausible interpretation in cases like (67), where the licensing NP has more than two members:

(67) Bärbel, Jan and Frank read different books.

The sentence is most likely interpreted as claiming that the books that Bärbel read are different from the books that Frank read and different from the books that Jan read, and similarly for the other two. This is what we predict, assuming that the cover divides the books into the ones read by Bärbel, the ones read by Frank and those read by Jan, as suggested by the

subject NP. A formalization in terms of weak reciprocity would only claim that Bärbel's books are different from (at least) the books of one of the other two. For two-memebered covers, the difference between strong and weak reciprocity obviously does not matter.[2]

Notice also that the interpretation of (60a) is weak in another respect. I assume that the subgroups of books we are looking at are in the basic extension of *different*, that is, *different* directly applies to groups. In this sense, the formalization corresponds to a collective reading of *different*. This implies simply non-identity of those groups, but they are allowed to overlap. This seems to me to be correct in view of data like (68):

(68)    Lindsey and Alice solved different problems.

Suppose that Lindsey and Alice are students and that the conversation is about your last exam. (68) can be true if the sets of problems that Lindsey and Alice solved overlap, just as long as they did not solve exactly the same set of problems.

Finally, let me draw your attention to the interaction of the non-identity statement contained in the reciprocal with *different*. One effect of the non-identity requirement is that the anaphoric antecedent of the reciprocal must be genuinely plural, i.e., divisible into more than one part. This makes the requirement that those parts be different from each other trivial if we read *different* in its non-identity of objects sense. This might appear odd, but I believe that such a reading is attested in interpretations of *different* characterized as otiose or synonymous with *various* by Carlson:

(69)a.    John went to different places on his shopping trip.

b.    John went to five different plays.

Since the NP containing *different* is plural already, even the plurality requirement does not seem to add anything to the meaning of the sentence. Hence *different* seems semantically vacuous. Notice also that in sentences like (60a) where we talk about non-trivial salient subpluralities the whole sentence is of course not such a trivial statement of plurality, because of the division into salient subgroups that it implies. So the reading in which *different* is indeed vacuous only comes about when we look at cases in which the relevant subparts of the anaphoric antecedent of the reciprocal are singularities.

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[2] Schwarzschild's analysis of reciprocals using the EachOther function could not straightforwardly predict the strong interpretation. This is one reason why I changed the analysis of reciprocity from Beck (1998).

## 5. LICENSING ENVIRONMENTS

### 5.1. *Plural NPs*

The analysis of the plural NP dependent reading I propose in the preceding section ties the availability of that reading crucially to factors of plurality (via reciprocity and cumulation). It does not tie it to scope, in the sense of one of the NPs needing to have scope over the other, since the plural NP is related to the *different* NP via the cover, that is by pragmatic means. More specifially, the plural NP determines which comparisons are made with *different* by making a particular cover salient. This cover in turn determines which entities are being compared, via the sensitivity of reciprocity to context, i.e., the cover. In this section I explore some predictions this makes concerning the linguistic environments that license such readings. To anticipate the results of this section, we will see that while the pragmatic nature of cover choice allows the association of *different* with the plural NP to be fairly loose in some respects, there are requirements on the licensing environment imposed by cumulation, in particular. So to say that the phenomenon is partly pragmatic in nature does not mean that anything goes. It merely means that the restrictions that we observe are somewhat unusual.

Since we don't need one NP to take scope over the other, plural NP dependent readings should for instance be possible when the two NP are separated by a scope island. Below I embed either the *different* NP or the plural NP inside a relative clause. (70) is an example where the plural NP is embedded. The sentence has a dependent reading, paraphrased in (70′a) and analyzed in (70′b). (70) on this analysis means something like: let's look at the largest entity that is a set of books each of which has been read by either Frank or Bärbel. The salient subgroups of this group are different from each other. If the salient subgroups are the books that Frank likes on the one hand, and the books that Bärbel likes on the other (as indicated in (70'c)), then this represents the plural NP dependent reading.

(70)    Die Bücher, die  Frank und Bärbel mögen, sind verschieden.
        *The books    that Frank and Bärbel like     are  different.*
        The books that Frank and Bärbel like are different.

(70′)a.  The books that Frank likes are different from the books that Bärbel likes.

   b.  $\forall x[x \leq \max(\lambda X[\text{books}(X) \ \& \ ^{**}\text{like}(F\&B,X)]) \ \& \ x \in \text{Cov} \rightarrow$
       $\forall y[y \leq \max(\lambda X[\text{books}(X) \ \& \ ^{**}\text{like}(F\&B, X)]) \ \& \ y \in \text{Cov}$
       $\& \ x \neq y \rightarrow \text{different}(x, y)]]$

(70′)c.   Cov[max(λX[books(X) & **like(F&B,X)])]
           = {the books that Frank likes, the books that Bärbel likes}

The reverse situation is also possible: we can get plural NP dependent read-ings when the *different* NP is embedded in a relative clause. An example is given in (71), and more data that have been noted in the literature are in (72).

(71)   Ottilie und Maria haben Bücher gelesen, die  zu verschiedenen
       *Ottilie and Maria have  books   read      that to different*
       Schlüssen   kamen.
       *conclusions came*
       Ottilie and Maria read books that came to different conclusions.

(72)a.  Those two gorillas saw women who fed different
        men.                                                    [Dowty]

   b.   The men found books which discussed different
        topics.                                                 [Carlson]

(71) can mean (71′a), and is analyzed as in (71′b). If we have the cover indicated in (71′c), we get the NP dependent interpretation.

(71′)a.  The conclusion(s) that the book(s) that Ottilie read arrived
         at was/were different from the conclusion(s) that the book(s)
         Maria read arrived at.

    b.   ∃X[books(X) & **read(O&M, X) and ∃Y[conclusions(Y) &
         **arrived_at (X, Y) & ∀x[x ≤ Y & x ∈ Cov →
             ∀y[y ≤ Y & y ∈ Cov & x ≠ y → different(x, y)]]]]]

    c.   Cov[Y] = {the conclusion(s) that the book that Ottilie ar-
         rived at, the conclusion(s) that the book that Maria arrived
         at}

Importantly, we need to understand the relations in both the relative clause and the matrix clause as cumulated for this cover to be possible. Imagine that Ottilie and Maria had read the same books. It would be impossible to divide the books along the 'Ottilie and Maria' dimension, and accordingly, it would also be impossible to divide the conclusions in those books along the 'Ottilie and Maria' dimension. Thus we need to gather the books that

have been read by either Ottilie or Maria in one set, i.e., cumulate the basic relation *read*, as well as cumulate *arrive-at*. Generally, the plural NP and the *different* NP have to be related via a series cumulated relations.

Since we predict this to be one parameter for the availability of this reading, let's see what happens if we interrupt the chain of co-arguments of cumulated relations. One way of doing this is to replace a plural link in the chain by a singular. Contrast (71) with (73).

(73)　Ottilie und Maria haben ein Buch gelesen, das zu
　　　*Ottilie and Maria have　a　book read　　that to*
　　　verschiedenen Schlüssen　kam.
　　　*different　　　conclusions came*
　　　Ottilie and Maria read a book that arrived at different conclusions.

When the head noun of the relative clause is singular, the NP dependent reading is lost. Similar data have been noticed by Dowty (1985). We now have an explanation for this. The meaning of (73) is indicated in (74). If both Ottilie and Maria read the same book (and this is of course the only possibility with a singular), it is impossible to devide the books, and the conlusions, according to Ottilie and Maria. The cover required for the plural NP dependent reading is factually impossible. We can only choose covers independently of Ottilie and Maria.

(74)a.　$\exists x[book(x)$ & O&M read x and $\exists Y[conclusions(Y)$ & x arrived at Y
　　　　& $\forall x[x \leq Y$ & $x \in Cov \rightarrow$
　　　　　$\forall y[y \leq Y$ & $y \in Cov$ & $x \neq y \rightarrow different(x, y)]]]]]$

　　b.　Ottilie and Maria both read a book that arrived at conclusions that were different from each other.

Another way to disrupt cumulativity is to add a floating *each*. This forces a distributive interpretation, hence is incompatible with cumulation. Accordingly, (75) does not have an NP dependent reading.

(75)　Ottilie and Maria each read books that arrived at different conclusions.

The interference of a floating quantifier can actually be illustrated with simpler examples like (76). In those sentences also, of course, it is necessary that Frank and Bärbel didn't read the same books to begin with if

we want to split up the set of books according to which of the two read them. German *beide* (like English *each*, but apparently not like English *both*, cf. Schwarzschild (1996)) seems to be necessarily distributive, so (76) looses the NP dependent reading: the books have to be different from each other according to some other criterion. The English translation interestingly does have an NP dependent reading. This seems to be an instance of the Q-bound reading – compare (77), where I have replaced *verschieden* with *anders*, and where an NP dependent reading is possible (the change from Frank to Annette is so I have two feminine NPs, which is better for agreement purposes).

(76)     Frank und Bärbel haben beide verschiedene Bücher gelesen.
         *Frank and Bärbel have  both  different    books   read*
         Frank and Bärbel each read different books.

(77)     Annette und Bärbel haben jede andere   Bücher gelesen.
         *Annette and Bärbel have   each different books   read*
         Annette and Bärbel each read different books.

The two ways to interrupt the cumulative chain work the same way with the mirror image data where we embed the plural inside a relative clause and have *different* upstairs. (78) has a singular head noun, and (79) has a relative clause that is distributive instead of cumulated. Neither has the NP dependent reading that we got without these interfering factors (cf. (70)).

(78)     Das Buch, das Frank und Bäbel  gelesen haben, kam  zu
         *the book   that Frank and Bärbel read     have   came to*
         verschiedenen Schlüssen.
         *different      conclusions*
         The book that Frank and Bärbel read arrived at different conclusions.

(79)     Die Bücher die  die Jungen beide mögen, sind verschieden.
         *the books   that the boys   both  like    are different*
         The books that the boys each like are different.

A final case in which cumulation of a relation becomes impossible is that of relations that require a group as one argument, and hence enforce a collective interpretation. Carlson provides us with examples (80a, b) for

this phenomenon, neither of which has an NP dependent interpretation; I add (80c) (which I find clearer in that it involves a two-membered group).

(80) a. The twenty men dispersed to different rooms.

    b. John, Bob, and Fred and Mary surrounded different guests.

    c. Different people separated Mary and John.

I agree with Carlson that in (80) it is collectivity that destroys the NP dependent reading. We disagree, however, in that for me the requirement for the NP dependent reading to exist is cumulation, whereas for him it is distributivity. The German data (76) vs. (60) and (79) vs. (70) show that it is indeed cumulation we need, as distributuvity renders the dependent interpretation impossible. This is harder to observe in English due to the Q-bound interpretation possible in the distributive case (76); but note that in (79) in English just like in German no NP dependent reading is possible (the plural NP dependent reading is impossible due to distributivity, and the Q-bound reading is impossible for scope reasons, as we will see shortly).

## 5.2. *Universal NPs and Scope*

We have seen that plurality is a parameter in determining the availability of the plural NP dependent reading, supporting an analysis that recognizes plurality as a crucial factor. Now, such an analysis could not possibly be extended to the Q-bound reading, since there is no plural anywhere in those sentences. Fortunately, there is further support for my decision to treat the two NP dependent readings as different phenomena, in that the licensing contexts are clearly distinguished. Let's look at some contrasts.

(81a) is the familiar example with the plural embedded in a relative clause, where the dependent reading is possible. (81b), in contrast, where we have a universal instead of a plural, does not have an NP dependent reading.

(81) a. Die Bücher die  Frank und Bärbel mögen, sind verschieden.
       *The books   that Frank and Bärbel like    are  different.*
       The books that Frank and Bärbel like are different.

    b. #Die Bücher, die  jedes Kind mag, sind anders.
       *The books    that every child likes  are  different.*
       The books that every child likes are different.

In (82) I list some data from Johnson (1996) and Carlson (1987) in which the universal NP is embedded either inside a relative clause or inside a finite complement clause. The '#' indicates that the Q-bound reading is unavailable.

(82)a. #A different girl met the man that everyone admired. [Johnson]

  b. #Different men said that John knows each magician. [Carlson]

  c. #A different girl claimed that Joe admired everyone. [Johnson]

Johnson's (1996) generalization is that the Q-bound reading is only possible when the universal NP can take scope over *different*. The English double object construction is a good illustration of this. The first object seems to obligatorily take scope over the second object; accordingly, the Q-bound reading is possible when the universal is the first object, but not when it is the second object.

(83)a.  I gave every girl a different marble.      [Johnson]

  b. #I gave a different girl every marble.      [Johnson]

Compare (83) to (84), where instead of a universal we have a plural NP. The plural NP dependent reading is possible both with the first and with the second object.

(84)a.  I gave different girls "Harnessing Peacocks" and "Knowledge of Language".

  b.  I gave Maria and Luise different books.

The data in (85) vs. (86) make the same point. In German, with a normal transitive verb like *buy*, a subject preceeding an object in the middle field obligatorily takes scope over the object (Frey (1993)). We expect a universal subject to be able to license a Q-bound reading, then, but not a universal object, and this is indeed the case ((85a) vs. (85b)). On the other hand, a definite plural NP can license an NP dependent reading as subject or as object ((86a) and (86b)).

(85)a.  ..., weil    jedes Mädchen ein anderes Buch gekauft hat.
        *because every girl    a   different book bought  has*

  b. # ..., weil    ein anderes Mädchen jedes Buch gekauft hat.
        *because a   different girl    every book bought  has*

(86)a. ..., weil    verschiedene Mädchen "Harnessing Peacocks
*because different     girls     "Harnessing Peacocks*
und "Knowledge of Language" gekauft haben.
*and "Knowledge of Language" bought have*

   b. ..., weil    Luise und Maria verschiedene Bücher gekauft
*because Luise and Maria different     books bought*
haben.
*have*

We do not expect a restriction on relative scope of NPs to affect the plural
NP dependent reading in these cases, because we can have the two NPs as
co-arguments of a cumulated relation, and that's really all that is required
in terms of semantics and Logical Form. I conclude that different factors
decide on the availability of our two NP dependent readings. This justifies
my view that we should not give the same analysis to the Q-bound reading
and the plural NP dependent reading.

## 6. Q-BOUND *DIFFERENT*

The plan is, then, to find an analysis of the Q-bound reading in which
the semantic contribution of *different* is that of the comparison operator
discussed in section 3. I suggest (87c) to represent the relevant reading of
(87a).

(87)a. Every girl read a different book.

   b. Every girl read a book that was different from the book that
every other girl read.

   c. $\forall x, y[\text{girl}(x) \ \& \ \text{girl}(y) \ \& \ x \neq y \rightarrow x$ read a different book than
$y]$

Interestingly, the Q-bound reading is not restricted to *different*: the com-
parative can do something very similar, as the data in (88) illustrate. Some
minimal pairs are given in (89) and (90).

(88)a. Each subsequent apple was more succulent.

   b. Susanne got more tired with every step.

   c. Nutella gets more expensive every year.

(89)a.   Otto hat  jedes Jahn ein anderes  Auto gekauft.
   *Otto has every year a    different car    bought*
   Otto bought a different car every year.

   b.   Otto hat  jedes Jahn ein größeres Auto gekauft.
   *Otto has every year, a   bigger    car    bought*
   Otto bought a bigger car every year.

(90)a.   She gave a better talk every time.

   b.   She gave a different talk every time.

A first rough semantics for (89) is given in (91), which should make the semantic similarity obvious. Q-bound readings thus seem to be something comparison operators can do, not really a speciality of *different*.

(91)a.   $\forall t1 t2[\text{year}(t1)$ & $\text{year}(t2)$ & $t1 \neq t2 \rightarrow$ Otto bought a different car in t2 than in t1]

   b.   $\forall t1 t2[\text{year}(t1)$ & $\text{year}(t2)$ & $t1 < t2 \rightarrow$ Otto bought a bigger car in t2 than in t1]

I suggest that the interpretations of these data are parallel to those of comparative conditionals; an example and its interpretation is given in (92). Compare Beck (1997) for a corresponding semantic analysis.

(92)a.   Uli was more tired the hotter it got.

   b.   $\forall t1 t2[\text{it was hotter to t1 than to t2} \rightarrow$ Uli was more tired to t1 than to t2]

The semantic parallel to the data we are concerned with here should be obvious. The question is of course how to derive interpretations like (91). The nuclear scope of the universal is fairly unproblematic: we can assume that the universal quantifier binds two variables which as a pair are the first argument of the comparison operator, as indicated in (93).

(93)a.   every year [t1,t2] [-er(t2,t1)($\lambda t \lambda d$[Otto bought a d-big car in t])]

   b.   every year [t1,t2] [anders$'$(t2, t1)($\lambda t \lambda x$[car(x) & Otto bought x in t])]

The restriction is harder. Let's ignore for a moment the conditions 't1 < t2' and 't1 ≠ t2', where the two sentences differ. Then the problem is that we need to quantify over a pair of years with *every year*. Even if we assume that *every* is an unselective binder, as has been argued for on the basis of data like (94), it is not clear how to accomodate the restriction on a second year-variable. I have not been able to resolve this and will leave it open.

(94)    Every woman who owns a donkey likes it.

Here is a part of the restrictor problem that I do have something to say about: the conditions 't1 < t2' and 't1 ≠ t2'. Notice that if we didn't have them, the sentences would be contradictions. Notice also that the comparative example would still be a contradiction if we had only 't1 ≠ t2'. I suggest that the way these things get into the restrictor has nothing to do with compositional semantics. We accomodate the weakest condition that will make the sentence non-contraditory, thereby saving it as a useful contribution. That is, I suggest that we do something similar to what happens in (95):

(95)a.    Everybody has a faster computer than Douglas.

   b.    $\forall x[x \neq \text{Douglas} \rightarrow x$ has a faster computer than Douglas]

This has to mean that everybody other than Douglas has a faster computer than Douglas, even though Douglas is clearly around in the universe of discourse.

Notice that since we accomodate the weakest statement that would make the sentence non-contradictory into the restriction in (91), we get as a result the strongest possible interpretation of the sentence. This is in line with proposals like the Strongest Meaning Hypthesis in Dalrymple e.a. (1998).

Supposing that we can eventually resolve the pair question, the Logical Form of (87) looks like (96) according to those suggestions:

(96)    every girl [x, y]    [anders$'$(x, y)($\lambda z\lambda v[$book(v) & read(z, v)])]

Obviously, the universal needs to scope over the comparison operator on this analysis, since it binds the two variables that are the first argument of the comparison operator. Hence we expect the restrictions on the availablity of this reading that were discussed in section 5.

I suggest that the comparative Q-bound reading and the Q-bound reading of *different* should receive a parallel analysis. I take this to be a further argument in favour of using the regular comparison operator semantics

of *different* in the Q-bound reading. Since we need to derive a Q-bound reading for one comparison operator, deriving such a reading for the other should come with no extra trouble.

I would like to point out one final desirable consequence of this analysis. Notice that Q-bound readings can only occur if the comparison operator is contained within an indefinite NP. Quantified determiners lead to ungrammaticality:

(97)a.   She gave a better talk every time.

 b.   She gave every better talk/most better talks every time.

(98)a.   Every girl read a different book.

 b.   #Every girl read every different book/most different books.

 c.   For every pair of girls x, y: the kind d such that x read every book of kind d was different from the kind d′ such that y read every book of kind d′.

I take this to be just one more example of the generalization discussed in section 3 that a comparison operator cannot be contained in a quantified NP it needs to take scope over. Of course, it is only obvious how to reduce these data to the more general effects with comparison operators if we are dealing with the comparison operator *different* in these cases.


7. CONCLUDING REMARKS

To summarize: I suggest that the two NP dependent readings of *different*, contrary to the first impression, are not one and the same phenomenon. As German helps us to see, one is an instance of a reciprocal use of a relational adjective, the other is particular use of a comparison operator. The mechanisms involved in deriving the NP dependent readings are very different. The first makes crucial use of plurality, and the fact that the interpretation of reciprocals leaves some room for pragmatics. We see that accordingly, plurality has an important influence on the availability of that reading, whereas scope interaction between the licensing NP and the NP containing *different* doesn't. The Q-bound reading on the other hand shares properties of comparison constructions and requires the licensing NP to take scope over the comparison operator. The readings are licensed in different environments, requiring us to give them different treatments.

While the analysis of NP dependent readings I suggest is non-uniform in this sense, I use the ordinary meanings of *different* (i.e., those meanings we need for independent reasons anyway) to account for the dependent readings also.

Let me indicate where I think my analysis is preferable to its predecessors. Once the Q-bound reading is distinguished from the plural NP dependent reading, it becomes clear that we would not want to make use of the usual strategies of relating the *different* NP to its licensing NP in the latter case. By 'usual' I mean scope and variable binding or anaphoricity. I take it to be a strength of my analysis that it allows us to stick to a restrictive view of the syntax-semantics interface, in particular with respect to what we know about restrictions on scope. Both Carlson and Moltmann observed that the relation between *different* and its licenser is not quite like any other grammatical relation that comes to mind. On my story, the apparently unrestricted nature of the phenomenon we're looking at is due to this being a partially pragmatic effect, and it does not force us to make unusual claims about scope. This is what I criticise in Carlson's proposal: the *different* NP would have to take very wide scope to implement his analysis (cf. the data in section 5). The same criticism applies to Moltmann's theory, where *different* corresponds to an operator on the rest of the clause. It also applies to Heim's (1985) suggestion to extend the comparison operator *different* to account for the plural NP dependent reading, an option briefly discussed in her paper. She would treat the licensing NP as an argument of *different*, hence raise *different* to take the NP into its scope.

On the other hand, the phenomen is only apparently unrestricted, in that the availabilty of cumulation was shown to be a constraining factor.

Let me also mention a limitation of the present proposal. I have concentrated here on NP dependent readings. It is a known fact from previous work that there are other dependent readings of *different* where the licenser is not an NP (cf. the data in section 2.2.). (99a) (from Moltmann) is another case in point:

(99)a.  Different men came and left.

    b.  The men who came are different from the men who left.

The sentence has a reading paraphrased in (99b). The idea underlying my analysis carries over to this example easily. The preliminary formalization suggested by my analysis is given in (99'a). With the cover indicated

in (99′b) (which presumably is licensed by the linguistic context), this represents the dependent reading.

(99′)a. ∃X[men(X) & X came and left and X are different from each other]

   b. Cov[X] = {the men who came, the men who left}

There is a problem, however, with the exact analysis of a particular part of this statement, namely 'X came and left'. This would have to mean that some parts of X came and other parts of X left for this analysis to be successful. I believe that we need such an interpretation anyway for data like (100):

(100)   Mary and John came and left, respectively.

That is, I think that we need pluralities that are not groups of individuals, and that we need a more general sense of cumulation. Data such as (99a) have lead Carlson and Moltmann to discuss *different* in terms of events and subevents, an aspect of their proposals that I haven't addressed above. Notice that I did not criticise the implementation in terms of plural events. I criticise the the specific semantic contribution they suggest *different* makes. I claim that *different* itself is nothing special at all, just a relation denoting expression. Special effects come about by this relation inducing a hidden reciprocal. I would stick to this assumption in extending my proposal to data like (99). I will not make up my mind as to what the other notion of plural object is that we need for (99) and its cousins – I could follow Carlson and Moltmann in taking those plural objects to be events. My analysis will carry over to such data just in case it can be claimed that they involve a two-way pluralization operation akin to standard cumulation as we know it for the case of plural individuals.

Quite generally, I predict a dependent reading of *different* to be possible only if the licenser can be related to the *different* NP via cumulated relations (of whatever kind). While I have made use of some restrictions on cumulation in section 5, just what the restrictions for cumulation between two argument slots are remains to be clarified, even for the case of individuals. Consider (101):

(101)a. Mary and John read books by different authors.

   b.?Mary and John read a book by different authors.

   c.#Mary and John read Jill's book by different authors.

(101a) has an NP dependent reading – it is essentially the same as the relative clause examples in section 5. I propose to connect Mary and John to *different* by cumulating *read* and *by*. (101b) is more interesting, since it involves a singular. Hence we cannot cumulate either *read* or *by*. We could conceivably cumulate the relation in (102):

(102)  $\lambda y \lambda x[x$ read a book by $y]$

This relation will be available at LF to be the argument of the ** operator just in case we can QR *different authors* out of its containing NP (as in inverse linking data). I am not sure about (101b) as the question mark indicates. I think that the relevant reading might be possible in (103):

(103)  Luise and Franz saw a premiere of different operas.

The 'specificity effect' exhibited by (101c) has been observed by Moltmann. This indicates that we might be observing a restriction on cumulation in terms of how far one can QR things out of the way to create the relation that needs to be cumulated. Hence, there is a way in which restrictions on scope re-enter the picture even with the plural NP dependent data.

Obviously, these questions about pluralities and cumulation will have consequences for the predictions we make about dependent readings of *different*. Since I am not certain about the answers to these questions, I have left out a lot of Carlson's and Moltmann's data, and I will need to leave these issues for another occasion.

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