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## Friends and Colleagues: Plurality and NP-Coordination

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### 1. Introduction

This paper presents a set of largely novel data concerning conjunction inside the noun phrase, and shows how this little-studied domain includes structures with readings which are quite unexpected under any current theory of coordination. Moreover, these readings vary across languages in an interesting and systematic fashion.

To address this problem, we outline a new proposal for the interpretation of conjunction that can handle these data, but can also, we believe, be extended to the whole phenomenon of coordination. We deduce the cross-linguistic variation from an independently motivated theory of the syntax-to-semantics mapping, in which a parametric difference exists in the way that natural languages obtain the semantics of *number*, starting from the same set of functional projections within the DP.

Our analysis is intended partly as a case-study in the interplay between the syntax and semantics of functional heads; the account of conjunction that we develop provides a tool for further syntactic and semantic analysis of the DP.

### 2. Split and joint conjunction in the DP

Semantic studies of conjunction have concentrated almost exclusively on the conjunction of maximal (extended) projections (in the case of DPs, the entire DP). The focus of this paper, however, is on examples such as (1):

- (1) [My [friend and colleague]] always sang too loud.

A typical basic assumption about the internal syntax and semantics of argument nominals is that they include the lexical projection of the noun, interpreted as a predicate (see Stowell 1983, Higginbotham 1987, Hudson 1989, Longobardi 1994, and Zamparelli 1995, 1995); this then restricts a variable contributed by a higher functional projection (say, the D head).

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- (2) [DP the [NP/predicate doctor ]]

The obvious conclusion about the structure in (1) is that it involves conjunction at the level of N or NP. Given that NPs are taken to be predicates, we then expect that here conjunction should be interpreted exactly as conjunction of predicative nominals or adjectives, which is adequately captured by the operation of *property intersection*:

- (3) a. My uncle is [short and fat].  
 b. My aunt is [a doctor and an active member of the local union]
- (4)  $\text{my-uncle}' \in (\text{short}' \cap \text{fat}')$

This reading, which we will call "*joint*", is indeed available: unambiguous examples are given in (5).

- (5) a. [My [friend and colleague]] was late.  
 b. [That [liar and cheat]] is not to be trusted.

What is not expected, however, is that there is another reading, according to which the conjunction is interpreted as denoting distinct individuals with distinct properties:

- (6) a. [My [father and grandfather]] were both sailors.  
 b. [That [man and woman]] were still shouting at each other.

We call this the "*split*" reading.<sup>1</sup>

The examples in (6) are conjunctions of singular NPs; the split reading however (like the joint reading) is also possible in the plural, as shown in (7).

- (7) a. [My [parents and grandparents]] were all from Rome.  
 b. [Those [men and women]] were advancing on the barricades.

In fact, a search through the British National Corpus reveals that, far from being an unproductive, highly restricted construction, the split reading of NP conjunction is available with many determiners and noun heads:

- (8) a. the actor's work depends so much on the technical decisions of [the [director and editor]]  
 b. In today's preliminary hearings ... [a [36-year-old farmer and 25-year-old X-ray technician]] both claim a right to asylum ...  
 c. [This [global stance and anthropological imagination]] continue to guide him  
 d. ... each item consisted of so many bars of [one [tempo and time signature]]  
 e. [My [mouth and throat]] went dry  
 f. There is a Bastille in [every [glen and firth]].

<sup>1</sup>Agreement on the main verb disambiguates these two readings; we will not however be addressing the question of how to handle verbal agreement in this paper. Likewise, we will have nothing new to say on the *internal* structure of constituent coordination; our account is not dependent on any particular structure.

- g. the technical structure of [each [step and pose]] is known.

So far we have one mystery: how can the split reading seen in (6)–(8) be reconciled with what we know about the syntax and semantics of nominals? But the facts are yet more complex when we consider languages other than English.

The singular split reading exists in Dutch, although it seems to be somewhat less productive than in English.<sup>2</sup> However, in many languages, including French, German, Italian and Spanish, conjunction of singular count NPs within DP yields only the *joint interpretation*; the singular split interpretation is excluded (here and throughout this paper we will exemplify with Italian):

- (9) a. [ L' [ amico e collaboratore ] di Gianni ] è stato qui.  
           the friend and collaborator of Gianni is been here  
           *Gianni's friend and collaborator was here.*  
 b. \*[ Questo [ soldato e marinaio ] ] sono buoni amici.  
           this soldier and sailor are good friends  
           *This soldier and sailor are good friends.*

Strikingly, this contrast between “singular-split” (SS) languages like English (and Dutch) and “non singular split” (NSS) ones like Italian holds only in the singular. In Italian, as in English, conjunction of simple *plural* nouns within DP can have the split reading:

- (10) a. [ Questi [ soldati e marinai ] ] sono buoni amici.  
           these soldiers and sailors are good friends  
 b. [ Gli [ amici e nemici ] di Gianni erano finalmente d'accordo.  
           the friends and enemies of Gianni were finally in agreement  
 c. [ Vari [ fratelli e cugini ] di Carlo ] vennero al matrimonio.  
           various brothers and cousins of Carlo came to the wedding.

However, in NSS languages the plural split reading degrades when modifiers or complements are conjoined along with the nouns, under a definite determiner:

- (11) a. ??[ Quei [ soldati italiani e marinai dell' incrociatore “Percy” ]  
           those soldiers Italian and sailors from the cruiser “Percy”  
           sono buoni amici.  
           are good friends.  
 b. ??[ Gli [ amici italiani di Carlo e nemici stranieri di Mario ] erano  
           the friends Italian of Carlo and enemies foreign of Mario were  
           finalmente d'accordo.  
           finally in agreement

We will defer the discussion of this effect (which is not present in English, as can be judged from the glossae) to Section 7.

<sup>2</sup>Our informants were happy with definites and demonstratives, but found indefinites rather marginal. Singular split readings were also reported to us for Finnish and Japanese.

We now have the following questions to answer: First, what semantics for conjunction can capture the full range of DP-internal cases (both the joint and the split readings)? Second, what is the difference between English and Italian that gives rise to the contrast in the singular, but only partially in the plural? Third, why does Italian show a contrast between 'simple' and 'complex' NPs?

Already at this point the facts suggest that the answer to the second and third questions must lie in some cross-linguistic difference in the syntax and/or semantics of the DP (thus we differ from the basic approach of Dowty 1988, one of the very few analyses of this phenomenon in the literature): no independent evidence exists for a difference between English *and* and Italian *e*. Moreover, any such distinction would have to distinguish between singulars, 'simple' plurals and 'complex' plurals.

### 3. Why the split interpretation is not determiner ellipsis

Given the synonymy of a split conjunction like (12a) with the full DP conjunction in (12b), an obvious line of analysis is to propose that these two constructions are in fact syntactically (and semantically) identical, differing only in their phonological spell-out: the split reading would arise from *ellipsis* of (at least) the determiner in the second conjunct.

- (12) a. My mother and father live in the South.  
b. My mother and my father live in the South.

However, there are a number of reasons to reject this analysis. First, this construction does not behave like other better-established cases of ellipsis, such as gapping. The examples in (13a,b) demonstrate that when there are three conjuncts, gapping can "delete" the verb from both the second and the third conjuncts (13a), or from the third conjunct alone (13b).

- (13) a. John wrote the first chapter, Mary ~~wrote~~ the second chapter, and Bill ~~wrote~~ the conclusion.  
b. John wrote the first chapter, Mary wrote the second chapter, and Bill ~~wrote~~ the conclusion.

In contrast, the ellipsis operation hypothesized as the source of split conjunction must delete both the second and third determiner if it deletes either. (14b) is ungrammatical, in contrast to (13b):

- (14) a. the man, ~~the~~ woman, and ~~the~~ child  
b. \*the man, the woman, and ~~the~~ child

On the other hand, suppose that split conjunctions like (14a,b) are not the result of ellipsis, but rather, as we have been assuming, that the absence of a determiner in a conjunct shows that the coordination is at a lower level in the structure. The ungrammaticality of (14b) follows straightforwardly. (14b) is out because *child* cannot coordinate with the full DPs *the man* and *the woman*. It could coordinate with *woman* to form the full DP *the woman and child*, but this would leave the top level

coordination without an overt marker of conjunction. If this is added (“the man and the woman and child”), grammaticality is restored.

Second, under the ellipsis proposal we would expect (15b) to mean the same as (15a) (total of 8 people): but this reading is not available.

- (15) a. Four men and four women walked into a bar. Total = 8  
 b. Four men and women walked into a bar. Total = 4

Even if we could explain why the reading of 8 people is not available for (15b), an even more serious problem is that the ellipsis proposal gives us no way of deriving the actual interpretation of four adults including at least one man and one woman.

Finally, we can envisage no plausible explanation for why in NSS languages ellipsis should operate only with (simple) plural nominals (see (9b) vs. (10)).

#### 4. Conjunction as “set product”

As mentioned above, we start from the assumption that the behavior of conjunction within nominals depends crucially on the internal syntax and semantics of the DP. First we have to ask the question: What should singular and plural NPs denote?

A standard semantic assumption is that nouns (and therefore, their immediate projection NP) denote sets of atomic individuals. Departing slightly from this view for reasons of type-uniformity with plurals, we propose that a singular NP denotes a set of singletons, and a plural NP denotes a set of sets of atoms:

- (16) a. Singular: set of singletons, e.g.  $\{\{a\}, \{b\}, \{c\}\}$   
 b. Plural: set of sets, e.g.  $\{\{a,b,c\}, \{a,b\}, \{a,c\}, \{b,c\}\}$

Now, what should the conjunction of two singular NPs denote? The obvious answer is that we want the denotation to be a set of two-membered sets, in which each set contains an element from each of the conjoined nominals. Given the denotation in (16a), we can get this result by interpreting conjunction as the operation of *set product*, defined in (17).

- (17) **Set-Product**  

$$SP(A^1, \dots, A^n) =_{def} \{ X : X = a^1 \cup \dots \cup a^n, a^1 \in A^1, \dots, a^n \in A^n \}$$

Given two or more sets, this operation takes a member from each and performs union; this is repeated for all possible combinations, and the results gathered into a new set.

To give a simple example: If there are just two conjuncts, ( $NP_i$  and  $NP_j$  in (18a)) and they do not share any members (as in e.g. *man and woman*), we will obtain a set of two-membered sets, as in (18b).

- (18) a.  $\|NP_i\| = \{\{a\}, \{b\}\}, \quad \|NP_j\| = \{\{c\}, \{d\}\}$   
 b.  $\|NP_i \text{ and } NP_j\| = SP(\|NP_i\|, \|NP_j\|) = \{\{a,c\}, \{a,d\}, \{b,c\}, \{b,d\}\}$

This is just what we need for the *split* reading. But now observe: since set-product is defined in terms of union, if the two conjuncts do overlap (as they may in e.g.

*friend and colleague*), the resultant set will also contain singletons. For example, in (19a) there is one element that is in both sets ( $\{c\}$  is both an  $NP_i$  and an  $NP_j$ ); correspondingly there is one singleton in the denotation of the conjunction in (19b).

- (19) a.  $\|NP_i\| = \{\{a\} \{b\} \{c\}\}$ ,  $\|NP_j\| = \{\{c\}, \{d\}\}$   
 b.  $\|NP_i \text{ and } NP_j\| = SP(\|NP_i\|, \|NP_j\|) = \{\{a,c\}, \{a,d\}, \{b,c\}, \{b,d\}, \{c,d\}, \{c\}\}$

The set of such singletons is precisely the *intersection* of the two conjuncts, i.e. what we need for the *joint* reading. The problem is now how to exclude the split reading for Italian singular conjunctions like (9b). The answer lies in the interaction of conjunction with the way in which singularity and plurality are construed.

### 5. The internal structure of the noun phrase and its semantics

The structure we are assuming for the noun phrase is given in (20).<sup>3</sup>

- (20) a.  $[DP \textit{ Det } [_{NumP} \textit{ Num } [_{PIP} (\textit{ Modifier } |_{NP} \textit{ Noun } (\textit{ Compl} ) ] ] ] ] ]$   
 b.  $[DP \textit{ Those } [_{NumP} \textit{ few/three } [_{PIP} \textit{ interesting } [_{NP} \textit{ papers } ] ] ] ] ]$

Following Zamparelli 1995, we will minimally assume that NumP hosts “weak” determiners in the sense of Milsark 1974 (the indefinite article *a(n)*, cardinal numerals, vague numerals such as *many*, *few*, *several*, *some* etc.), and DP, “strong” determiners (definite determiners, universal quantifiers, etc.).

In this paper, we are interested in a semantics which provides a procedure for evaluating the meaning of the DP in terms of the meaning of the projections in (20). To this effect, we set out the following working principle in (21):

- (21) **Semantic Composition of Functional Heads:**  
 Each functional head F denotes a function over the meaning of its syntactic arguments.

Precisely which function each F denotes depends in part on its overt lexical content, if any, and in part on which semantically interpretable features are checked at F in the course of the derivation. The important cases for us are the functional heads *Pl* and *Num*. What do they take as their arguments, and what operations do they perform on them?

All count nouns (and NPs based on them), whether singular or plural, denote sets of singularities. Note that this is a revision of what we said in (16), where for the sake of exposition we glossed over the distinction between the denotation of the noun as it comes out of the lexicon, and the denotation of the larger nominal structure that it projects.<sup>4</sup> The difference between singular and plural is expressed by the feature

<sup>3</sup>DPs are in fact likely to contain additional functional projections to host various types of modifiers. The projections in (20) (corresponding to SDP, PDP, KIP and NP in Zamparelli 1995, 1998) are however the only ones relevant to the semantics of number.

<sup>4</sup>The idea that the plural denotation of plural nouns is generated only at a certain level within DP is motivated by the fact that no expression of cardinality can modify nouns below a certain DP

$\{\pm\text{PLUR}\}$  on  $N$ ; this feature is checked by some higher functional head, and triggers a particular semantic operation at that point.

The *Pl head* is where pluralities are constructed from the denotation of the NP, where “constructing a plurality” means building the closure under Generalized Union of the set denoted by the NP (the *\*-operation*):

$$(22) \quad \text{Generalized Union} \\ \cup(X) =_{def} \begin{cases} y, y \in X & \text{if } X \text{ is a singleton set} \\ y^1 \cup \dots \cup y^n & \text{if } X = \{y^1 \dots y^n\}; \text{ undefined otherwise} \end{cases}$$

$$(23) \quad \|\|_{Pl} NP\|\| = * \|\| NP\|\| = \{X : \exists Y \subseteq \|\| NP\|\| \ X = \cup(Y)\}$$

The *Num head* regulates the cardinality of the PIP denotation, filtering from it all the elements with the wrong number of atoms:

$$(24) \quad \|\|_{NumP} n \text{ PIP}\|\| = \{X : X \in \|\| PIP\|\| \text{ and } |X| = n\}$$

The semantics of *Det* are not crucial for our account; we will not discuss it here.

Given these ingredients, we need to specify a way in which singular and plural DPs obtain their different denotations. A simple and intuitive way to obtain the number difference is the following: the PLUR feature associated with the noun is attracted to Pl; a +PLUR value linked to plural morphology triggers the application of the *\*-operator* at PIP, while a -PLUR value doesn't. In the latter case the NP denotation, a set of singular individuals, is passed up to NumP unaltered.  $\pm\text{PLUR}$  doesn't play any *semantic* role higher than PIP (though it may raise further to check *syntactic* agreement, e.g. at D); we therefore refer to this as the *PIP strategy*. In the absence of an overt numeral in Num, no semantic filtering takes place at NumP (the projection is possibly absent). Note that a +PLUR feature value preserves singularities in the denotation.

But there is a second possible way to obtain the right semantics for number. Singular and plural can be seen as ways to partition the denotation which is delivered by the *\*-operator*. Just as “3” preserves only those elements in the denotation which contain exactly three atoms, -PLUR can be seen as the number 1, which preserves only elements of cardinality 1 in the denotation, and +PLUR as the complement of this operation, i.e. an instruction to *remove* from the set any element of cardinality 1. In a layer system, this means that Num attracts PLUR whenever the projection doesn't host any overt numeral expression, and applies its filter over the denotation of PIP, removing all the elements with the wrong cardinality, as determined by the value of PLUR; we therefore refer to this as the *NumP strategy*. PLUR transits over Pl on its way to Num, and it triggers the *\*-operation* at PIP (always, or only when it has a positive value: the final result is not affected).

The main syntactic ingredient of our proposal is that both of these strategies are realized in natural language. Specifically, we propose that English and all SS languages adopt the PIP strategy, whereas Italian and other NSS languages adopt the NumP strategy.

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layer. See Zamparelli 1998 for discussion.



The difference between the PIP and the NumP strategies has syntactic and semantic consequences quite independent from coordination. On the syntactic side, in English the feature PLUR is never checked by an empty Num head. If no indefinite is present in NumP, the projection plays no role and we have suggested that it might not be realized at all. In Italian-like languages, on the other hand, an empty NumP is always realized and always checked by PLUR. Let's consider a case in which this difference leads to different licensing strategies.

English has various constructions in which a DP-internal modifier appears to have been fronted to a DP-initial position. One example is *adjectival fronting* (25); another, the "N-of-a-N" construction illustrated in (26) and studied in Napoli 1989 and Den Dikken 1996. This includes the special case of "much"-raising (27). (25b) and (26b) show that both constructions are impossible in the plural.

- (25) a. John was {[too shrewd] a politician} to miss this opportunity.  
 b. \*They were {[too shrewd] (some) politicians } (to miss this opportunity).
- (26) a. Mary was [[a jewel] of a girl]  
 b. \*I just saw [[(some) jewels] of (some) girls]
- (27) Bill wasn't [[too much] of a scholar]

The N-of-a-N construction is also present in Dutch ((28), from Den Dikken 1996) and Italian (29).

- (28) Die pracht van een Westertoren  
 that beauty of a Westertoren
- (29) a. Quella peste di (un) Gianni      b. Quelle pesti di ragazzi  
 that rascal of a Gianni                those rascals of boys

The issue here is the status of the indefinite ("a" in (25a), (26a), (27), "een" in (28) and "un" in (29a)) which appears in these constructions, why it is optional in Italian (see (29a)), and why Italian allows a plural version of the N-of-a-N which is at best marginal in the other two languages. Our proposal is as follows.

Suppose that these constructions require the raised modifier to go through or stop in the Spec of NumP. Obviously, NumP must be realized in this case, but the raised predicate does not by itself license it, lacking the appropriate 'cardinal' meaning. In Italian, PLUR is attracted to this position as usual, licensing it and allowing either singular and plural versions of the construction. In English and Dutch, on the other hand, PLUR is not attracted to Num (the plural-forming operation is completed at PIP); as a back-up strategy, these languages insert a 'light' indefinite article in Num. In turn, the indefinite attracts -PLUR to have its syntactic feature checked, forcing the whole construction to be singular.

The analysis extends to other cases of determinerless singular count nouns. Contrast the Italian example in (30) with its gloss.

- (30) Come (\*un) avvocato, Gianni è bravo.  
 As \*(a) lawyer, John is good.

At a semantic level, our proposal implies that in English, but not in Italian, formally plural DPs might have singular reference. One instance of this phenomenon is the existence in English of a plural “no” which clearly ranges over *singular* individuals (see (31)). In Italian, no plural form of “nessuno” (*no-one<sub>singular</sub>*) exists (see (32)), morphologically parallel to “alcuni” (*some-ones<sub>plural</sub>*).

- (31) No boys arrived. *false if 1 boy arrived*  
 (32) \*Non sono arrivati nessuno ragazzi.  
       not are arrived no-ones boys

The same semantic distinction is also responsible for a difference in the availability of *dependent plurals*, exemplified in (33) for English.

- (33) a. Those two men are wearing hats.  
       b. Octopuses have beaks.

Here the second plural is quantificationally dependent on the first one, and it ranges over *individual* hats or beaks (one per man/animal). In Italian, the equivalent of (33) is semantically odd, since it suggests that each men/octopus has more than one hat or beak. In other terms, the Italian bare plural always denotes a proper plurality even when in the scope of a higher quantifier, while the English one doesn't.<sup>5</sup>

- (34) a. Quei due uomini portavano (# cappelli / orecchini).  
       those two men wore ( hats / earrings)  
       b. I polpi hanno (# becchi / tentacoli)  
       the octopuses have ( beaks / tentacles)

## 6. The two strategies for number meet conjunction

Given the interpretation of *and/e* as set-product (Section 4.), and the two strategies for number (Section 5.), the distribution of the split interpretation within and between languages follows directly. We illustrate with some simple examples. First, consider a model where there are two soldiers, two sailors, and no one with two jobs:<sup>6</sup>

- (35) a.  $\| \text{soldier} \| = \{ \{a\}, \{b\} \}$ ,  $\| \text{sailor} \| = \{ \{m\}, \{n\} \}$   
       b.  $\| \text{soldier and sailor} \| = \text{SP}(\| \text{soldier} \|, \| \text{sailor} \|) = \{ \{a,m\}, \{a,n\}, \{b,m\}, \{b,n\} \}$

In English, this denotation is passed up to PIP, which leaves it unchanged (both Ns have -PLUR features). NumP is inactive: the pair denotation reaches D and functions as a restrictor for D.

<sup>5</sup>It should be added that (34) is more natural if a definite article is inserted before the second DP. The effect is even sharper then, but this might be due to presence of the article. Thanks to Alessandra Giorgi for discussions on this point.

<sup>6</sup>Note that we are making the assumption that coordination is “as low as possible”, perhaps as the reflex of some consideration of economy of structure.

In Italian, the -PLUR feature on the N heads raised across-the-board to NumP triggers the filtering away of all the pairs that resulted from the conjunction. Hence, there is no split interpretation:

- (36) a.  $\| \llbracket_{NP} \text{ soldato} \rrbracket \| = \{\{a\}, \{b\}\}$ ,  $\| \llbracket_{NP} \text{ marinaio} \rrbracket \| = \{\{m\}, \{n\}\}$   
 b.  $\| \llbracket_{NP} \text{ soldato e marinaio} \rrbracket \| = SP(\| \llbracket_{NP} \text{ soldato} \rrbracket \|, \| \llbracket_{NP} \text{ marinaio} \rrbracket \|) = \{\{a,m\}, \{a,n\}, \{b,m\}, \{b,n\}\}$   
 c.  $\| \llbracket_{PIP[NP]} \text{ soldato e marinaio} \rrbracket \| = \{\{a,m\}, \{a,n\}, \{b,m\}, \{b,n\}, \{a,m,n\}, \{a,b,m\}, \{a,b,n\}, \{b,m,n\}, \{a,b,m,n\}\}$   
 d.  $\| \llbracket_{NumP} \text{-PLUR} [PIP[NP] \text{ soldato e marinaio}] \rrbracket \| = \emptyset$  *no singularities*

When the two properties overlap, the set product operation produces also singularities. In English these are simply part of the denotation of PIP/NumP. In Italian, *only* the singleton sets will be preserved by the Num<sub>-plur</sub> filtering; hence the unambiguously joint interpretation in this language, illustrated in (37):

- (37) a.  $\| \llbracket_{NP} \text{ amico} \rrbracket \| = \{\{a\}, \{b\}\}$ ,  $\| \llbracket_{NP} \text{ collega} \rrbracket \| = \{\{b\}, \{c\}\}$   
 b.  $\| \llbracket_{NP} \text{ amico e collega} \rrbracket \| = SP(\| \llbracket_{NP} \text{ amico} \rrbracket \|, \| \llbracket_{NP} \text{ collega} \rrbracket \|) = \{\{a,b\}, \{a,c\}, \{b,c\}, \{b\}\}$   
 c.  $\| \llbracket_{PIP[NP]} \text{ amico e collega} \rrbracket \| = \{\{a,b\}, \{a,c\}, \{b,c\}, \{b\}, \{a,b,c\}\}$   
 d.  $\| \llbracket_{NumP} \text{-PLUR} [PIP[NP] \text{ amico e collega}] \rrbracket \| = \{\{b\}\}$

In the plural, however, the two languages converge. Again, consider a model with two soldiers and two distinct sailors:

- (38) a.  $\| \llbracket_{NP} \text{ soldati} \rrbracket \| = \{\{a\}, \{b\}\}$ ,  $\| \llbracket_{NP} \text{ marinai} \rrbracket \| = \{\{m\}, \{n\}\}$   
 b.  $\| \llbracket_{NP} \text{ soldati e marinai} \rrbracket \| = SP(\| \llbracket_{NP} \text{ soldati} \rrbracket \|, \| \llbracket_{NP} \text{ marinai} \rrbracket \|) = \{\{a,m\}, \{a,n\}, \{b,m\}, \{b,n\}\}$

In both English and Italian the \*-operator will apply at PIP to construct a plurality:

- (39)  $\| \llbracket_{PIP} \text{ soldati e marinai} \rrbracket \| = * \| \llbracket_{NP} \text{ soldati e marinai} \rrbracket \|$   
 $= * \{\{a,m\}, \{a,n\}, \{b,m\}, \{b,n\}\}$   
 $= \{\{a,m\}, \{a,n\}, \{b,m\}, \{b,n\}, \{a,m,n\}, \{a,b,m\}, \{a,b,n\}, \{b,m,n\}, \{a,b,m,n\}\}$

If NumP is empty, it is inactive or absent in English, hence this is the denotation which will be passed up to DP. In Italian, even an empty NumP is active: a -PLUR feature triggers the filtering away of all singletons in  $\|PIP\|$ . But of course here there are no such singletons, so the filtering operation applies vacuously. Thus the NumP denotation passed up to DP will be exactly the same as in English, and the availability in both languages of the split reading in the plural is accounted for.

## 7. Contrast between Ns and NPs in NSS languages

The account given so far predicts that in the conjunction of *plural* nominals under a single D, split readings should be freely available in any language. As shown above

in (11), this is not entirely correct: under a definite article or a demonstrative, coordinated nominals with complements and modifiers are impossible. In some languages (e.g. French, Spanish, see (40)), even simple N coordination is marginal after definites.

- (40) a. ?Les marins (\*dans le bar) et soldats dans la rue chantaient.  
           the sailors (in the bar) and soldiers in the street sang  
       b. ?Los hermanos (\*de Carlos) y nietos de Juan se encontraron.  
           the brothers (\*of Carlos) and nephews de Juan met

However, grammaticality is restored if complex NPs are coordinated under a numeral expression, whether or not a definite precedes. Again we exemplify with Italian:

- (41) a. (I) numerosi [ amici italiani di Carlo e nemici stranieri di  
           (the) numerous friends Italian of Carlo and enemies foreign of  
           Mario ] erano finalmente d'accordo.  
           Mario were finally in agreement  
       b. (I) {molti / venti} [ ufficiali della Nato e diplomatici russi ]  
           (the) {many / 20} officers of NATO and diplomats Russian  
           discussero brevemente  
           discussed briefly

Recall that in NSS languages  $\pm$ PLUR raises to Num whenever this layer contains no overt specification of number. But the difference between (11)/(40) and (41) is precisely that in (41) NumP has been filled, so it doesn't attract PLUR. Note, next, that in (11)/(40)  $\pm$ PLUR would have to raise across-the-board from within each of the complex NP categories. However, cases of overt ATB Wh-movement, e.g. (42a), show that in this case it is very difficult to obtain the split reading, given in (42b):

- (42) a. #Tell me which documents John wrote today and Mary filed yesterday.  
       b. ... which documents<sub>i</sub> John wrote and which ones<sub>j</sub> Mary filed.

We tentatively suggest that, in (11)/(40),  $\pm$ Plur has to pied-pipe enough interpretable features from each N to trigger the same effect found in (42a) at the NumP layer—though the precise nature of the effect remains to be specified. As for the grammaticality of coordinated simple nominals under definites (e.g. (10) above), the structure here is compatible with the conjunction of N heads;  $\pm$ PLUR is thus associated with the complex [<sub>N</sub> N and N] head, and it doesn't raise across-the-board.<sup>7</sup> The situation is analogous to "Tell me which books John [<sub>v</sub> bought and sold] today", which is compatible with a pair-list reply: "Those<sub>i</sub> he bought, those<sub>j</sub> he sold". The structures involved are schematically shown in (43):

- (43) a. [DP I [<sub>NumP</sub> Num<sub>F(N<sub>i+j</sub>)</sub> [<sub>PIP</sub> Pl [<sub>NP</sub> [<sub>NP</sub> N<sub>i</sub> Compl] and [<sub>NP</sub> N<sub>j</sub> Compl]]]]]]  
       b. [DP I [<sub>NumP</sub> Num<sub>F(N<sub>i+j</sub>)</sub> [<sub>PIP</sub> Pl [<sub>NP</sub> [<sub>N<sub>i+j</sub></sub> N<sub>i</sub> and N<sub>j</sub>] Compl]]]]] no ATB  
       c. [DP I [<sub>NumP</sub> 20 [<sub>PIP</sub> Pl<sub>F(N<sub>i+j</sub>)</sub> [<sub>NP</sub> [<sub>NP</sub> N<sub>i</sub> Compl] and [<sub>NP</sub> N<sub>j</sub> Compl]]]]]]

<sup>7</sup>NSS Languages where definites with conjoined simple nouns are not perfect might simply have a preference to treat these cases, too, as NP-conjunctions.

## 8. Conclusion

In this paper we have proposed a new interpretation for conjunction. For reasons of space we have only been able to demonstrate that it gives the right results for the particular case of N and NP conjuncts within the DP; we believe however that it generalizes to other cases of conjunction, and are exploring this in work in progress. We have further shown that an intricate pattern of cross-linguistic differences can be derived from this single interpretation of conjunction, when coupled with an independently motivated parametric theory of number. To the extent that the analysis proposed here is successful, we believe that it argues strongly for the importance of giving equal weight to the syntax and semantics of functional structure.

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