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„The Italian Determiner *Ogni* and its Cumulative Readings"

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# Contents

# Acknowledgements

> "You wanted me to come here?" — "I wanted Sybil and her husband to be here for Mary's wedding, yes."
>
> Tom Branson and Violet Crawley, Downton Abbey

Without Viola Schmitt, my supervisor, I would know nothing about much of what is written in these pages and, of course, this thesis would have not been written. She has always trusted me and she possesses the very precious skill of preventing you (actually, me) from going the wrong way without being patronising in any way. She has been there for my work and for me any time I needed, she knew when I did need it and when I did not.

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[1] Obviously, the reverse alphabetical order is intentional.

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# Chapter 1

# The problem

> Ask any linguist for an example of a quantifier, and the answer is likely to be *every*. For most linguists, *every* is the prototypical, garden-variety quantifier, that which appears in the stock example sentences […] Philosophers, however, when constructing universal generalisations, seem to harbour a conflicting preference for *all* […] Indeed, it is the letter *a* from *all* which, when capitalized and turned upside-down, forms the symbol for the logicians' universal quantifier ∀.
>
> Gil 1995: 321

In this chapter I present the empirical problem to be discussed in this thesis, which is the description of the conditions under which a sentence with a quantifier headed by a singular universal determiner (English *every*) has a cumulative reading. The whole phenomenon will be treated here from a rather pre-theoretical, informal point of view with knowledge of some theoretical notions assumed.

## 1.1 Distributive quantifiers

Universal quantification over individuals can be expressed in more than one way in English, and this is the case for other natural languages as well (see e.g. Keenan and Paperno 2012). In fact, the three determiners *all*, *every* and *each* appear in many cases to be equivalent, i.e. synonymous, in the sense that these three sentences are arguably truth-conditionally equivalent (i.e. there is no model in which these three sentences do not have the same truth value):

(1.1) a. [All students] sleep.
b. [Every student] sleeps.
c. [Each student] sleeps.

To put it informally, these sentences are true only if in the model in which they are evaluated there are no members of the set of students of which the property of sleeping

does not hold.[1] From this perspective, one can say that the bracketed portions of the sentences in (1.1) all denote a certain property of sets, namely the property of containing all students. Accordingly, the determiners in (1.1) could be thought of as having one common denotation viz. "function", which, following standard assumptions (Barwise and Cooper 1981), corresponds to affirming the subset relation between two sets (in this case, the set of students and the set of sleepers):[2,3]

(1.2) $[\![ \text{all/every/each} ]\!] \stackrel{?}{=} \lambda P_{et}.\lambda Q_{et}.\forall x[P(x) \rightarrow Q(x)]$.

Note that the sets that are involved in the sentences in (1.1) contain atomic individuals, i.e. *student* and *sleep* have atomic individuals in their extension. In fact, leaving formal definitions aside, *student* is neither a mass nor a collective noun and, as we shall see later, when *sleep* is predicated of a plurality (as in *Nina and Gennaro sleep*), it always allows the inference that *sleep* applies to each member of that plurality (unlike other verbs like *meet*). According to the putative definition (1.2) and using a "set talk" (i.e. talking about sets instead of characteristic functions thereof), the determiner first takes a set of individuals as its *restrictor* ($P$) and then it takes another one as its *nuclear scope* ($Q$)[4] and states that all individuals that are members of the restrictor set are members of the nuclear scope set too, i.e. $P$ is a subset of $Q$. This seems indeed to work as a definition of the determiners as presented in (1.1), as it determines the truth conditions we expect.

However, it is relatively easy to find cases where these determiners do not show the same behaviour, a fact noted in Kroch (1974), and even if these phenomena alone do not help us decide whether (1.2) is valid or not, this forces us to come up with an account for the difference between these determiners that goes beyond syntactic considerations (like the ability to "float" or the morphosyntactic features that are selected). Such discriminating cases exist in a parallel way also in other languages, like Italian (on which the main empirical focus throughout this discussion will be), as these examples show:

(1.3) a. All the boys surrounded the fort.

b. ?/* Every boy surrounded the fort.

c. ?/* Each boy surrounded the fort. (Beghelli and Stowell 1997: 88)

[1] Of course, the model must also be such that no presupposition is violated for the expression to be evaluated as "true", but such precision is not relevant here.

[2] Here we ignore obvious syntactic differences between the determiners, such as the fact that *all* selects a plural restrictor whereas the other two select a singular one.

[3] As a notational explanation: the non-italic and non-numeric subscripts on variables are a sloppy shorthand for indicating the domain to which the entities that the variable ranges over belong, i.e. these subscripts indicate the type of the entities over which the variable ranges. Thus, $z_{\xi}$ is, in the notation used here, equivalent to $z \mid z \in D_{\xi}$.

[4] This common terminology is from Heim (1982).

(1.4) a. Tutti i ragazzi hanno circondato il forte.
all the boys have surrounded the fort

b. ?/* Ogni ragazzo ha circondato il forte.
every boy has surrounded the fort

c. ?/* Ciascun ragazzo ha circondato il forte.
each boy has surrounded the fort

(1.5) a. All the boys earned 100 euros.

b. {Every / Each} boy earned 100 euros.

The reason of the asymmetry in the judgments between (1.1) and (1.3) is the difference between the two predicates: *sleep* is a distributive predicate, *surround* is a collective one. For a predicate *P* to be distributive, the distributive entailment (Champollion 2017) has to be valid: if *P* holds of a certain plurality of individuals, then it holds for each atomic individual that is part of that plurality.[5] Intuitively, this is the case for *sleep* but not for *surround*. In fact, a sentence like *A boy surrounded the fort* is hardly acceptable, and this is because of the collectivity of the predicate: it can only hold of a plurality.[6] On the other hand, predicates like *earn 100 euros* are compatible both with *all* and with *every*/*each*, but (1.5a) and (1.5b) have different truth conditions. For (1.5b) to be true it must be the case that every boy earned 100 euros individually, and thus the total amount of money earned is bigger than 100 euros, depending on how many boys there are. This condition is not necessary for the truth of (1.5a). Predicates that show this behaviour are usually called *mixed*, because they can be interpreted either collectively or distributively depending on "external" factors.[7]

There are at least two different notions of collectivity of a predicate, and therefore at least two definitions thereof. The simple invalidity of the distributive inference is just one of such definitions, and it is adopted e.g. by Link (1983) and by Dowty (1987). Another view of collectivity, defended e.g. in Landman (2000), holds that some additional condition must be present in order for the predication to be collective: this condition is in most cases stated as a "thematic collectivity" in the sense that the plurality of which the collective property is predicated must bear some sort of collective participation to the event (possibly in the form of carrying out the action, of collective responsibility, of actual formation of a body such as in *The boys touch the ceiling* and other similar forms of acting as a group).[8]

[5] We can ignore for the moment the important question of what it actually means, from a semantic point of view, for individuals to "form a plurality", in order to keep the discussion as informal as possible.

[6] The morphological category of number is irrelevant in these distinctions, although it obviously needs some syntactic treatment: *An army surrounded the fort* is perfectly acceptable, as *army* is a collective noun. Plurality is here a semantic notion.

[7] In this case, the external factor is obviously the choice of the determiner, but it might be the presence of particular expressions that force one reading: *The boys earned 100 euros together*/*individually*.

[8] For example, according to Landman (2000: 168), *The boys sing* can be a case of collective predication, whereas it couldn't be according to the first definition of collectivity (as here the distributive entailment is valid). In its (available) distributive reading, the boys might just sing each one for his own and not even

For the moment, whichever definition of collectivity is adopted is irrelevant, since the distribution of *every* and *each* does not seem to be affected by it, but the nature of collectivity will eventually be of interest in the development of the discussion. If one assumes the classification "distributive vs. collective predicates" (ignoring its shortcomings[9] that are not relevant here), the determiners will work as expected: expressions with predicates like *smile*, *die*, *be bald* pattern with (1.1), expressions with predicates like *form a circle*, *meet*, *gather* pattern with (1.3), the restrictor of the quantifier being e.g. *boy*.

Thus, from this small piece of data it appears that certain quantifiers, namely those headed by *every* and *each*, are not compatible with collective predicates, and therefore they are sometimes referred to as "distributive quantifiers" (e.g. in Beghelli and Stowell 1997) that have universal force in distributive environments. In the present work I will sometimes label them as "singular universal quantifiers", which requires less theoretic commitment and has the same extension as "distributive determiner" in the cases under scrutiny, given that in the three languages I focus on here (namely Italian, English and German) one can observe the syntactic pattern of (1.1): *all*-QPs[10] contain a plural NP (also the case in QPs headed by *all-* in German and *tutt-* in Italian), the others contain a singular NP.

One would then expect some consistency, i.e. the zero assumption would be that whenever a well formed quantifier of the form [*every NP*] combines with a predicate, two possibilities exist:

- The result is an odd or ungrammatical expression (in those cases where the predicate is collective, or the distributive reading is implausible);
- The only reading available is the distributive one.

It is important to stress that it is not obvious how this "distributive component" (if there is any) contributes to the semantic composition. For the present case I just recognise the distributional facts exemplified by (1.3) and (1.4) and I assume that they justify the classification.

Distributivity as a notion plays a role not only in the classification of predicates, but also in the description of the readings an expression may have, so that, for example, some sentences might (not) "have a distributive reading". For instance, a sentence that involves more than one plurality has a distributive reading available if it is true in a context where the two pluralities are in a distributive relation:

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know each other. In its collective interpretation (as it is understood by Landman) the plurality of the boys itself has the not pluralised Thematic Role of Agent of the singing event: in this case, the context that makes the sentence true is one where the boys form a group and are coordinated (in their intention, from an harmonic point of view or something else).

[9]As Dowty (1987) points out, citing unpublished work by Hans Kamp and Werner Frey, a three categories classification would do better, in order to account for the differences between predicates like *meet/gather/surround the fort* on one hand and predicates like *be numerous* on the other hand. Note for instance that quantification with *all* highlights this distinction: *?*All the boys are numerous*.

[10]Following Sportiche (1988) I use *QP* as a convenient label that refers to a syntactic phrase which has the semantic properties of a quantifier. However, this does not imply any theoretical commitment by me on this point, and thus is interchangeable with *DP* in these cases.

(1.6) SCENARIO: John, Bill and Mary are students, each of them read five books (not necessarily the same five books).

[$_A$ Three students] [$_B$ read (exactly) five books].

The sentence in (1.6) is arguably felicitous and true in the given scenario, which is characterized by a distributive relation. Following the terminology of Gil (1995), I call B the Share and A the Key. The Share is the expression that denotes the property that holds of each individual member of the denotation of the Key.

(1.6) also has another reading that will be discussed later, which becomes visible when considering contexts that make the sentence true and invalidate the distributive entailment. It might be the case that John, Bill and Mary had the assignment of reading and summarising five books, and therefore they decided to divide the labour: John, the most passionate about literature, read three books, Bill and Mary one each. In this context, it is not true that the property denoted by B holds of each member of the plurality denoted by A. Thus, the sentence in (1.6) is ambiguous.

Given what has been said and observed about the determiner *every*, we expect the following example to be true *only* in the context given in (1.6):

(1.7) Every student read five books.

In fact, (1.7) has only a distributive reading. There is reason to suspect that in replacing *three students* with the universal *every student* the contrast between the truth conditions of the two sentences (with *every student*, the only reading which is available is the distributive one) is in some way related to the contribution to the composition of *every*, since nothing was changed in the predicate *read five books*. Again, this simple fact is not really surprising, and in fact it just strengthens the case for the definition of *every NP* as "distributive quantifier", or at least it provides more evidence of the tight relation between *every* and the notion of distributivity.

## 1.2 Asymmetries with *every*

However, there is more to say about *every* in this respect. There are cases, already discussed in the literature, where a quantifier headed by *every* does not force distribution over its restrictor but instead makes another reading prominent. For example:

(1.8) SCENARIO: Three cats between them chased away all of the mice, so that each mouse was chased away by at least one cat, and each cat chased away at least one mouse.

Three cats chased away every mouse.

Let's say, for simplicity of representation, that there were four mice in total. Then (1.8) is arguably true both in a distributive scenario like the one represented in Figure 1.1

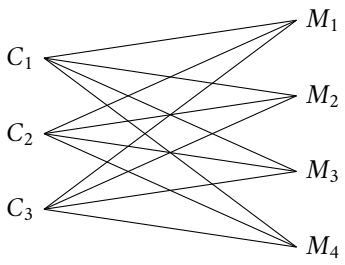



Figure 1.1: The distributive reading.

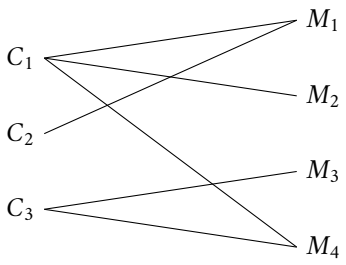



Figure 1.2: The cumulative reading.

and in a scenario like the one given in (1.8) represented in Figure 1.2:[11] The availability of a non distributive reading with the determiner *every* is somewhat unexpected. A famous and more complex example is brought up in Schein (1993):

(1.9) a. [$_A$ Three video games] taught [$_B$ every quarterback] [$_C$ two new plays]. (Schein 1993: 57)

b. Three video games between them were the cause for each quarterback to learn two new plays (the number of different new plays learned being up to two times the number of quarterbacks).

The interesting aspect of this sentence is, of course, its reading (1.9b) that is reportedly available. On the one hand, there is a distributive relation between B and C, the former being the Key and the latter being the Share. On the other hand, (1.9b) gives us a relation between A and B which is neither a form of collective[12] nor of distributive predication and which was forced in (1.9b) by means of *between them*. This example is in fact quite complex: we may temporarily turn our attention to simpler examples where such a relation shows up for us to be able to state its truth conditions more easily. Here, just as before, the "disambiguator" *between them* is not necessary for the sentence to have the reading we are interested in:

(1.10) [$_A$ Three video games] (between them) brainwashed [$_B$ five quarterbacks].

This sentence has a reading, which I will call cumulative following Scha (1981) among many others, according to which the totalities of video games and of quarterbacks that are involved in this brainwashing relation amount to three and five respectively; three different available readings of the sentence are given here, the cumulative one being the third:

[11]Note however that, as Champollion (2010) reports with respect to a different but equivalent example, not all speakers find it easy to get the cumulative reading that will be discussed. As of the judgments I have collected personally, all speakers could get this reading, albeit with some degree of difficulty in certain cases.

[12]I deliberately avoid here to discuss the notion of cumulativity as reciprocal collectivity, which will be considered later.

(1.11) a. There are 3 video games and up to 15 quarterbacks, each video game brainwashed 5 quarterbacks. (A > B)

b. There are 5 quarterbacks and up to 15 video games, each quarterback was brainwashed by 3 video games. (B > A)[13]

c. There are 3 video games and 5 quarterbacks, such that each video game brainwashed at least one quarterback and each quarterback was brainwashed by at least one video game.

The first two readings, which involve distributive quantification, result from the two possible scopal configurations of A and B, and, following standard assumptions (May 1978), "X > Y" translates syntactically in "X c-commands Y at LF". That is to say, those readings are relatively easy to represent.

This kind of scopal interaction is not present in (1.11c), and in fact cumulative readings are said to be scopeless relations. As already mentioned, ambiguity with respect to the kind of quantification (whether distributive, collective or cumulative) is strongly affected by plausibility, a condition that is not easily definable but nevertheless intuitive.[14] Given our knowledge of the world, we can generally identify examples of which the cumulative reading is the most plausible or even the only one that is plausible. This is in fact the case with the original example by Scha:

(1.12) 600 Dutch firms use 5000 American computers. (Scha 1981)

The two distributive readings of this sentence, especially if we take into consideration the fact that the example was formulated in 1981, are highly implausible: under one reading there would be 600 enormously rich and identically equipped Dutch firms, under the other one there would be 5000 computer each with a considerable and equal number of Dutch users. Indeed, the only reading that comes to mind is the cumulative one, and a sentence like this is plausible and expectable when considerations are being expressed about how developed the IT market is in the Netherlands. This kind of cumulative reading under plausible interpretive circumstances is not limited to sentences involving bare numerals, as is the case for the previous examples, but is also shared characteristic of certain kinds of quantifiers, definite descriptions and coordination structures. For these two sentences, for instance, cumulative readings are available that do not really need to be spelled out explicitly:

(1.13) a. [The cats of my neighbour] killed at least 10 mice in my cellar this week.

b. [Albano and Romina] have written more than 50 songs.

Coming back to (1.9a), we can recognise that, at least under one reading of the sentence, the property is not distributed among the members of the restrictor set of the

[13]There is considerable variation in the judgments about the availability of this reading.

[14]Beck and Sauerland (2000) talk about it in terms of a "pragmatic bias" that would make one reading very hard to perceive because of the implausibility of a certain scenario.

determiner *every*. The core of the problem is the lack of a cumulative reading for this sentence:

(1.14) Every cat chased away three mice.

Here, the property denoted by the VP *chased away three mice* is the Share of the distributive relation, i.e. it holds of each cat separately, and there seems to be no cumulative reading along the lines of (1.8) available.

The manipulation that apparently leads to the loss of the cumulative reading is the switching of the determiner *every* and the bare numeral *three*: this is the transformation (in non technical sense) that generates (1.8) and (1.14) from each other. Arguably, both distributive and cumulative readings are plausible in both sentences, but, as we said, the cumulative reading for (1.14) is simply not available, for reasons that are not clear — yet. Crucially, the verb itself is unchanged.

We can also exclude the hypothesis that some lexical property of the restrictor of *every* is in any way (in this specific case) responsible for the asymmetry, because if we have *every mouse* in subject position we still do not get the cumulative reading we are after:[15]

(1.15) Every mouse chased away three cats.

This sentence is false in a context where e.g. some mouse chased away only one cat. We may conclude on the basis of these data that it is the syntactic position of *every NP* that, other things (plausibility, syntactic well-formedness etc.) being equal, plays a crucial role in the (dis)appearing of cumulative readings that involve the individuals denoted by the restrictor of *every*.

## 1.3 What has to be done

Although in this chapter some attention has been given to the difference between *all* and *every* in order to justify the latter's common label of "distributive determiner", this is not an issue that the present work is focused on. Instead, the asymmetry in the availability of certain readings that comes with *every* is the main topic of the whole discussion.

Apparently, we are dealing with an asymmetry that could be, as a first attempt, described as involving the subject and the object position of the clause. On the basis of the previous examples one can conclude that a sentence with some plural individual and a QP headed by *every* can have a cumulative reading (provided the reading is plausible) only if the *every*-QP is in object position, whereas this is impossible if the same quantifier is in subject position. Such tentative generalisation would indeed encompass cases like (1.14).

According to the judgments I have had access to, asymmetries are to be found in other languages too: this is for example the case in Italian with *ogni* (/'ɔɲi/), in German

[15] We might ignore the strong implausibility of this sentence.

with *jed-*, in French with *chaque* and in Greek with *kathe*. Depending on which piece of data one considers, and several will be presented, this asymmetry can be traced back to other conditions, so that the reduction to object vs. subject position no longer retains its descriptive adequacy.

The first and main goal of this thesis is therefore to give a precise description of the distribution of the cumulative reading of the singular universal quantifier in Italian: I will argue that no existing analysis of the phenomenon that I know of is equipped to predict this distribution. The broader goal, to which this exposition would ideally contribute, is the understanding of the nature of cumulativity. The best outcome possible would be a (cross-linguistic) generalisation that clearly predicts in which cases sentences with *every NP* have only a distributive reading: if such a generalisation were available, then this determiner and the asymmetry it carries would provide a good lead towards the understanding of the relation between cumulativity and other phenomena.

After presenting two existing analyses and their shortcomings in accounting for Italian data, the discussion will focus on the asymmetry that comes with *ogni* (an Italian determiner largely equivalent to *every*).

# Chapter 2

# *Every* and the Agent Role

The subject of this chapter is the critical discussion of one influential analysis of the phenomenon that has been proposed in the literature: the main source I will be discussing is Kratzer (2000), since there the focus is exactly on those empirical cases I am interested in. For Kratzer, the cumulative readings with *every* are an important case study that eventually motivates a certain number of theoretic assumptions about what enters in the semantic composition and ultimately how the latter works.

With her analysis, which is based on an argument presented in Schein (1993), Kratzer argues in favour of the view that posits the existence of events as arguments of verbs and of Thematic Roles as binary predicates that relate individuals and events in the semantic composition. The argumentation in Kratzer (2000) goes like this: since the present phenomenon can be analysed only by making these specific theoretical assumptions, then these assumptions must be held.

I will first focus on events and Thematic Roles and their motivation, in order to give some theoretical context to the discussion of Kratzer's analysis, which I will conduct by criticising its assumptions and its descriptive adequacy.

## 2.1 Events and Thematic Roles

In this section, I briefly summarise the differences between traditional "eventless" semantics, Davidsonian and Neo-Davidosonian semantics that are relevant to the discussion of Kratzer (2000), so that the theoretical aspects of this proposal can be contextualised. Thus, I will refrain from presenting all motivations for and arguments against each approach. Instead I will concentrate on the essential points and stress the differences between the frameworks that have the most relevant consequences.

### 2.1.1 The traditional treatment of verbs

In traditional Montagovian semantics, verbs are treated as predicates of individuals. An intransitive verb, IV in Montague's formalism (Montague 1973), would then denote a unary predicate, i.e. a predicate that takes only one argument. For example, *sleep*

denotes a function that maps individuals to truth values (1 if the individual sleeps, 0 if it does not) and as such has the type *et*: in other words, it is the characteristic function of the set of those things that sleep:

(2.1) a. $[\![ \text{sleep} ]\!] = \lambda x_{\text{e}}.\text{sleep}'(x)$

b. $[\![ \text{sleep} ]\!] = \{x \mid x \in D_{\text{e}} \wedge \text{sleep}'(x)\}$

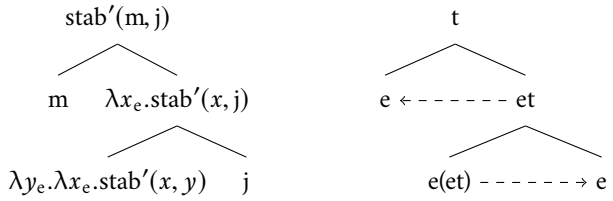
This treatment can be generalised to all verbs, regardless of the number of arguments they take. For instance, the binary function denoted by a verb like *stab* can, using a technique known as *currying* or *schönfinkelisation*[1], be reduced to two unary functions that form a sequence, and accordingly its type is *e*(*et*). Currying is thus a general technique that enables the computation of an *n*-ary function by means of computing *n* unary functions.

(2.2) a. $[\![ \text{stab} ]\!] = \lambda y_{\text{e}}.\lambda x_{\text{e}}.\text{stab}'(x, y)$

b. $[\![ \text{stab} ]\!] = \{(x, y) \mid x, y \in D_{\text{e}} \wedge \text{stab}'(x, y)\}$

So the semantic composition of the sentence *Mary stabs John* would be like the one in (2.3).[2] The tree at the right represents the same composition but only the types and the operation of Functional Application are indicated there (where $\alpha \dashrightarrow \beta$ stands for "$\alpha$ takes $\beta$ as its argument"):

(2.3)




Thus, if we ignore intensionality phenomena (which require some additional compositional considerations), the lexical meaning of verbs is a certain property of individuals or a certain relation between individuals, and as such is reducible to the participants in such relation. In fact, the extension of a transitive verb (again, a binary relation) in a given model is the set of the tuples made up by the individuals that, as a tuple, are in that relation in the model, as in (2.2b). The isomorphism between the domain of (curried) functions like (2.2a), objects of type *e*(*et*), and the binary relations defined over the domain of individuals $D_{\text{e}}$ like (2.2b) allows to switch between these two when thinking of the denotation of transitive verbs without any dramatic consequence in most cases. This is obviously the case for intransitive verbs like in (2.1) and for *n*-ary predicates in general as well.

[1] From the names of two logicians who were among the first to explicitly use this operation, namely Haskell Curry (1900–1982) and Moses Ilyich Schönfinkel (1889–1942).

[2] Note that throughout the whole discussion, whenever convenient, I shall use the first letter of proper names to indicate their extensions without stating it explicitly. Proper names will be chosen so that such convention does not result in any ambiguity.

So, if in a model $M$ there are four individuals *John*, *Kai*, *Owen* and *Willy*, everyone stabbed only *Willy* except *Willy* himself who stabbed nobody, the extension of *stab* is:

(2.4) $[\![ \text{stab} ]\!]^M = \{(\text{John,Willy}), (\text{Kai,Willy}), (\text{Owen,Willy})\}$

And if, in the same model, both *John* and *Kai* beat *Owen*, (*Willy* does not take part to any beating), the extension of *beat* in $M$ would be:

(2.5) a. $[\![ \text{beat} ]\!]^M = \{(\text{John,Owen}), (\text{Kai,Owen})\}$

b. John beat Owen.

c. Kai beat Owen.

These two sentences are obviously both true in $M$.

### 2.1.2 Events as arguments

A possibly problematic case that may require some revision of what we have just established is represented by these two sentences, evaluated in the same model $M$ as (2.5):

(2.6) a. John beat Owen twice.

b. John beat Owen once.

One could say that both sentences are true in $M$, just like the sentences in (2.5), but even if it is in fact the case, this does not feel like a fully legitimate move because, obviously, they do not mean *the same thing*: it would be good to have a way of specifying a model in which only one of them, say (2.6b), is true whereas the other one is false. The distinction is in principle not so subtle at all: in fact, it is easy to imagine such a model. To further complicate the issue, we could come up with a context for (2.6a) analogue to the one described in Landman (2000: 19): two temporally distinct instances of John's beating of Owen never happened, but instead John beat Owen simultaneously in two places. Especially if the modification is understood as being not strictly temporal, we feel something ought to be done in order to capture this kind of contrasts.

The question can presumably be reduced to what the denotation of the modifiers *twice* and *once* is: if we know *what* they modify, we are in a good position to find out how we can account for the truth conditions of (2.6). Before presenting the case for events, it should be stressed that what is going to be proposed is *not* the only existing adequate approach to such problems, but since my purpose is not to argue in favour or against a particular approach, I deliberately ignore the issue.

One of the core concept of Davidsonian semantics is the intuition that the semantic contribution of verbs has something to do with *events*, understood as things that are placed in space and time and are predicated of by the verb itself: according to the lexical meaning of the verb, the corresponding event will be of a different kind (so that an event of killing will be quite different from one of cooking). Thus, the puzzle

in (2.6) can be solved by assuming that the adverbials like *twice* and *once* modify the event over which the sentence existentially quantifies: everything stays the same (the sentences have the same kind of event, namely a beating event, and the very same participants, namely John and Owen) except for these predicates (*twice*, *once*) that hold of the event.

The formal realisation of this intuition is that a verb denotes a set of tuples: in the case of an $n$-ary predicate, the set of tuples $(e, x_1, \ldots, x_n)$ where $x_1, \ldots, x_n$ are the participants in the event of whatever the lexical meaning of the verb specifies. So the (new) denotation of *stab* is, in "function" terms:

(2.7) $[\![ \text{stab} ]\!] = \lambda y_{\text{e}}.\lambda x_{\text{e}}.\lambda e_{\text{v}}.\text{stab}'(e, x, y)$

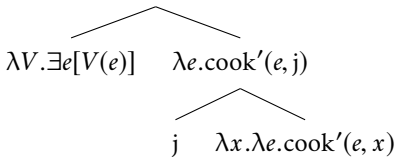
Having just one new argument for each verb, namely the event argument, allows for an intuitive and straightforward approach to modification:

(2.8) [Brutus] stabbed [Caesar] [with a dagger] [in today's Largo di Torre Argentina] [at noon].

If we want to capture the fact that each bracketed portion of the sentence expresses a "participant" to the stabbing, we do not need to expand the arity of the predicate according to how many modifications we have — this would result in verbs having a variable arity value that is determined by the presence of (a potentially infinite number of) facultative modifications. Instead, we have those adjuncts represented as predicates of events, and the sentence says that they hold of the event of stabbing that involves Brutus and Caesar.

To illustrate how a basic composition looks like assuming a Davidsonian denotation for verbs, I choose an intransitive verb for the sake of brevity:

(2.9) $[\![ \text{John cooks} ]\!] = \exists e[\text{cook}'(e, \text{j})]$




The last element that enters the composition above is the so called *Existential Closure*, which takes a property of events as argument and existentially binds the event variable: it says that there are events of which the property holds.

### 2.1.3 Thematic Roles

A substantial modification of the Davidsonian model has been proposed a.o. in Parsons (1990). In this framework, which is commonly labelled as "Neo-Davidsonian" (see

Dowty 1989), verbs simply denote sets of events, and are thus functions of type *vt*.[3] The Neo-Davidsonian denotation of *stab* is therefore very simple:

(2.10) $[\![ \text{stab} ]\!] = \lambda e_{\text{v}}.\text{stab}'(e)$

The participation of the various arguments in the event is realised in the semantic representation by means of particular binary predicates, often called *Thematic Roles*.

The exact status of Thematic Roles in both syntactic and semantic theory is a debated issue. As Carlson (1998) points out, the concept of Thematic Role has played very different roles in the literature, and the terminology related to it has varied as well. In syntax[4], where they are often called θ-roles, it is usually assumed that the number and the kind of Thematic Roles are in some way or the other encoded in the lexical entry of each verb.[5] Furthermore, principles like the so called θ-Criterion (Chomsky 1981: 36) add to the various well-formedness conditions of an expression the necessity that each argument of the verb has (only) one of such roles and that all roles that a verb has to assign are in fact assigned.[6] Thematic Roles[7] turn out to be an important piece of syntactic theory in that they make interesting generalisations and explanations possible, the syntax of so called "raising" constructions in English and other languages among many others.

How many Thematic Roles are actually needed is a intensively debated issue too. I will not commit myself to any position, apart from stressing the rather obvious economy criterion according to which the fewer roles we assume as necessary the better. Just for the purpose of illustration, here is the tentative listing of the Thematic Roles that are necessary for the semantic theory as it is presented in Table 2.1.[8] Thematic relations, understood as ways of distinguishing the various arguments of a verb, can be employed in the semantic representation in order to specify the participation of arguments to the events. For any Thematic relation (in the example, the Experiencer) we will have the following binary predicate

[3]In Kratzer (2000) the events are given the type *s*. However I follow others using *v* as I did before also because *s* is traditionally the type of possible worlds in intensional semantics.

[4]The idea of verbs and their arguments being connected to each other via semantic relations that might not consistently correspond to the purely syntactic relation (e.g. subjecthood vs. objecthood) is quite old in syntactic theory, and some of the first and most elaborated discussions of the matter are Gruber (1965) and Fillmore (1968), where they are called *case relations*.

[5]For example, in Adger (2003: 90) the term θ-grid is used to refer to part of a lexical entry that specifies the number of θ-roles the verb assigns. This grid is stored together with corresponding grids for the syntactic selection features (of which syntactic category can each argument be), the semantic selection features and the actual Thematic Roles (i.e. Agent, Patient, Goal etc.).

[6]Of course, there are different views with respect to to the validity of a principle like the θ-Criterion which is canonically assumed in the syntactic literature. For example, Parsons (1990) defends the view that there are cases where an argument has more than one Thematic Role (this would be ruled out by the θ-Criterion).

[7]I will henceforth use only this general denomination instead of the various names found in the literature.

[8]The author himself, when discussing how different authors assume slightly different lists, notes that "The commonest divergence in lists stems from whether authors try to give the whole list or only the core cases of Agent, Experiencer, Theme, Source, and Goal" (Parsons 1995: 637).

| Thematic Relations | |
|---|---|
| Agent | *Mary* left early. |
| Experiencer | *He* likes roses. |
| Theme/Patient | Brutus stabbed *Caesar*. |
| Source | We bought it *from Agatha*. |
| Goal | We sold it *to Sam*. |
| Instrument | They opened it *with the key*. |
| Benefactive | We threw *her* a big party. |
| Location | It's hot *in the studio*. |

Table 2.1: Examples of Thematic Relations (from Parsons 1995: 638)

(2.11) $\lambda x.\lambda e.\text{Experiencer}(e, x)$

which, once combined through Functional Application with the argument, denotes the set of events that have the reference of that argument as their Experiencer. If we assume that the two arguments of the transitive verb *beat* are an Agent and a Patient (now, note, regardless of who is the grammatical subject and who is the grammatical object), the logical representation of *John beat Owen* would then be

(2.12) $\exists e[\text{beat}'(e) \wedge \text{Agent}(e, \text{j}) \wedge \text{Patient}(e, \text{o})]$.

To represent this, in addition to what has been already presented, some sort of conjunction rule has to be defined: for simplicity, a generalised intersection between two expressions of $t$-conjoinable type that are sister nodes of the structure will do.[9]

(2.12) says that the intersection of the set of beating events, the set of events whose Agent is John and the set whose Patient is Owen is not empty i.e. it says that there is an event which is a beating event whose Agent is John and whose Patient is Owen: this existential statement has the same truth conditions as *John beat Owen*.

Two interesting consequences of letting Thematic Roles specify the relation between arguments and events are the following:

- All verbs are unary predicates, and as such denote characteristic functions of sets of events and are thus expressions of type $vt$.[10]

[9] A standard proposal for an operation of intersection that is generalised for expressions whose type "ends in $t$" (i.e. that denote a characteristic function of a set) is in Partee and Rooth (1983). Some authors have similar rules for predicate modification, i.e. they treat certain adjectival modifications like *green* or relative clauses as expressions of type $et$ rather than $(et)(et)$. In the case of (2.12) such an operation is assumed to apply on expressions of type $vt$.

[10] This actually is only true for so called *compositional* Neo-Davidsonian semantics. In the *lexical* variant, the denotation of the verb already contains the Thematic predicates. Throughout the present subsection I implicitly considered only *compositional* Neo-Davidsonian denotation of verbs. As to the treatment in Kratzer (2000), the choice is consciously not made: "[I] conclude that the comparison between derivation 1 [lexical Neo-Davidsonian] and 2 [compositional Neo-Davidsonian] has not yet produced a winner. I will eventually plead for derivation 2. But Schein's examples all by themselves do not settle the case about argument association in the syntax" (Kratzer 2000: 15).

- The semantic distinction between arguments and adjuncts is not clearly representable, as a consequence of having verbs taking only the event argument. A traditional Davidsonian representation of *John beat Owen with a tennis racket*, for example, would presumably have the PP as an adjunct (being optional) and thus as a modification of the event in some way, whereas *John*, *Owen* and the event variable would be arguments of the predicate *beat*. Following Neo-Davidsonian treatment, however, all arguments are predicated to be in a certain relation to the event in the same way (presumably as Agent, Patient and Instrument).

### 2.1.4 Ontology of events — Bach (1986)

Events can be made up of "smaller" events, and this is a rather intuitive notion. In order to capture it in formal semantic terms it has been proposed that the domain of events has a rich structure, with operations on its members that define yet other members, along the lines of what has been first proposed in Link (1983) for the domain of individuals in order to account, among others, for the relation between plural count and mass nouns. The reason why I discuss here, though in a brief way, the mereology of events as it is formulated in Bach (1986) is that these considerations play a key role in the account of cumulative readings of *every* given in Kratzer (2000).

In Bach (1986) events are just a subset of the domain of *eventualities* (other disjoint sets being the one of processes and the one of states[11]) and are thought of as corresponding to the individuals (both singular and plural) of Link's framework. A homomorphism relates atomic events and so called "bits of process" (the parallel of singular count nouns and the atomic parts that make up the denotation of a mass noun) to one another. This is the description of the algebraic properties of the domain of eventualities from Bach (1986):

1. $E_e$: the set of events with join operations $\sqcup_e$ and partial ordering $\leq_e$ (a complete atomic Boolean algebra);
2. $A_e \subseteq E_e$: atomic events;[12]
3. $D_e \subseteq A_e$: bits of processes with join operations $\sqcup_p$ and partial ordering $\leq_p$ (a complete join semilattice);
4. Two temporal relations on $E_e \times E_e$:
   (a) $\propto$: "strictly precedes" (transitive, irreflexive, asymmetric),
   (b) $^\circ$: "overlaps" (nontransitive, reflexive, symmetric);
5. A homomorphism $h_e$ from $\langle E_e, \sqcup_e, \leq_e, \propto, ^\circ \rangle$ to $\langle E_e, \sqcup_p, \leq_p, \propto, ^\circ \rangle$ such that:

[11] Several phenomena suggest that predicates like *be drunk* and *sleep* form one class and *drink* and *fall asleep* form another. These various classes are reduced to the kind of eventuality the verb predicates of: a dynamic *state* in the first case, an *event* in the second.

[12] Atomic events are those events that, because of their own nature, are not decomposable into "smaller" events. Bach gives examples like *John kiss Mary*, *Mary stumble*, *Sally pound in a nail*. The join operation $\sqcup_e$ generates plural events from atomic events.

(a) $h_e(\alpha) = \alpha$ iff $\alpha \in D_e$,

(b) $h_e(\alpha \sqcup_e \beta) = h_e(\alpha) \sqcup_e h_e(\beta)$,

(c) $\alpha R \beta \Rightarrow h_e(\alpha) R' h_e(\beta)$ for $R = \leq_e, \propto, {}^\circ$ and $R' = \leq_p, \propto, {}^\circ$ respectively.

To slowly get near the case in discussion, we can imagine an event $e$ of Gennaro catching a plurality of three mistakes. This event can be conceived as the product of the operation $\sqcup_e$, in that there are three atomic events $\alpha$, $\beta$ and $\gamma$ that stand for the events of Gennaro catching one mistake. In this sense we can say that, e.g. $\alpha \leq_e e$. The partial ordering relative to the domain of events resulting from these three atomic events can be represented as a semi-lattice like the one in Figure 2.1, where the supremum $\alpha \sqcup_e \beta \sqcup_e \gamma$ is the event $e$ of Gennaro catching the three mistakes.

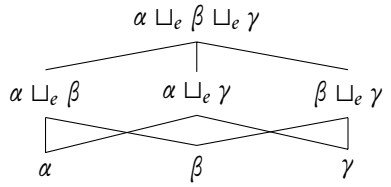



Figure 2.1: A semi-lattice defined by the partial ordering $\leq_e$.

Having the possibility of linking arguments with events in a way that distinguishes them from a semantic point of view (by means of Thematic Roles) and having an algebraic toolkit to represent the mereology of the events (i.e. being able to refer to parts of an event) makes it possible to achieve what has been called *essential separation* (Schein 1993) between arguments and predicates: this possibility plays a crucial role in the analysis defended in Kratzer (2000), where different arguments are linked to different event variables (in a mereological relation to each other) using Thematic Roles.

## 2.2 Kratzer's argument

As already said, Kratzer (2000) is dedicated to the the analysis of sentences like the following:

(2.13) Three copy editors caught every mistake in the manuscript.

This sentence has a cumulative reading, and Kratzer's aim is to produce a logical representation of (2.13) that has those characteristic weak truth conditions, which result from the intersection of the conditions in (2.14).

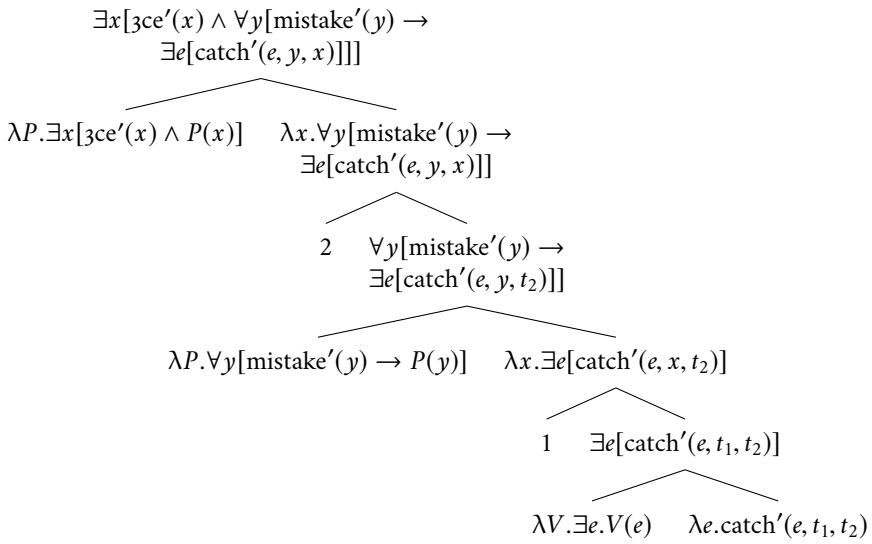



Figure 2.2: Composition inspired by the first representation in Kratzer (2000)

(2.14) a. three copy editors have been looking for mistakes in the manuscript (not necessarily as a team);

b. each copy editor caught at least one mistake;

c. each mistake was caught by at least one of those copy editors;

d. at the end no mistake has been left uncaught.

During the whole discussion, I will follow Kratzer and adopt a very raw denotation for the plurality *three copy editors*, since the exact compositional derivation of the plurality is irrelevant for the analysis.[13] Thus, to avoid unnecessary clutter in the expressions, I will use

(2.15) $[\![\text{ three copy editors }]\!] = \lambda x.3\text{ce}'(x)$

and a similar treatment will be applied to other pluralities whenever a more precise analysis is not needed.

A straightforward representation of (2.13), where *every mistake* is a normal generalised quantifier taking narrow scope is then the following (the composition is given in Figure 2.2, where I simplified when possible and used QR):

(2.16) $\exists x[3\text{ce}'(x) \wedge \forall y[\text{mistake}'(y) \rightarrow \exists e[\text{catch}'(y, x, e)]]]$.

[13] Following Landman (2004) in treating numeral modification as intersective adjectival modification, one could assume that $[\![\text{ three copy editors }]\!] = \lambda x.{}^{*}\text{copy-editor}'(x) \wedge |x| = 3$, where the operator $^{*}$ adds to the extension of the predicate to which it applies all the plural individuals that can be formed from the atomic individuals in the extension of the basic predicate.

Another option would be to slightly complicate (2.16) by having a variable over parts of the plurality of copy editors as an argument of *catch*:

(2.17) $\exists x[3\text{ce}'(x) \wedge \forall y[\text{mistake}'(y) \rightarrow \exists e \exists z[z \leq x \wedge \text{catch}'(y, z, e)]]]$.

The cumulative reading does not come out from these representations. The truth conditions of (2.16) are much stronger than we want them to be: in fact, each mistake must have been caught by the same *plurality* of copy editors for it to be true, i.e. *caught every mistake* is, according to (2.16), the Share of a distributive relation. On the other hand, the truth conditions of (2.17) are too weak: (2.17) would still be true if two of the three copy editors did not catch any mistake at all. This is a scenario we want to exclude. As expected, given what has been said about cumulativity in general, letting *every mistake* take wide scope does not help us at all. The problems with these two representations *de facto* demonstrate the inadequacy of traditional Davidsonian semantics of verbs (i.e. the approach according to which the arguments are not distinguished by their Thematic relation to the event).

(2.18) $\exists e \exists x[3\text{ce}'(x) \wedge \text{Agent}(x, e) \wedge \forall y[\text{mistake}'(y) \rightarrow$
$\exists e'[e' \leq e \wedge \text{catch}'(y, e')]]]$.

The effect of separating the Agent and predicating the verb (with the object represented in a Davidsonian association) as in (2.18) still would be true if members of the copy editors plurality did not participate in the catching. Even if, as in (2.19), the Theme is separated too ("pure" Neo-Davidsonian association) this does not help, since in the event $e$ some copy editor could have caught other things and not one single mistake:

(2.19) $\exists e \exists x[3\text{ce}'(x) \wedge \text{Agent}(x, e) \wedge \text{catch}'(e) \wedge \forall y[\text{mistake}'(y) \rightarrow$
$\exists e'[e' \leq e \wedge \text{Theme}(y, e')]]]$.

Requiring the catching event $e$ to be minimal through some minimalisation operator also does not yield the needed result, because we do want to include redundancy scenarios, in the sense that (2.13) is true even if there are some mistakes in the manuscript that have been caught more than once. Defining the operator in any of the obvious ways would rule out this possibility and would thus make it not suitable to our purpose. Kratzer examines a simple Minimalisation operator that would replace the last conjunct in (2.19) with:

(2.20) $\forall y[\text{mistake}'(y) \rightarrow \exists e'[e' \leq e \wedge \text{Theme}(y, e')]] \wedge$
$\neg \exists e''[e'' \leq e \wedge \forall y[\text{mistake}'(y) \rightarrow \exists e'''[e''' \leq e'' \wedge \text{Theme}(y, e''')]]]$.

This would in fact produce too strong truth conditions, and the problem is that the plurality of the three copy editors is taken to be the Agent of the whole event, without access to the singular copy editors. With (2.20), we would exclude the possibility that some mistake has been caught by more than one copy editor whereas one copy editor caught mistakes that nobody else caught. In such a case, the plurality would not be the

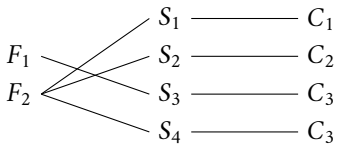



Figure 2.3: The cumulative reading of *each* as tested in Thomas and Sudo (2016).

Agent of any minimal (in the sense stated above) event of catching mistakes. Kratzer does not consider other minimalisation options, but in fact it is not straightforward (just to try a solution) to fix (2.19) by accessing the members of the plurality of copy editors and requiring that they caught nothing but mistakes. Indeed, we would not want a scenario where some copy editor caught *also* other things while looking for mistakes to make (2.13) false. According to Kratzer, it turns out that the right formula is a fixed version of (2.18):

(2.21) $\exists e \exists x[3\text{ce}'(x) \wedge \text{Agent}(x, e) \wedge \forall y[\text{mistake}'(y) \rightarrow$
$\exists e'[e' \leq e \wedge \text{catch}'(y, e')]] \wedge \exists y[\text{mistake}'(y) \wedge \text{catch}'(y, e)]]$.

The addition that says that there are mistakes such that $e$ is an event of catching them makes the truth condition of (2.21) strong enough to exclude that some of the three copy editors did anything but catching mistakes: still, the truth conditions stay weak enough for the cumulative reading to be captured. In other words, what (2.21) says that the previous tentative representations did not is that $e$ is a "completed event of catching $y$, not […] in which $y$ is caught" (Kratzer 2000: 5). However, it is not obvious to me (nor is it explained by Kratzer) how this condition could come about compositionally, and this must be considered as a weak spot of the proposal.

### 2.2.1 Predictions for *each*

An interesting prediction of this analysis is that every distributive determiner should behave the same way as *every* does with respect to its cumulative readings. This straightforwardly follows from the fact that there is nothing specific to *every* in how the cumulative interpretation is semantically achieved: it is enough to have the restrictor of the determiner under the scope of the existential quantification of a subevent (of the event whose agent is the other argument involved in the cumulative relation).

A recent experimental study (Thomas and Sudo 2016) proved this prediction correct with respect to the determiner *each*, provided that certain conditions are met:

(2.22) a. Two farmers sold each sheep. *Cumulative*: ✗

b. Two farmers sold each sheep to one customer. *Cumulative*: ✓

The contrast between (2.22a) and (2.22b) illustrates what the conditions are, according to Thomas and Sudo (2016), namely that only if the so called Differentiation Condition is satisfied, *each* can yield a cumulative reading. The Differentiation Condition is, in its original form, phrased as following:

> Differentiation Condition: A sentence containing a quantified phrase headed by *each* can only be true of event structures which are totally distributive. Each individual object in the restrictor set of the quantified phrase must be associated with its own subevent, in which the predicate applies to that object, and which can be differentiated in some way from the other subevents. (Tunstall 1998: 124)

This condition explains why (2.22a) (where it is not satisfied) has no cumulative reading whereas (2.22b) (where it is satisfied) has such reading, the rest of the analysis being analogous to Kratzer's treatment of *every*. In (2.22b) the cumulative reading is available because the subevents of one sheep being sold is distinguishable from each other, given that the indirect object *to one customer* provides the means to uniquely identify each selling of one sheep. Thus, cumulative reading is a common feature of distributive quantifiers, but for some quantifiers stronger conditions must be met than for others.

The Italian *ciascun-* behaves essentially the same as English *each* in all respects. Just like *each*, it can occur in determiner position, in adverbial position and in adnominal position, adjacent to the Share: in fact, it is listed as a distance distributive item analogous to *each* in Zimmermann (2002).

In fact, the judgments of Thomas and Sudo (2016) hold for Italian too. The following sentence is true in a scenario where the number of sheep and the number of customers are the same, each customer buys one sheep and the sheep are "cumulatively" sold by two farmers:

(2.23) Due contadini hanno venduto ciascuna pecora a un cliente.
two farmers have sold each sheep to one customer
*Two farmers sold each sheep to one customer.*

However, in this particular case the parallel with *ogni* does not hold, since in the following sentence there is a very strong preference, especially if compared to (2.23), for *un cliente* to take wide scope (and this scope configuration is compatible with the Differentiation Condition):

(2.24) Due contadini hanno venduto ogni pecora a un cliente.
two farmers have sold every sheep to one customer
*Two farmers sold every sheep to one customer.*

Since the effect disappears whenever there is more than one customer (after all, Schein's example *Three videogames taught every quarterback two new plays* has the same reading in Italian than it has in English), I suspect that the reason for the wide scope preference is the following: in Italian the numeral *one* and the indefinite article are the same item, so *un cliente* in (2.24) is an indefinite NP and as such can take wide scope. But the question remains as to why this is not the case when the same phrase appears in the syntactic scope of a quantifier headed by *ciascun-* as in (2.23).[14]

[14] In simpler expressions of the type [[$_{\text{Subj}}$ *Ciascun/ogni NP*] *V* [$_{\text{Obj}}$ *Indefinite NP*]] both scope configurations are available, of course.

Furthermore, if we add more customers to the scenarios, a clear difference appears: while the restrictor of *ciascun-* can only be the Key of a distributive relation with *Num customers* (thus the distributive reading is the only one that is available), *ogni* can also be interpreted as being in a cumulative relation. I will come back on this later when discussing the analysis in Champollion (2010).

### 2.2.2 Empirical weaknesses

The notion of the Agent argument is central in Kratzer's analysis, which is in fact an argument in favour of this Thematic Role being the only one in the semantic composition. However, this is a source of empirical problems for the whole analysis if applied to Italian. Two empirical scenarios could, logically, falsify Kratzer:

- sentences where an Agent *every NP* argument cumulates with another argument;
- sentences where a non-Agent *every NP* argument cumulates with another non-Agent argument.

It is possible to find occurrences of both kinds in Italian with the determiner *ogni*, which otherwise behaves just like *every* in the cases presented in Kratzer (2000). English cases of the first kind have actually already been presented in the literature, and are mentioned as counterexamples also in Champollion (2010, 2017):

(2.25) *Gone with the Wind* was written by every screenwriter in Hollywood.
(Bayer 1997: 206)

Since (2.25) has the cumulative reading (which becomes evident when thinking of *Gone with the Wind* as a plurality of writing contributions: note that the distributive reading would be in this case highly implausible) and *every screenwriter in Hollywood* is clearly the Agent in the semantic representation, the asymmetric Neo-Davidsonian approach fails to account for this sentence.

With respect to Italian, the translation of (2.25) (with the determiner *ogni*) has the same cumulative reading. But analogous cases can also be found where an agentive *every NP* cumulates with a plurality denoted by a coordinate structure or by a definite NP:

(2.26) Scenario: The Government, which is supported by a coalition of five parties (A, B, C, D and E) has proposed two controversial reforms, the Tax Reform and the Electoral Reform. The two reforms could not be approved because A, B and C blocked the Tax Reform and A, D and E blocked the Electoral Reform.

La riforma fiscale e la riforma elettorale sono state bloccate da
the reform fiscal and the reform electoral are been blocked by
ogni partito della maggioranza.
every party of.the majority
*The tax reform and the electoral reform have been blocked by every majority party.*

(2.27) SCENARIO: There are some sheep on sale. The owner organises a small sheep exhibition so that people get to know them and eventually buy one or more sheep. It turns out that the sheep are so lovely that every visitor ended up buying at least one sheep.

Le pecore in vendita sono state comprate da ogni visitatore.
the sheep on sale are been bought by every visitor
*The sheep on sale have been bought by every visitor.*

If we consider measure phrases, we find asymmetries between the subject position and the *by*-phrase of a passive construction. (2.28a) does not have a cumulative reading, whereas (2.28b) has one:

(2.28) a. Ogni partito ha speso 10 milioni di euro di finanziamento.
every party has spent 10 millions of euros of funding
*Every party spent 10 million euros of funding.*

b. 10 milioni di euro di finanziamento sono stati spesi da ogni
10 millions of euros of funding are been spent by every
partito.
party
*10 million euros of funding were spent by every party.*

At this point, and at this stage where I am not yet considering additional factors that might facilitate a cumulative reading, I see a simple and clear "disagreement" between the judgments for English (as they are reported by Kratzer) and those for Italian. She judges both following sentences as lacking a cumulative reading:

(2.29) a. Every copy editor caught 500 mistakes in the manuscript.

b. 500 mistakes in the manuscript were caught by every copy editor.

In Italian, as I made clear throughout the discussion so far, sentences like (2.29a) (where *every NP* is subject of an active sentence) indeed lack a cumulative reading, whereas sentences like (2.29b) generally have one (given the appropriate plausibility conditions).

This point is particularly interesting because Kratzer explicitly takes the contrast between (2.29) and (2.13) to prove that the status of the Theme argument in Neo-Davidsonian semantics is not clear (in other words, she argues for the asymmetric

Neo-Davidsonian position). Kratzer's reasoning is as follows: the sentences in (2.29), which lack a cumulative reading, can be represented equivalently both in classical Davidsonian terms (without Thematic Roles) and in Neo-Davidsonian terms (in this case, using both the Agent and the Theme roles). However, this is only true if both arguments scope above the existential quantifier over events, which is the case for the distributive reading, which is the only one available for (2.29) according to Kratzer. If we, analysing (2.29), treat Theme and Agent equally and, analogously to what was done to model the cumulative reading of (2.13), we establish a scopal relation like Theme > [$\exists e'(\leq e)$] > Agent, we end up with:

(2.30) $\exists e \exists x[\text{500mistakes}'(x) \wedge \text{theme}(x, e) \wedge \forall y[\text{CE}'(y) \rightarrow \exists e'[e' \leq e \wedge \text{Agent}(y, e') \wedge \text{catch}'(e')]]]$.

But this is a representation of a reading of those sentences that allegedly does not exist, namely the cumulative one. Thus the empirical picture allows us to note that the Theme argument is somehow not needed, and this is the argumentative core of Kratzer (2000). As the examples brought up in the literature and here show, Kratzer's empirical observation is either incorrect or at least not generally valid, which undermines this whole theoretical hypothesis.

Another serious problem with this account is represented by sentences that are (at least superficially) analogous to (2.13) from a syntactic point of view (and with the same cumulative reading), but whose verbal predicate does not have an agentive subject. This is the case of verbs like *ascoltare* 'to listen', where the subject can hardly be thought of as an Agent of an event. The subject of a listening event is rather an Experiencer, and the object could be a Theme. The following sentence is true in the given scenario, and thus has a cumulative reading that is parallel to the one in (2.13):

(2.31) Scenario: In a big investigation of government corruption there are thousands of recordings from wiretapping of various politicians. The government defunds investigative agencies and fires a lot of their employees in order to prevent this large amount of recordings to be listened to. But three heroic stakhanovian investigators manage to listen to all of them in just a couple of days (of course they split the workload between themselves).

Tre investigatori hanno ascoltato ogni intercettazione.
three investigators have listened every recording
*Three investigators have listened to every recording.*

If we modify (2.31) in order to exclude the collaboration between the investigators viz. a possible "team credit" reading, the cumulative reading is, according to my intuition, well preserved, since the following is true in the scenario described:

(2.32) SCENARIO: A security leak in a government agency has been discovered and investigators found out that in the months of the security leak three hackers[15] were independently able to get to classified audio files. Although none of the three individuals was able to get to all of the available classified audio files, every classified audio file on the servers has been obtained by at least one of them (i.e. a cumulation scenario). In denouncing the effects of defunding IT security of government agencies, a certain opposition politician utters:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| È | una | vergogna, | tre | hacker | hanno | ascoltato | ogni intercettazione |
| is | a | shame | three | hackers | have | listened | every recording |
| secretata | dei | nostri | servizi. | | | | |
| classified | of.the | our | services | | | | |

*It's a shame, three hackers have listened to every classified recording of our security agency.*

Also with verbs like *subire* 'to endure', whose subject is definitely no Agent, the same phenomenon is found:

(2.33) SCENARIO: The topic of the discussion is the frequency of train strikes. Luca, who is perversely proud of never travelling by train and of knowing only three people that do, says that the strike situation is unbearable, as of the 20 strikes of the previous year, there has been none that did not hit at least one of his three acquaintances. They have been unlucky in different measures, but Luca's point is that all strikes have been very effective, since each of them involved the travel of at least one member of his (small) sample.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tre | miei | conoscenti | hanno | subito | ogni | sciopero | dei treni |
| three | my | acquaintances | have | endured | every | strike | of.the trains |
| che | è | stato | indetto | l'anno | scorso. | | |
| that | is | been | called | the.year | previous | | |

*Three acquaintances of mine have endured every train strike that has been called last year.*

In fact, if Thematic Roles are supposed to have some descriptive content, a distinction between the role of the grammatical subject of *endure* and the one of *destroy* must be drawn. For one thing, one difference comes out from derivational morphology. In Italian for instance, no agentive suffix can be applied to the root of *subire* (and similar verbs) to have a noun referring to the grammatical subject of *subire*, i.e. 'the one who

[15] I am well aware of the fact that using the denomination *hacker* to refer to people doing bad things is offensive and wrong. For the hacker community the term has always implied not only ability and passion, but also positive attitudes of sharing and caring for each other (for an explanation `https://stallman.org/articles/on-hacking.html`). I apologise, but the need of a certain naturalness of the examples compelled me to use this word in this context (which, after all, does not involve a *very* bad criminal act).

endures' — with *destroy* it is fine, of course. There is also further evidence that Agent, Experiencer, Theme/Patient are distinguished by syntax (see Belletti and Rizzi 1988).

The only straightforward way to extend Kratzer's account in order to cover the cumulation with non agentive subjects is to say that there are *two* Thematic Roles that are expressed in the semantic representation, namely Agent and Experiencer (depending on the verb). This would result in a somewhat odd asymmetric account, but it would do, if cases like (2.25), (2.26) and (2.28) did not exist. In fact, these last cases are the true Achille's heel of Kratzer (2000): if there are cases of an *every NP* that bears the Agent role and cumulates with another argument, the Kratzerian treatment has nothing to say.

This impossibility of applying the system discussed so far to those cases cannot really be reduced to the fact that the *every NP* arguments are Agent in a passive sentence, in contrast to sentences like (2.13) which are active, for the whole point of Thematic relations is to have a way to distinguish between arguments independently from syntax. The only solution would be to say that the bracketed phrase in the following sentences bears the Agent role in (2.34a) but another role (which one?) in (2.34b):

(2.34) a. [Caesar] conquered Gaul.

b. Gaul was conquered [by Caesar].

This is definitely a path I do not want to pursue.

# Chapter 3

# An eventless analysis

An alternative analysis of the cumulative readings of *every* is first proposed explicitly in Champollion (2010). This alternative is characterised by adopting a very different (and in some sense more economical) theoretical approach than Kratzer's: in fact, neither events nor Thematic Roles are necessary to derive those readings according to Champollion.

## 3.1 Some new theoretical tools

However, two other major assumptions are made, and I will present some motivation for those first: there exists a cumulation operator (also called *double star* operator after its symbol) that pluralises relations, and *every NP* is not a generalised quantifier. Both theoretical "innovations" are presented and explained here before the actual argument put forward by Champollion is discussed.

### 3.1.1 The cumulation operator

In Link (1983), one of the most important contributions in the framework of algebraic semantics, various operations are introduced and defined in order to structure the domain of individuals (the focus of that particular paper is the relation between the semantic notion of plurality and the denotation of mass nouns). One of these operations involves $^*$, which is also called the *star operator*, and it will turn out to be a central ingredient of many analyses of cumulativity, including the one in Champollion (2010).

Up until now, whenever I have talked about cumulativity, I have been referring in a more or less formal way to certain weak truth conditions that are available under certain circumstances for expressions involving more than one plural reference. The term has also another usage, which goes back at least to Quine (1960): cumulative reference is understood as being a property of predicates that contrasts with distributive reference and is characteristic of predicates denoted by mass nouns. Quine's example is *water*: "Any sum of parts which are water is water". The difference between cumulativity and distributivity of predicates can be defined by means of these inferences,

where $x \oplus y$ stands for the sum of the two parts (just like two portions of water in Quine's example):

(3.1) a. $P$ is cumulative iff $[P(x) \wedge P(y)] \rightarrow P(x \oplus y)$

b. $P$ is distributive iff $P(x \oplus y) \rightarrow [P(x) \wedge P(y)]$

The underlying idea is that cumulative reference is a characteristic of mass nouns and plurals. Link (1983) proposes an operator that makes any one-place predicate have this property,[1] and the operator is $^*$. The extension of $^*P$ would then be the closure under sum (as an operation that generates pluralities out of individuals or atomic entities) of the extension of $P$:

(3.2) a. $[\![ P ]\!]^M = \{a, b, c\}$

b. $[\![ {}^*P ]\!]^M = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$

The star operator has not only been applied to NPs in order to analyse plural nouns, but has also played a role in the literature on the semantics of verbs: a hypothesis formulated, among others, in Krifka (1986), Lasersohn (1989) and Kratzer (2008) has it that all verbs are plural in nature as if the star operator applied to them were part of their lexical entry. If the star operator is generalised for $n$-ary predicates, we have a tool for modelling cumulative readings. For any two-place predicate $R$ we can define $^{**}R$, following Krifka (1986) and Sternefeld (1998), as the smallest relation such that both conditions in (3.3) hold. Thus, we can define in general the functor $^{n(*)}$ as in (3.4).

(3.3) $R$ is a binary relation and $^{**}R$ is the smallest function such that:

a. $R \subseteq {}^{**}R$

b. $[(x_1, y_1) \in {}^{**}R \wedge (x_2, y_2) \in {}^{**}R] \rightarrow (x_1 \oplus x_2, y_1 \oplus y_2) \in {}^{**}R$

(3.4) $R$ is a $n$-ary relation and $^{n(*)}R$ is the smallest function such that:

a. $R \subseteq {}^{n(*)}R$

b. $[(x_1, \ldots, x_n) \in {}^{n(*)}R \wedge (y_1, \ldots, y_n) \in {}^{n(*)}R] \rightarrow$
$(x_1 \oplus y_1, \ldots, x_n \oplus y_n) \in {}^{n(*)}R$

This functor provides a denotation for transitive verbs that is suitable to model cumulative sentences such as the one on Dutch firms and American computers (note, without events or Thematic Roles):

(3.5) a. 600 Dutch firms use 5000 American computers.

b. $\exists X \exists Y [X \in {}^*\text{df}' \wedge Y \in {}^*\text{ac}' \wedge 600(X) \wedge 5000(Y) \wedge (X, Y) \in {}^{**}\text{use}']$

[1] The theorem (T.11) in Link (1983) is actually (3.1a) universally quantified over the two individual variables and with the star operator on the predicate: $\bigwedge x \bigwedge y ({}^*Px \wedge {}^*Py \rightarrow {}^*Px \oplus y)$.

This logical representation has the weak truth conditions that correspond to the cumulative reading (the most plausible one) of Scha's example. In Beck and Sauerland (2000) the $^{**}$ analysis of cumulative interpretation is defended and supported with syntactic arguments on how this operator is part of the derivation of LF (it is therefore argued that cumulation is not only a lexical property but also the result of a syntactic operation). What Beck and Sauerland (2000) defend is an analysis in which, in order to derive sentences with cumulative quantification, QR is applied to the arguments of the relation and then the $^{n(*)}$ operator is inserted and cumulates the $n$-ary predicate that results from the instances of QR and of λ-abstraction. The theoretical assumptions on which the argument is based (QR and the compositional treatment of variables) are not unusual.[2] The crucial point made in Beck and Sauerland (2000) is that the availability of cumulative readings of sentences with more than one plural argument patterns with the availability of QR in general (which is diagnosable in an independent way). In fact, since QR amounts simply to (covert) movement from a syntactic point of view, it is expected that islandhood conditions which affect extraction possibilities in general affect movement like QR as well, and this is indeed the case. For instance, it is known that relative clauses are islands with respect to QR extraction, i.e. a quantifier inside of a relative clause cannot be covertly extracted in the derivation of LF (it cannot take scope outside of the relative clause):

(3.6) a. $[_A$ Sue and Amy] saw a premiere of $[_B$ the two new operas] this week.

b. #$[_A$ Sue and Amy] talked to a man who likes $[_B$ the two countries].

c. $^{**}\lambda y.\lambda x.x$ talked to a man who likes $y$

(Beck and Sauerland 2000: 365)

Whereas (3.6a) has a reading where A and B cumulate, (3.6b) does not, and this is due to the fact that the relation in (3.6c) is simply not obtainable because QR extraction from the relative clause is ungrammatical.

However, there are cases where syntactic islandhood does not match with such unavailability of cumulative readings, and those cases should be considered as counter-examples to the hypothesis in Beck and Sauerland (2000) according to which cumulated relations are purely syntactic "products". One such counterexample is brought up in Schmitt (2013): given the availability of the cumulative reading for sentences like those in (3.9), Beck and Sauerland (2000) would predict that QR can (at least under certain circumstances) violate the so called Coordinate Structure Constraint, which is a well known and typologically robust constraint that forbids extraction of a conjunct from a coordinate structure and is what makes (3.7a) ungrammatical (compare with the grammaticality of the extraction from the PP). Note that QR seems to obey the Coordinate Structure Constraint, in the sense that quantifiers that are inside of a

[2]Note however that, while not being unusual, these theoretical positions are far from universally accepted. For a recent example, Keenan (2014) proposes a way of obtaining a composition for quantifiers in all syntactic configurations alternative to QR. However, these alternatives are not the focus of the present discussion and, actually, Beck and Sauerland (2000) itself seems to me to provide a quite appealing argument in favour of QR.

coordinate structure cannot covertly move out of it to take scope: while (3.8a) has an unsurprising scope ambiguity, (3.8b) does not and only the surface scope reading is available because of the Constraint (the reading where for each professor there is a student who hates her is namely excluded).

(3.7) a. *What$_i$ do you smoke [tobacco and $t_i$]?

b. What$_i$ do you smoke [tobacco with $t_i$]?

(3.8) a. A (different) student likes every professor.

b. A (# different) student [likes every professor and hates the dean].
(Fox 2008: 91)

(3.9) a. The cats bit the dogs or slept.

b. The children were dancing and smoking or sleeping. (Schmitt 2013: 25)

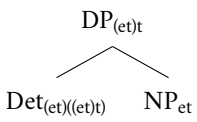
Since e.g. (3.9a) has a reading which is cumulative (the sentence is still true if in fact no cat slept and the biting relation between the cats and the dogs has cumulative character), it appears that either QR can violate the Coordinate Structure Constraint or Beck and Sauerland (2000) are wrong in assuming that the predicate subject to $^{n(*)}$ is derived by syntactic movement.

Such cases are quite problematic since an asymmetry between different types of islands would somehow take away from the elegance of the generalisation that relates QR and a $^{n(*)}$ based approach to cumulativity: however, I refrain from reporting solutions here that have been attempted in Schmitt (2013) or elsewhere, and I take the points made in Beck and Sauerland (2000) for valid, both for simplicity of exposition and for adherence to common treatments.

### 3.1.2 The denotation of *every*

*Every*, being a determiner, under traditional assumptions, takes an NP to form a generalised quantifier:[3]

(3.10)




It is important to note that the expression of type $(et)t$ resulting from applying a determiner to an NP, i.e. the quantifier, does not refer to individuals, as it denotes a property of sets: this type, according to Partee (1987), is the most "general". In fact, also proper names (which, if one seeks to keep the types as low as possible, can be treated

[3]Among others, arguments against this traditional treatment have been brought up from a crosslinguistic perspective in Matthewson (2001), where it is assumed that the restrictor of a quantifier is of type $e$ instead of $et$. However, this wouldn't make much difference for the approach I am presenting here.

as of type *e*, since they refer to one individual) have been analysed as generalised quantifiers (e.g. see Montague 1973) — the shifting operation that maps individuals to generalised quantifiers is also known as Lift.[4] If some theoretical choices are made, the type of an expression like *every mistake* is constant and independent of syntactic aspects, and so is the the type of the determiner (at least, I see no reason to assume otherwise).[5]

Suppose that we want to account for the (alleged) distributive nature of *every*, understood as the reason why the following sentence only has a distributive reading according to which it is the case that there is no editor (i.e. no individual belonging to a contextually defined set of editors) who has not caught three mistakes:[6]

(3.11) Every editor caught three mistakes.

We might want to have an $(et)((et)t)$ analysis of *every* (thus treating it as a determiner that combines with an *et* expression to denote a property of properties of individuals, i.e. a GQ) that ensures that (3.11) does not mean that there is an exhaustive plurality of editors who collectively caught three mistakes: this is a reading that the sentence in fact does not have. Depending on whether the existential quantifier related to the object takes narrow or wide scope, two readings are available for (3.11) that change the truth conditions as to whether the plurality of the caught mistakes is the same for each editor (wide scope) or might covary with each editor (narrow scope). However, the standard determiner denotation for *every*, repeated here, would provide the intended truth conditions for (3.11):

(3.12) $\lambda P_{\text{et}}.\lambda Q_{\text{et}}.\forall x[P(x) \rightarrow Q(x)]$.

A possible alternative type for *every NP* would be a referential one, and this is the type assumed in Champollion (2010). *Every mistake* would then be an expression that refers to the sum of all mistakes, i.e. it denotes a plurality of individuals. A similar analysis has been proposed for the Chinese determiner *meige*, which is claimed to be an expression of type $(et)e$, mapping predicates to (plural) individuals (see Lin 1998). The plural individual referred to by *every* is derived by means of a supremum operator

[4]Montague, who assumes a strict correspondence between syntactic category and semantic type, does not really have *shifting* operations that produce generalised quantifiers out of proper names (*terms* in his terminology): rather, as his rule T1(d) in Montague (1973) specifies, a proper name like *John* directly translates into $j^*$, which is, in montagovian notation, the set of all properties that hold of $j$. In a system where there are three types that the syntactic category of NP viz. DP might correspond to (referential, predicative, quantificational), then several type shifting operations are generally assumed, among which: $[\![ \text{LIFT} ]\!] = \lambda x.\lambda P.P(x)$ (see Partee 1987).

[5]Quantifiers in object position are problematic from a type theoretic point of view because Functional Application cannot apply between expressions of type $e(et)$ and $(et)t$. If we want to leave the types as they are, we need a process (usually known as QR) that outputs a structure where the object quantifier takes as its nuclear scope the verb phrase as a first order predicate. This is what I do here.

[6]I deliberately ignore aspects that are interesting but here irrelevant, like the existence of a scalar implicature (there is at least a reading where the sentence is not false in case some editor caught more than three mistakes).

first proposed in Sharvy (1980) as a generalisation of Russell's ι for plural definite descriptions, which ended up to be known as σ. Applying σ to a predicate results in the sum of all members of the extension of that predicate, if such sum is itself in that extension, otherwise the operation is undefined (and this condition accounts for the presuppositional behaviour of definite descriptions):

(3.13) a. $[\![ \text{mistake} ]\!]^M = \{a, b, c, d\}$

b. $[\![ \text{the mistakes} ]\!]^M = \sigma x.{}^*\text{mistake}'(x) = a \oplus b \oplus c \oplus d$ ✓

c. $[\![ \text{the mistake} ]\!]^M = \sigma x.\text{mistake}'(x) = a \oplus b \oplus c \oplus d$ ✗

d. $[\![ \text{every mistake} ]\!]^M = \sigma x.{}^*\text{mistake}'(x) = a \oplus b \oplus c \oplus d$

The fact that *the mistake* is bad in such a model (because of the uniqueness presupposition) is predicted by how the σ operator is defined: the plural individual that results from the sum of all mistakes is itself not in the extension of the predicate. Note that if in the model there were only one mistake, $\sigma x.\text{mistake}'(x)$ would be trivially fine (in this sense, this operator is a generalisation of ι). If we assume the principle of Maximise Presupposition, first proposed (although not with this name) in Heim (1991: 515), which roughly says that the utterance of an expression is not felicitous if there is an alternative expression with the same truth conditions but with stronger presuppositions, we can see why, under this analysis, *Every mistake has been caught* is bad if it is known that there is just one mistake and this one mistake has been caught. In such a context *The mistake has been caught* is the pragmatically correct utterance, because it has stronger presuppositions (which are met) than the alternative where *every* is used instead of the definite article.

In Lin (1998) this analysis for *meige* is supported by various facts illustrated by its interaction with the VP modifier *dou*, which is analysed as a distributive operator. *Dou* is obligatory whenever *meige* is used, and the syntactic scope configuration must be *meige* > *dou*. One of these facts, which I report here for illustration purpose, comes from sentences like the following, where *mei*'s restrictor denotes pluralities:

(3.14) Mei-yi zu (de) xiaohai dou hua-le yi-zhang hua.
every group DE children all draw-Asp one-Cl picture
*Every group of children drew one picture.* (Lin 1998: 236–237)

If *dou* introduces, as a distributive operator, a universal quantifier so that the verbal predicate is applied to each atomic member of the denotation of the argument[7] and *mei* is assigned the traditional GQ denotation that *every* has, then a reading according to

[7]Actually in order to stay general and include various kinds of plurality denoting expressions as Keys (definite or bare plurals, numerals…) as well as so called "intermediate readings" one should rather hold that the distribution is over the members of a Cover of the plurality, where "Cover" is defined as in Schwarzschild (1996: 64) as the set $C$ of the subsets of a set $P$, such that (I use second order PL for brevity) $\forall x[x \in P \rightarrow \exists Q[Q \in C \wedge x \in Q]] \wedge \neg[\varnothing \in C]$. Of course, $P$ and the members of $C$ are sets under the assumption that pluralities are sets: if a Linkian ontology with plural individuals is assumed instead, they are a plural individual and parts of it respectively.

which for each group of children, each child drew a picture would be expected. But this reading is not available: it is not the plurality of atomic children that is the Key of the distributive relation, but instead it is the plurality of the groups of children. In order to predict this (and other phenomena) retaining the analysis of *dou* as generalised distributive operator, *mei NP* has to denote a plural individual and have nothing "inherently distributive".

## 3.2 The c-command condition

The analysis I summarise here is an explicit response to Kratzer (2000) and aims at demonstrating that the Neo-Davidsonian apparatus is actually not needed in order to derive the cumulative readings of *every*. The cumulation operator and the referential analysis of *every NP* are enough a tool and a very simple, c-command based condition delivers, according to Champollion (2010, 2017), a better description of the distribution of these cumulative readings.

In fact, the proposal is extremely simple. Taking Kratzer's sentence as an example (*Three copy editors caught every mistake*), one can assume that *every mistake* moves out of the VP and takes scopes over $^{**}$VP (but, of course, has narrow scope relative to *three copy editors*) and that in some way or other the *mistake* is interpreted also in situ. To achieve this, Champollion chooses to use the Trace Conversion Rule (Fox 2002), which makes traces (or deleted copies) interpretable as definite descriptions (hence the ι).

(3.15) a. Three copy editors caught every mistake.

b. $\exists X[3\text{ce}'(X) \wedge (X, \sigma y.\text{mistake}'(y)) \in {}^{**}\lambda X'.\lambda Y.\text{catch}'(X', \iota y'.\text{mistake}'(y') \wedge y' = Y)]$

(3.16) a. Three video games taught every quarterback two new plays.

b. $\exists X[3\text{vg}'(X) \wedge (X, \sigma y.\text{quarterback}'(y)) \in {}^{**}\lambda X'.\lambda Y.\exists Z[2\text{np}'(Z) \wedge {}^{***}\text{taught}'(X', \iota y'.\text{quarterback}'(y') \wedge y' = Y, Z)]]$

These logical translations adequately represent the cumulative readings the sentences have: in the case of (3.16), the Schein's complex reading where *every quarterback* is both in a cumulative and in a distributive relation is captured by having two cumulations, where the lower one basically puts in a scopeless relation *three video games* and *two new plays*, so that the weak truth conditions of the sentence under the relevant reading are secured. In Figure 3.1 the Logical Form of (3.16) is represented as an example (whenever possible, things are omitted or simplified in order to avoid clutter[8]).

Although several theoretical assumptions are needed,[9] Champollion (2010) proposes a simple and compositionally neat analysis of the cumulative readings of *every*,

[8]For example, I refrain from giving a proper definition of rules of composition that are usually known as Abstraction and Predicate Modification (intersection) that are used in the composition in Figure 3.1, for the purpose of sparing some unnecessary digression.

[9]Note, however, that these assumptions (the cumulation operator, the referential denotation of *every NP* and the interpretation of in situ copies of moved phrases) are independently motivated. Each of

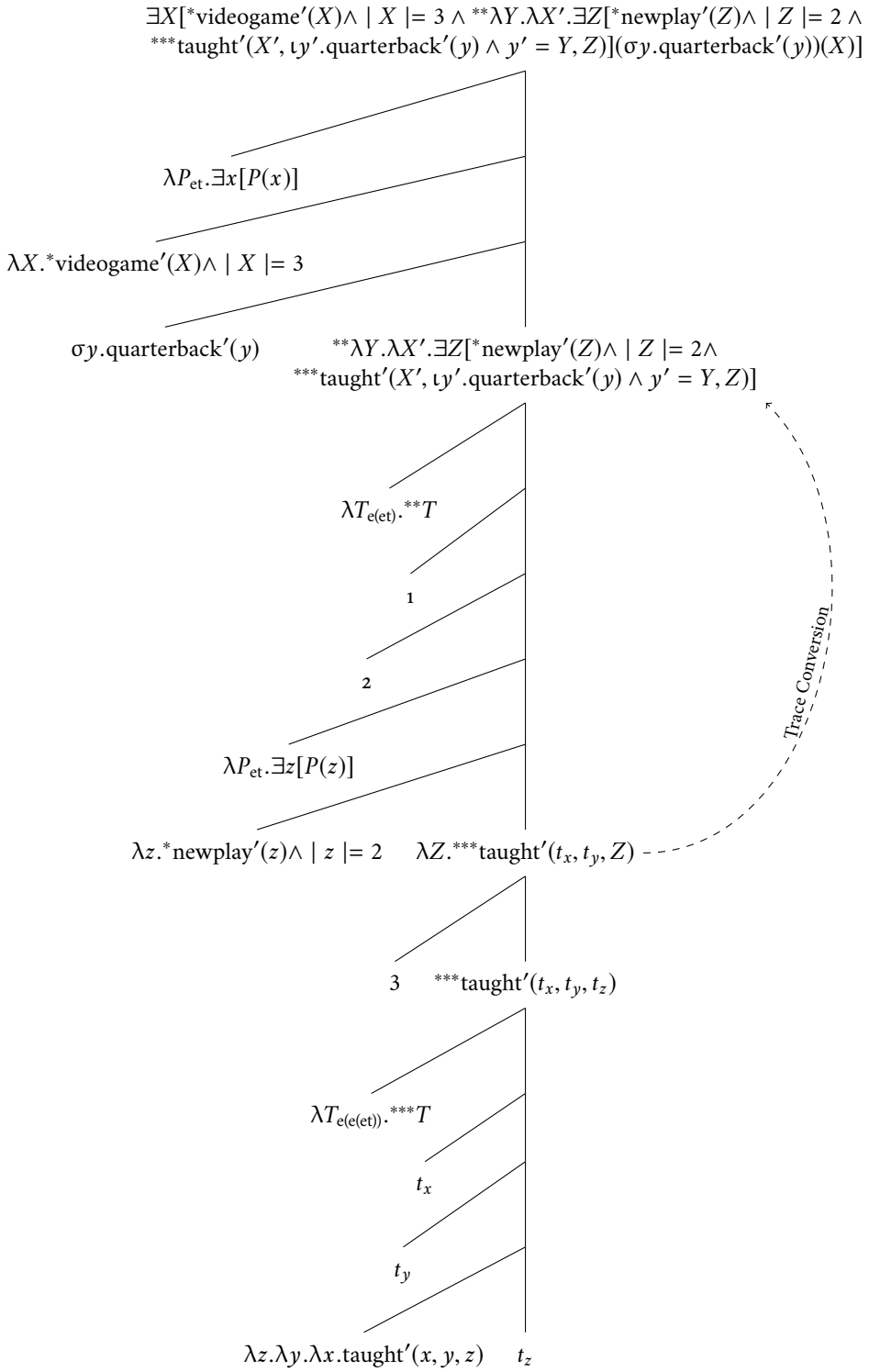



Figure 3.1: An LF for *Three video games taught every quarterback two new plays.*

but so far it is not clear how their distribution is restricted (for instance, why a sentence like *Every copy editor caught 100 mistakes* does not have any cumulative reading).

The restriction proposed by Champollion is that "a noun phrase headed by *every* cannot cumulate with anything it c-commands" (Champollion 2010: 220). This simple restriction encompasses the cases considered so far and is also implemented in a later, different analysis proposed in Champollion (2017). This analysis is developed in a Neo-Davidsonian framework, and I do not present it here in detail since its predictions with respect to cumulative *every* do not differ from those of the proposal in Champollion (2010). With $\bigoplus$ being the Generalised Sum operator, Champollion proposes this determiner denotation that implements what he calls the Event-Based Distributivity operator:[10]

(3.17) $[\![ \text{every} ]\!] = \lambda P_{\text{et}}.\lambda\theta_{\text{ve}}.\lambda V_{\text{vt}}.\lambda e_{\text{v}}.\theta(e) = \bigoplus P \wedge e \in {}^{*}\lambda e'.V(e') \wedge \text{Atom}(\theta(e'))$.
(Champollion 2017: 225)

Just for the sake of exposition, the "new" logical form of (2.13) is:

(3.18) $\exists e. \mid {}^{*}\text{Agent}(e) \mid = 3 \wedge {}^{*}\text{ce}'({}^{*}\text{Agent}(e)) \wedge {}^{*}\text{Theme}(e) = \bigoplus \text{mistake}' \wedge$
$e \in {}^{*}\lambda e'.\text{catch}'(e') \wedge \text{Atom}(\text{Theme}(e'))$. (Champollion 2017: 227)

In this later proposal, the c-command condition becomes derivable from the composition itself, given the denotation in (3.17): an eventual argument in the nuclear scope of *every*, together with the verbal predicate would end up in the composition as a pluralised Thematic predicate that holds of each event $e'$ that is part of $e$, and this amounts to having a distributive construal.

### 3.2.1 Counterexamples

The c-command condition proposed in Champollion (2010) is very elegant but empirically wrong, at least for Italian. Clauses with a direct object and prepositional object are constructions that provide robust counterexamples to Champollion's generalisation. One such sentence is:

(3.19) Gennaro ha assegnato [$_{\text{DP}}$ un problema] [$_{\text{PP}}$ a Nina].
Gennaro has assigned a probem to Nina
*Gennaro assigned Nina a problem.*

One tentative syntactic representation of this sentence could be such as in Figure 3.2. Note that the two objects can be put in either order without the well-formedness of the sentence being affected (i.e. *Gennaro ha assegnato a Nina un problema* is perfectly

them is independently needed in order to account for other phenomena, and in some cases there is quite robust crosslinguistic evidence for it, as it is the case for distributivity phenomena in Chinese.

[10]This operator can be thought of as a Neo-Davidsonian version of the D operator, and as such is of type $(vt)(vt)$, i.e. it is a function that maps event predicates to event predicates. It is defined as: $[\![ \text{D}_\theta ]\!] := \lambda V_{\text{vt}}.\lambda e_{\text{v}}.e \in {}^{*}\lambda e'.V(e') \wedge \text{Atom}(\theta(e'))$ (Champollion 2017: 172).

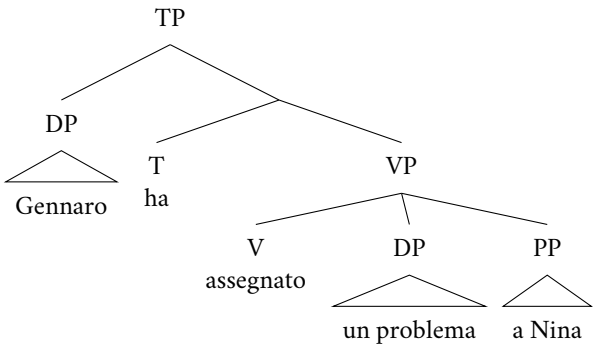



Figure 3.2: A tentative analysis of a ditransitive structure.

acceptable), and this is generally true for all these constructions. It is not my aim to argue in favour or against binary branching, but the structure of the verb phrase in Figure 3.2 might need to be revised with respect to the structure of the VP in order to account, among others, for certain binding phenomena.

Binding Theory aims to describe the distribution of coreferent DPs, i.e. DPs that have the same referent, and is usually presented and referred to in the form of three principles, which I quote here from Chomsky (1981: 188):

(3.20) Binding Theory:

A. An anaphor is bound in its governing category.

B. A pronominal is free in its governing category.

C. An R-expression is free.

*X binds Y* entails that *X* and *Y* are coreferent, and this is represented by coindexing them. *X is free* means that *X* is not bound by anything. As an example of R-expression[11] we might consider proper names:

(3.21) $\text{He}_{i/*j}$ told Mary that $\text{John}_j$ is in love.

*John*, being an R-expression, cannot be bound according to Principle C: this results in the ungrammaticality of the reading of (3.21) according to which John tells Mary about himself being in love, i.e. the reading where the pronoun *he* in the matrix clause and the R-expression *John* in the embedded clause are coreferent. It is generally assumed that for *X* to bind *Y*, *X* must c-command *Y* (as a necessary but clearly not sufficient condition). In fact, examples like the following show that linear precedence is not decisive for the establishing of binding relations:

[11] I do not want to go into details about the definition of *R-expression*. I just assume here, informally, that every DP which is not a pronominal or an anaphor is an R-expression.

(3.22) a. [His$_{i/j}$ brother]$_k$, John$_j$ has always loved $t_k$.

b. [John$_i$'s father]$_j$ always praises himself$_{j/*i}$.

The object of (3.22a) is topicalised and accordingly moved away from its base generation postverbal position. The binding relation does hold despite the surface linear order: in fact, because of the properties of this kind of movement[12] what counts for the binding options is just the base generation position. On the other hand, (3.22b) illustrates what the structural relation that has to hold between the binder and its target is, namely c-command.[13] This is the reason why that sentence cannot mean that the father of John always praises John: *John* is the complement in a PP embedded in the subject DP and thus it does not c-command the reflexive pronoun *himself*. This brief and highly sketchy digression in Binding Theory should have given the idea that binding relations are (used as) a diagnostic tool that helps to figure out the syntactic structure of an expression.

Coming back to cases like (3.19) we can, using the notions of Binding Theory, observe that there is a match between linear order (precedence) and c-commanding of one object of the other in Italian: the same observation is made in Anagnostopoulou (2003: 178):

(3.23) a. Gennaro$_i$ ha dato [a Nina$_j$] [la sua$_{i/j}$ penna].
Gennaro has given to Nina the her/his pen
*Gennaro gave Nina her/his pen.*

b. Gennaro$_i$ ha presentato [Nina$_j$] [ai suoi$_{i/j}$ vicini di casa].
Gennaro has introduced Nina to.the her/his near of home
*Gennaro introduced Nina to her/his neighbours.*

According to (3.23), I assume that, in Italian, *X precedes Y* is equivalent to *X c-commands Y*, *X* and *Y* being the direct and indirect (prepositional) objects of a ditransitive verb, i.e. I assume the revision of the verbal phrases that is presented in Figure 3.3:[14] At this point it is crucial to test Champollion's proposal with these constructions, and in order to do this we consider the following expression:

(3.24) Scenario: Gennaro is writing a new book and wants to see whether the 100 exercises it contains are actually doable or not. In order to check it, he sends the exercises to his students separately and via e-mail, so that each student gets some of those 100 to solve. Because Gennaro does not want to torture

[12] Actually it is quite the contrary: not affecting binding relations is one of the properties that define A-bar movement.

[13] An early and influential discussion of the relation between c-command and binding possibilities is in Reinhart (1981).

[14] A very detailed and influential argumentation in favour of such binary branching double object construction with verb movement is in Larson (1988). However, since it is not relevant for the point I am making, I refrain from adopting here every label and concept argued for there, e.g. I do not make use of the "little v".

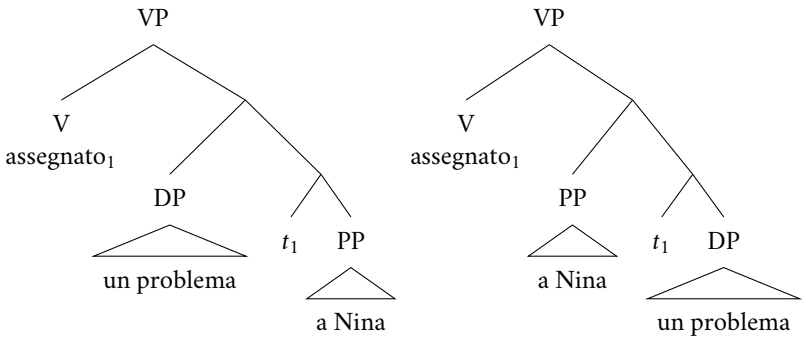



Figure 3.3: A revised structure for the double object construction.

his beloved students during vacation, nobody is assigned all 100 exercises (otherwise they would feel obliged to solve them all in one day).

Gennaro ha inviato ogni esercizio ai suoi studenti.
Gennaro has sent every exercise to.the his students
*Gennaro sent every exercise to his students.*

The crucial point is that (3.24) is true in the described scenario, and so would be the same sentence if there were a bare numeral like *five students* instead of a definite plural as indirect object (and the scenario were changed accordingly). A similar case is inspired by the example in Thomas and Sudo (2016). The following sentence is true in the given scenario, and therefore there is a cumulative relation between the *ogni*-phrase and the argument in its syntactic scope, namely the indirect object:

(3.25) Scenario: In a time of crisis for the agricultural sector, the only two farmers of some village had to sell all of their sheep, but they did not tell each other because they did not trust anyone and they hoped to avoid insider trading. A buys half of one farmer's sheep and B buys the other half. Another buyer C buys the sheep of the other farmer. They all do it independently from each other (i.e. there is *no* "team credit" interpretation of the sheep acquisition).

Due contadini hanno venduto ogni pecora a tre clienti.
two farmers have sold every sheep to three customers
*Two farmers sold every sheep to three customers.*

What such cases clearly show is that *ogni* can indeed cumulate with expressions in its c-command domain, and this is *ipso facto* an empirical falsification of the proposal in Champollion (2010). In fact, there are other constructions where this is evident, although admittedly cumulative readings are not always easily available in those expressions. This is the case of passive sentences, which will be discussed later.

Binding tests like those presented above show that, in Italian passive sentences (just like in English), the optional "*by*-phrase" expressing the external argument is c-commanded by the subject. In fact, Champollion himself states that "*every* as a passivized object noun phrase should be unable to cumulate" (Champollion 2010: 220). Thus, it would suffice to find passive sentences with *every NP* as subject that have cumulative readings to falsify this prediction: in a separate context later I will argue that such data exist, and I will describe it more precisely. For now, I consider the "c-command domain condition" proposed in Champollion (2010, 2017), though appealing for its clearness and simplicity, falsified at least for Italian.

# Chapter 4

# A new dataset

In this chapter the distribution of the cumulative readings of *ogni* is described in a systematic way. The descriptive generalisations in Kratzer (2000) and in Champollion (2010) have been proven inadequate if applied to the Italian *ogni*, in predicting in which cases cumulative readings are available, even though the determiner *ogni* behaves in most cases very similarly to *every*. Of course, I am not claiming that the observations I make here about *ogni* do apply to *every* (or to any other "distributive" determiner found in other languages), but an accurate description of the phenomenon in Italian could potentially be the basis for a deeper understanding of how cumulativity interacts with other phenomena.

## 4.1 Where *ogni* can(not) cumulate

In this section I try to define the conditions under which the possibility of *ogni* to enter in a cumulative relation appears to be blocked for whatever (non plausibility related) reason. *Ogni NP* will be considered non-cumulative whenever it is found in a sentence that has no cumulative reading and replacing the quantifier *ogni NP* in the same sentence with an expression like a modified or unmodified numeral, a plural definite or a coordinate structure results in the cumulative reading becoming available. This simple methodological principle ideally allows to focus on the contribution of the determiner *ogni* and to be sure that other factors not related to it do not get wrongly associated with the phenomenon under consideration. In each case I will discuss, *ogni* will (also) have a run-of-the-mill distributive interpretation where the restrictor of the determiner is the Key. In fact, I know no case where *ogni* has only a cumulative interpretation in well-formed expressions, even if in some cases discussed later the cumulative interpretation will turn out to be the prominent one. For convenience and shortness, throughout the discussion I will adopt this terminology:

Non-cumulative *ogni*: An *ogni NP* that, in the given linguistic context, does not have a cumulative reading (the sentence is marked with ✗).

Cumulative *ogni*: An *ogni NP* that, in the given linguistic context, has a cumulative reading (the sentence is marked with ✓).[1]

I will consider the subject and the direct object positions of active sentences and the Agent and the Theme arguments of passive sentences. The main reason why I do not include in this exposition other syntactic positions such as the indirect object and various adjunct positions with respect to their ability to host a cumulative *ogni* (wherever this "ability" originates) is that I have not been able to obtain a clear picture for those cases: in many such cases the cumulative reading, if available at all, seems to be an idiosyncratic property of that sentence (and often of that particular speaker), the cause of which is unclear to me. I will come back to this point after having presented the distribution of cumulative *ogni* in the "standard" cases.

### 4.1.1 Direct object

The direct object position is favourable to cumulative *ogni*:

(4.1) a. (Almeno / Esattamente) Tre redattori hanno trovato ogni errore.
at least / exactly three copy editors have found every mistake
*(At least/Exactly) Three copy editors found every mistake.* ✓

b. Nina e Gennaro organizzeranno ogni incontro questo semestre.
Nina and Gennaro will organise every meeting this semester
*Nina and Gennaro will organise every meeting this semester.* ✓

c. Uno studente e un dottorando hanno filmato ogni seduta.
a student and a PhD student have recorded every session
*A student and a PhD student recorded every session.* ✓

However this is to be interpreted, the direct object position seems to be the "best one" for cumulative *ogni*, in the sense that, in a transitive sentence, an object *ogni NP* will always be cumulative, if the scenario is plausible. Ditransitives with *ogni NP* in direct object position are also an interesting case.

(4.2) a. Scenario: There are ten sources that leaked classified information from some state agency. Gennaro is investigating on this leak and manages to have the identities of these ten sources disclosed, thanks to four journalists who were convinced to collaborate, independently from each other. Each journalist disclosed the identity of at least one source, and the identity of each source was disclosed by at least one of the four journalists. In total, all ten sources were disclosed.

[1] Of course, when ✗ and ✓ appear at the end of the English free translation of a glossed example they signal the availability of the reading for the actual example, not for the English translation of it.

Quattro giornalisti hanno rivelato ogni fonte a Gennaro.
four journalists have disclosed every source to Gennaro
*Four journalists disclosed every source to Gennaro.* ✓

b. Scenario: There are ten sources that leaked classified information from some state agency. The situation is so serious that three investigators are called to work on the case. Gennaro, who received the classified information and thus knows the identities of the ten moles, is somehow convinced to collaborate by the investigators. However, he wants to put the three investigators in competition against each other, by giving each of them only partial information. This means that each source was disclosed to at least one investigator and each investigator got at least one source disclosed. In total, all sources were disclosed by Gennaro.

Gennaro ha rivelato ogni fonte a tre investigatori.
Gennaro has disclosed every source to three investigators
*Gennaro disclosed every source to three investigators.* ✓

(4.3) [$_A$ Quattro giornalisti] hanno rivelato [$_B$ ogni fonte] [$_C$ a tre investigatori].
four journalists have disclosed every source to three investigators
*Four journalists disclosed every source to three investigators.* ✓

These last three examples ought to be considered carefully. (4.2a) and (4.2b) show that in sentences with a ditransitive predicate, the direct object *ogni NP* can enter in a cumulative relation both with the subject and with the indirect object.

When it comes to sentences like (4.3), the situation is complex, because there are two pluralities that *ogni NP* is in relation with. The available readings that involve cumulation are (in a model where there are 4 sources in total):[2]

- Each investigator has been told about all the four sources. Four journalists disclosed a total of 4 sources between them:[3] see Figure 4.1.

- Four sources (which is all the sources there are) have been disclosed to three investigators between them. Each journalist (four in total) disclosed the four sources: see Figure 4.2.

Specifically, the following reading seems to be *not* available:

[2]Note that *ogni*, when in a distributive relation, always takes narrow scope in examples like this. This is parallel to the behaviour of *every* vs. *each*: the former prefers narrow scope, the latter wide scope.

[3]This is equivalent to the interesting reading of Schein's example *Three video games taught every quarterback two new plays*.

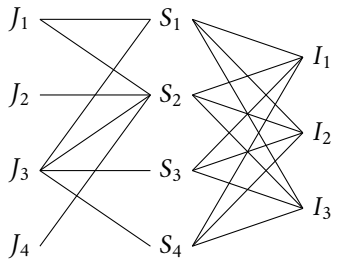



Figure 4.1: *Ogni* cumulates with the subject and distributes over the indirect object.

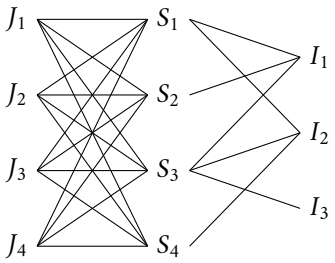



Figure 4.2: *Ogni* cumulates with the indirect object and is in distributive relation with the subject.

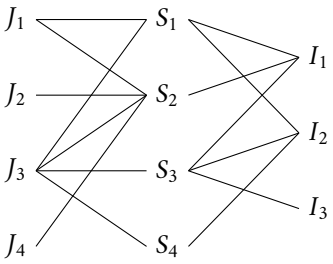



Figure 4.3: *Ogni* cumulates with both the subject and the indirect object. Not an available reading.

- The weakest truth conditions. Four journalists disclosed four sources, i.e. all of them, between them, and these four sources have been disclosed to three investigators between them: see Figure 4.3.

Thus, a quantifier headed by *ogni* in object position can cumulate with both the subject and the indirect object, because (4.3) is true in the scenarios exemplified in Figure 4.1 and Figure 4.2. However, it seems that there is some sort of restriction that, on a descriptive level, prevents *ogni* to cumulate with both arguments (Figure 4.3) or, to put it differently, in sentences like (4.3) it seems that *ogni* has to be in a distributive relation with at least one other argument.

If we accept this descriptive generalisation, it seems indeed to be a restriction whose nature is not so transparent. In fact, it seems to be a very suspicious restriction: it is difficult to imagine how this could come about from grammatical principles, since the data show that direct object *ogni* can, in principle, cumulate with either argument. Thus, I guess that perhaps the primary linguistic data that rule out readings like the one in Figure 4.3 are not due to some actual restriction implemented in the semantics of Italian but, as a hypothesis, rather due to the fact that the truth conditions that such a reading has would be too weak. In fact, a reading where the object cumulates with both other arguments and thus with such weak truth conditions is also not prominent

at all in case of a sentence like (4.3) where *ogni fonte* is replaced with a different plurality denoting expression:

(4.4) [$_A$ Quattro giornalisti] hanno rivelato [$_B$ cinque fonti] [$_C$ a tre investigatori].
four journalists have disclosed five sources to three investigators
*Four journalists disclosed five sources to three investigators.*

Thus, it might be the case that (4.3) is judged as lacking this reading because it is too weak a reading to be readily available. We might suppose that in principle *ogni* is not incompatible with "double" cumulation with ditransitive predicates, but the corresponding reading needs to be forced with some expression like *between them* or something similar that usually forces cumulative readings. If there were some syntactic or compositional restriction (whatever that may look like) preventing the reading, then inserting such an expression in (4.3) should result in a sentence that is odd at least. Instead, the sentence is acceptable and it seems that the reading we are after is in fact available, even if not as the most prominent one:

(4.5) In tutto, [$_A$ quattro giornalisti] hanno rivelato [$_B$ ogni fonte] [$_C$ a tre investigatori].
in everything four journalists have disclosed every source to three investigators
*Between them, four journalists disclosed every source to three investigators.* ✓

Some transitive verbs are collective in the sense that they only admit a plural object (let's call this property of verbs *object collectivity*). Such verbs include *compare*, *collect*, *align*:

(4.6) a. Gennaro confronta i libri.
Gennaro compares the books
*Gennaro compares the books.*

b. ?Gennaro confronta un libro.
Gennaro compares a book
*?Gennaro compares a book.*

c. ?Gennaro confronta ogni/ciascun libro.
Gennaro compares every/each book
*?Gennaro compares every/each book.*

As (4.6c) shows, the acceptability of a QP headed by *ogni* or *ciascun-* as object of such predicates is degraded. Indeed, such sentences cannot mean that Gennaro compares the books with each other.

(4.7) a. Gennaro e Nina hanno confrontato i libri scritti da Giuseppe.
Gennaro and Nina have compared the books written by Giuseppe
*Gennaro and Nina compared the books by Giuseppe.*

b. ?Gennaro e Nina hanno confrontato ogni libro scritto da Giuseppe.
Gennaro and Nina have compared every book written by Giuseppe
?*Gennaro and Nina compared every book by Giuseppe.* ✓

Surprising as it may seem, sentences like (4.7b) are judged with a question mark (i.e. their acceptability is slightly degraded, and that sentence does not have the reading where the books were compared to each other). In fact, (4.7b) is true if Gennaro and Nina did whatever they did with the books independently from each other and in such a way that the cumulation of the books they had something to do with corresponds to the totality of books — in other words, that *Gennaro e Nina* and *ogni libro* are in a cumulative relation. As Thomas and Sudo (2016) predict, this would not apply if the *ogni* in (4.7b) were substituted with *ciascun*, because here the Differentiation Condition is not satisfied.

(4.7b) and in fact also (4.6c) are perfectly fine if understood as if the books were not compared with each other, but with something else, as it is explicitly the case here:

(4.8) Gennaro e Nina hanno confrontato ogni libro scritto da Giuseppe con la Bibbia.
Gennaro and Nina have compared every book written by Giuseppe with the Bible
*Gennaro and Nina compared every book by Giuseppe with the Bible.* ✓

Let's say that Giuseppe has written only four books. Then (4.8) is true in a scenario like the one in Figure 4.4 but is false in a scenario like the one in Figure 4.5, because there is a book by Giuseppe which neither Gennaro nor Nina compared with the Bible ($B_2$).

Of course, this does not change a lot with respect to object collectivity, because here the question is very different. Nevertheless, it is interesting to note that when *every* is the object of such a collective predicate, like in (4.7b), the expression has a degraded acceptability but it is not entirely ungrammatical because it can be repaired by assuming that the information about what the object is which every book by Giuseppe has been compared with is left implicit (in fact, if there is a context that supports it, it can be left implicit and the acceptability of the sentence improves). And crucially, this understanding of the sentence has a cumulative reading: this fact supports the view that the direct object position is a very "natural" position for *ogni* to enter in a cumulative relation.

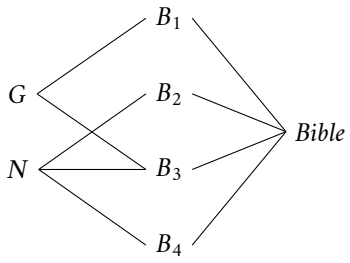



Figure 4.4

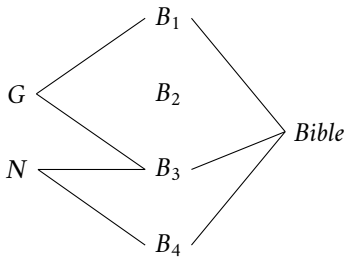



Figure 4.5

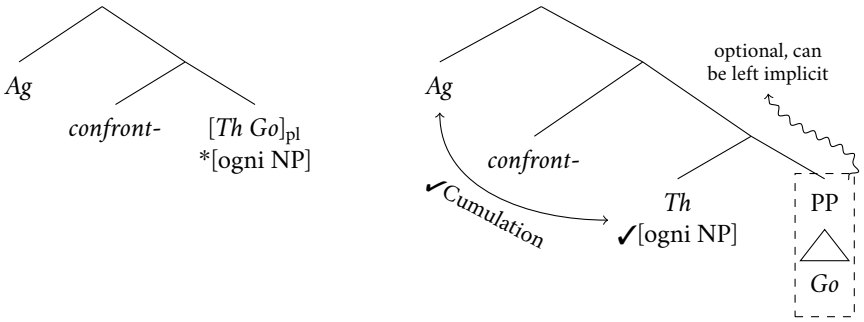



Figure 4.6: *Confrontare* as object collective (left) and as non-object collective (right).

The intuition is that the verb assigns three Thematic Roles, which we might assume to be an Agent, a Theme and a Goal. Optionally, the Goal can be left implicit and thus not be present in the structure.[4] If we let *Ag*, *Th*, and *Go* stand for the roles, we have three possible construals represented (in a syntactically very rough way) in Figure 4.6. In the construal represented by the structure on the right side of Figure 4.6, i.e. in the construal that corresponds to *compare something (with something)*, *confrontare* cannot be considered an object collective predicate, since non plural objects are grammatical. In this construal *ogni NP* as object is in fact fine, as (4.8) shows, and the reading where the subject and the object cumulate, i.e. a reading that makes the sentence true in a scenario like the one in Figure 4.4 is available. However, if *confrontare* is considered as an object collective verb, *ogni NP* is not grammatical in object position, i.e. (4.9a) is not acceptable in the given scenario (hence the #) whereas (4.9b) and (4.9c) are:[5]

(4.9) Scenario: There are four paintings (A, B, C, D) in a room. Lara, who wants to show off her art critic expertise, writes a detailed comparison of each pair of paintings, so that at the end six comparisons are made.

[4] One might alternatively argue that there are two distinct entries for *confrontare*, each one with its θ-grid. This choice depends on the approach that one has to Thematic Roles, among others.

[5] Interestingly, object collective verbs like *confrontare* in Italian do not accept morphologically singular collective NPs (like *army*, *flock*, *herd*) in their object position. Subject collective do not have this restriction, as pointed out in section 1.1.

a. #/? Lara ha confrontato ogni dipinto.
Lara has compared every painting
*Lara compared every painting.*

b. Lara ha confrontato tutti i dipinti.
Lara has compared all the paintings
*Lara compared all the paintings.*

c. Lara ha confrontato quattro dipinti.
Lara has compared four paintings
*Lara compared four paintings.*

There are object collective verbs which are, at first glance, more suited to this investigation, as they seem not to be ambiguous between different construals in the same way that *confrontare* is — but they will eventually turn out not to be a good test for what we are after. Such a verb is e.g. *collezionare* 'collect' (in the sense of having and managing a collection — for one to collect certain objects does not mean that she necessarily has all such objects but rather that all such objects are targets for this person's collection):

(4.10) a. Nina colleziona francobolli degli anni venti.
Nina collects stamps of the years twenty
*Nina collects stamps of the 1920s.*

b. *Nina colleziona ogni francobollo degli anni venti.
Nina collects every stamp of the years twenty
*Nina collects every stamp of the 1920s.*

c. ??Nina colleziona tipi di francobolli.
Nina collects types of stamps
*Nina collects types of stamps.*

d. Nina colleziona ogni tipo di francobolli.
Nina collects every kind of stamps
*Nina collects every kinds of stamps.*

These data show how problematic the situation is. (4.10a) is the "prototypical" case, where the object is a bare plural. On the other hand, (4.10c) which superficially looks analogous, is very odd at best due to its implausibility.

The most relevant case is (4.10b), where the sentence is just ungrammatical. At first it might be surprising that (4.10d) is fine, but we cannot simply draw the conclusion, from this sentence, that *collezionare* can have *ogni NP* as object. In fact, Nina's collection is not a collection of types of stamps, but instead a collection of stamps, and this is proved by the absolute infelicitousness of any conversational continuation of (4.10d) that contains some reference to "Nina's collection of types of stamps" (note that, odd as it is, given our world knowledge, such followings would be fine if there was an antecedent whose propositional content amounted to "Nina collects types of stamps").

So, a verb like *collezionare* is problematic for these kinds of tests after all, also because it is hard to use it felicitously in an episodic context that could eliminate the complication of the indeterminacy of the objects the collector is in relation with. In general, it also seems here that there is some restriction which makes it impossible to have *ogni NP* as the object of this verb. However, one should note that there is some difference between verbs like *collect* and *compare*, which was discussed above, with respect to their selecting a "collective object". I think that this is genuinely the case with verbs like *compare*, because they express some action (or event) that necessarily involves a quite definite plurality of individuals (say, two books, three houses, the characters of a film etc.): in this sense I call them "genuinely object collective". In the case of *collect*, it is not so clear in what relation the members of the object plurality stand. Nothing happens to and with them, but rather they just share a property that is relevant inasmuch as the subject (the collector) is interested in possessing objects with that property: hence, for example, the difficulty of setting up episodic contexts with *collezionare*. Although this whole discussion has been very informal and vague, I think this is an important difference for the investigation of *ogni*.

We have examined the behaviour of a quantifier headed by *ogni* as object of two verbs, *confrontare* 'compare' and *collezionare* 'collect': we found out that the two verbs present a number of differences that also reflect the difference in their interaction with *ogni NP*. The most robust and characteristic property of QPs headed by *ogni* (and *every*, *each*…) is that they cannot be the subject of a collective verb, i.e. a predicate that can only hold of a plurality, like *meet*, *gather* and similar: this fact has been presented in section 1.1. It becomes then an interesting question whether this restriction holds for the object position as well, i.e. whether *ogni NP* is grammatical as object of verbs that select pluralities as object. If such restriction did not hold, then there would be a new, unexplained aspect of the subject-object asymmetry related to the singular universal quantifier. This is the reason why these two verbs were considered and their problematic aspects have been discussed. From these observations the general conclusion can be drawn that *ogni NP* is suitable neither as object of an object collective predicate nor as subject of a subject collective predicate.

Note that this fact is especially problematic for a referential analysis of *ogni NP* along the lines of what is assumed by Champollion (2010) (see the discussion on page 34): if *ogni NP* has the denotation presented in (3.13d), i.e. if it denotes the plural individual that corresponds to the sum of all those individuals that are *NP*, then it is hard to explain why such an expression is not acceptable (as discussed above) as object of an object collective verb. An expression like $\sigma x.\mathrm{NP}'(x)$ is expected to behave like a plural definite, and therefore it should be grammatical in a position where a plural individual is needed: however, the data presented here show that this is not the case.

### 4.1.2 Passive sentences

Passive sentences have already been discussed twice as providing counterexamples to Kratzer (2000) and Champollion (2010): here I intend to make my assumptions with respect to passivisation explicit and consider again the status of *ogni* in such sentences

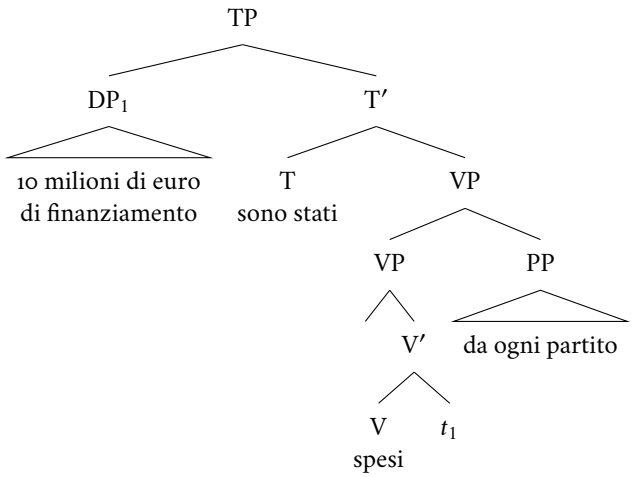



Figure 4.7: The Surface Structure of a passive sentence.

with respect to its cumulative readings. I assume here a quite "traditional" analysis of passive i.e. I consider it a transformation involving suppression of the agent argument, which is optionally expressed in a non A-position (by a PP headed by *by* in English, by *da* in Italian) and absorption of the Accusative Case and consequent A-movement of the argument base generated in object position to the specifier of the functional phrase above the VP, where it is assigned Nominative Case. Thus, the Surface Structure of (2.28b) looks like Figure 4.7, for which a gloss was given in (2.28b) on page 24. The crucial point of structures like Figure 4.7 is that the agentive PP is in the syntactic scope of the passivised object: here, the former is represented as Chomsky-adjoined to the VP, whereas the latter is in the Specifier of the TP. Again, a lot of arguments can be put forward against this "traditional" analysis, but as far as I know these structural relations have to be captured by any analysis of the phenomenon, else certain significant facts are left outside of the descriptive power of the analysis (at least in languages like Italian, English, German). Among these facts for instance, Binding phenomena and sentential negation prove the agentive PP to be contained in the TP (however that functional projection is labelled) and thus c-commanded by the passivised object.

(4.11) a. Nina$_i$ fu punita da se stessa$_i$.
Nina was punished by herself
*Nina was punished by herself.*

b. Lei$_{j/*i}$ fu punita da Nina$_i$.
she was punished by Nina
*She was punished by Nina.*

c. *Se stessa$_i$ fu punita da Nina$_i$.
herself was punished by Nina
*Herself was punished by Nina.*

These sentences show, on the basis of Binding phenomena, that the agentive PP is c-commanded by the passivised object: the coreference reading of (4.11b) is ungrammatical because it constitutes a violation of Principle C, and (4.11c) is ungrammatical because it violates Principles A and C. Note that this last case is not reducible to linear order considerations, since a sentence like the following, where the R-expression *Nina* is Right Dislocated, is grammatical:

(4.12) Se stessa$_i$ ha punito, Nina$_i$.
herself has punished Nina
*Nina punished herself.*

It is generally evident to me and to the informants that these two positions (passivised object and agentive PP) are not as favourable to cumulative *ogni* as, for instance, the direct object position of an active sentence is. In fact, the availability of cumulative readings when *ogni* is in either of these positions essentially falsifies one of the two proposals discussed above. If one judges these readings to be truly marginal in any case (this is not how they are judged for Italian, though), then one could legitimately argue for a model that is unable to predict those cases.

However, ignoring those cases might result in missing some generalisation that lies behind the cumulativity of *ogni* and possible other analogous expressions. As I will discuss in following sections, there seem to be some factors that indeed make the cumulative reading for *ogni* more readily available, and this happens across the board, whenever what seems to be a syntactic restriction is not violated (this is the topic of the next subsection).

For instance, the following sentence only has a cumulative reading (according to which each burglar was seen by at least one witness, each witness saw at least one burglar and, in total, all burglars were seen) if it is inserted in a context where the totality of burglars is salient. If such a context is completely removed or changed as to not having the burglars present in the discourse, the cumulative reading is very hard, or impossible, to access depending on the informant:

(4.13) Scenario: One investigator talks to a colleague who is working on a burglary case which, according to the evidence, involves four burglars. "It is usually not easy to find ocular witnesses for each burglar in these cases, and if you don't, your case will be quite weakened". The colleague replies: "No, we are lucky with this one, since…

Ogni ladro è stato visto da tre testimoni.
every burglar is been seen by three witnesses
*Every burglar was seen by three witnesses.* ✓

An analogous pattern is found with sentences like the following, where the *ogni* is in the agentive PP position:

(4.14) SCENARIO: In a small town called Watertown, public water has been managed for years by two companies *Fresh Water* and *Clean Water*, which each served a half of the town. It turned out that the two companies kept poisoning the water for profit. Now all the citizens of Watertown have organised two class actions against these companies, where each citizen sues the company which was poisoning the water she drank. Here is a headline:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Fresh | Water | e | Clean | Water | sono | state | denunciate | da | ogni |
| fresh | water | and | clean | water | are | been | sued | by | every |
| cittadino | di | Watertown. | | | | | | | |
| citizen | of | Watertown | | | | | | | |

*Fresh Water and Clean Water have been sued by every citizen of Watertown.* ✓

I will not develop this point further here since the factors that make the cumulative reading more easily available for sentences like (4.13) and (4.14) will be discussed in section 4.2. However, it ought to be stressed that the fact that cumulative readings are not blocked if *ogni NP* is in the agentive PP or in passivised object position in a passive sentence is a crucial piece of data for it relates to other analyses. Cases like (4.14) demonstrate that the proposal in Kratzer (2000) is not applicable to the Italian *ogni*: if a logical representation à la Kratzer (2000) were attempted for (4.14), then the restrictor of *ogni* would have to be represented as the Agent. But this means that the cumulative reading, which is available, could not come out from the logical representation itself because of the way it is derived in Kratzer (2000). In fact, it has also been argued that English passive sentences with *every NP* in the agentive PP can have a cumulative reading, e.g. the sentence in (2.25) on page 23: this would make the proposal in Kratzer (2000) inadequate for English too.

On the other hand, the availability of a cumulative reading for sentences like (4.13) constitutes a problem for the c-command condition proposed in Champollion (2010) and implemented in a different theoretical setting in Champollion (2017). In (4.13) *ogni NP* cumulates with a plurality in its syntactic scope: this is exactly what the condition defended by Champollion would exclude and therefore said condition does not hold for *ogni*.

### 4.1.3 Subject of an active declarative sentence

In this discussion *subject* refers to the argument that occupies the position of the specifier of the functional phrase that dominates the VP, after having moved from the specifier position or (in the case of unaccusative verbs) from the complement position of the VP (see Koopman and Sportiche 1991). When *ogni NP* is in this position and the whole expression is well-formed, only the distributive reading is available. This is the

case regardless of what the other expression, with which *ogni* should cumulate, looks like from a semantic point of view:[6]

(4.15) a. Ogni redattore ha trovato dieci errori.
every copy editors has found ten mistakes
*Every copy editor found ten mistakes.* ✗

b. Ogni studente conosce Gennaro, Nina e Giuseppe.
every student knows Gennaro Nina and Giuseppe
*Every student knows Gennaro, Nina and Giuseppe.* ✗

c. Ogni studente ha letto tutti gli articoli di Montague.
every student has read all the papers of Montague
*Every student has read all of Montague's papers.* ✗

It is not possible to reduce this syntactic restriction on the cumulativity of *ogni* to the base generation in [Spec,VP]: this attempt would accomodate both the passive data in of the previous subsection and the data in (4.15), but it would not predict that the same unavailability comes about in sentences with unaccusative predicates:

(4.16) Ogni studente è piaciuto a tre insegnanti.
every student is pleased to three teachers
*Every student pleased three teachers.* ✗

*Piacere* is an unaccusative verb, according to the syntactic diagnostic tools available in Italian[7], and this means that the subject is base generated as the complement of $V^0$, just like a passivised object (in the traditional analysis I am assuming). However, (4.16) represents a robust pattern: *ogni* as subject of an unaccusative verb cannot cumulate with whatever adjunct there is. Obviously, one could try to model a separate restriction that explains (4.16) by saying that cumulation between an argument and an adjunct is generally impossible or subject to other restrictions, but this argumentative

[6]Note however that expressions like definite plurals, in some circumstances, make it harder to get a clean and prominent distributive reading due to non maximality effects. A sentence like *Every student read the books that are suggested in the syllabus* has, beside a "normal" distributive reading, a non maximal reading where the plurality of books is not necessarily made up by all the atomic individuals denoted by *book that is suggested in the syllabus* but instead by a subset thereof, and this plurality might vary depending on the student: under this reading, the sentence is still true if there are books suggested in the syllabus which have not been read by any students (it probably must be case that the majority of books have indeed been read). On the other hand, different contexts may facilitate a "strictly distributive" (maximal) reading, and this is the case e.g. with a sentence like: *Every student solved the exercises I wrote on the blackboard*. Here, the fact that, according to very general plausibility conditions (which can of course be manipulated with different contexts), the exercises were meant to be solved in their wholeness (say, in order to pass the class), whereas that the reading of the books is probably facultative or not really testable, might be the cause for this asymmetry. However, this is an issue which is well beyond the scope of the present discussion.

[7]That is, it selects *essere* 'to be' as auxiliary and its subject can be extracted from postverbal positions with the pronominal clitic *ne*.

option does not seem easy to back either with theoretical arguments or with empirical observation, as the following sentence (true in the given scenario) shows:

(4.17) SCENARIO: Gennaro is stuck with the problem set he was given, for he cannot solve two problems. He then sends emails to all his colleagues where he asks for help. Each colleague was given one problem, some of them (the smarter ones) got two:

Gennaro ha chiesto aiuto a ogni suo collega per due problemi
Gennaro has asked help to every his colleague for two problems
che non riusciva a risolvere.
which not could to solve
*Gennaro asked every colleague of his for help with two problems he could not solve.* ✓

Sentences like this show that adjuncts can generally enter in a cumulative relation with an *ogni NP* argument (at least no straightforward restriction in this sense seems to exist).

As a further argument in support of the view that it is the surface subject position that "matters", one could look at raising predicates, i.e. predicates whose subject position is not a θ-position (see Chomsky 1981: 113). If we examine raising constructions like (4.18b), we see that they lack a cumulative reading — in fact, both of the following sentences are false in the given scenario:

(4.18) SCENARIO: A teacher is reviewing her twenty students' class assignments and finds some troubling coincidences that make her suspect that 10 students copied from the internet for the Latin assignments and 15 students did the same for the Greek assignments. She is very upset: everyone copied, and 5 students even cheated both in Latin and in Greek!

a. Sembra che ogni studente abbia copiato latino e greco.
*pro* seems that every student has copied Latin and Greek
*It seems that every student cheated in Latin and Greek.* ✗

b. [Ogni studente]$_i$ sembra $\varnothing_{C^0}$ aver $t_i$ copiato latino e greco.
every student seems to have copied Latin and Greek
*Every student seems to have cheated in Latin and Greek.* ✗

This suggests that the problem with cases like (4.16) is actually the surface subject position of the *ogni NP*. What has been shown in this subsection is that there is an unavoidable restriction on the cumulativity of *ogni NP* associated the surface subject position in an active sentence. Depending on the syntactic assumptions made, this position may be characterised in different ways: one possible descriptive generalisation that is consistent with the assumptions made so far could be that *ogni NP* can never be cumulative in an active sentence if it is in a position where it receives

Nominative case. This hypothesis would encompass all configurations that present the restriction discussed here, including raising constructions and sentences with unaccusative predicates where the surface subject is assumed to be moved from a different position than the one of a subject of an active sentence with a transitive predicate.

## 4.2 Correlating factors

The availability of cumulative readings of *ogni* presents some variability with respect to the prominence of the reading itself that is not related to general plausibility conditions (which are a quite obvious interference to the availability of certain readings). In fact, so far only the availability *per se* has been considered and has been a sufficient condition to qualify as cumulative *ogni*, and the actual naturalness of such readings has not be weighted. This has been done on purpose, as according to my intuitions there are two kinds of conditions that affect the behaviour of *ogni* with respect to cumulativity:

- structural conditions (those presented above) that, whatever their nature, clearly tear apart distributive and cumulative *ogni*, i.e. conditions that make cumulativity with *ogni* simply impossible: for example, it turned out that the subject position of an active sentence is a position that is incompatible with cumulative *ogni*;

- a (potentially very complex) cluster of conditions that, in those cases where cumulative *ogni* is structurally possible in the first place, increase or decrease the prominence of the cumulative reading for *ogni*, all other things (e.g. plausibility conditions) being equal.

The focus of this section is on the latter point, while the former one was the topic of section 4.1. Its relevance lies in the fact that if the investigation of these factors yielded systematic results, then we would end up with some potentially interesting connections between cumulativity and other phenomena, which could shed light on these interactions. My intuition is that information structure plays a significant role in making cumulative readings for *ogni* more or less prominent, and in the following section data in support of this claim will be presented.

In the very influential paper by Rizzi (1997), in order to account for the syntactic properties of dislocated phrases in Italian, it is proposed that the Complementiser Phrase be split in several functional layers, where information structure features are realised. Thus, the Italian CP should, according to such analysis, look like Figure 4.8.

This structure provides the means to analyse the properties of sentences where phrases are "stacked" in the left periphery. As Figure 4.8 shows, there are two distinct Topic projections (each with the Kleene closure, which can be informally translated into "zero or more up to an infinite number") and one Focus projection between them. In fact, one very common strategy for topicalisation in Italian is the so called Clitic Left Dislocation (henceforth CLLD), whose superficial structure has the topicalised

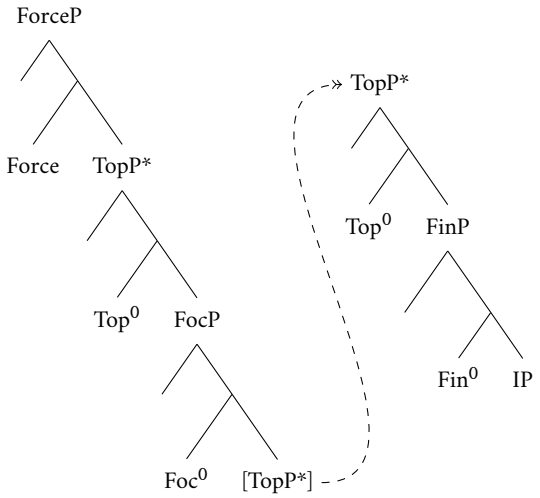



Figure 4.8: The expanded Italian CP according to Rizzi (1997).

phrase in the left periphery of the clause[8] and a coreferent resumptive clitic in the IP/TP (which is obligatory if it is the direct object that is topicalised). So (4.19a) is the "neutral" sentence, which could felicitously be uttered out of the blue, whereas in (4.19b) is the bracketed constituent is topicalised, and has characteristic intonational properties as well:

(4.19) a. Gennaro ha trovato i due errori.
Gennaro has found the two mistakes
*Gennaro found the two mistakes.*

b. [I due errori]$_i$, Gennaro li$_i$ ha trovati.
the two mistakes Gennaro them has found
*The two mistakes, Gennaro found.*

The notion of Thematic Topic[9] is a very complex issue. Thematic Topic (henceforth TT) is in many cases understood as a linguistic strategy for contributing to the meaning of a sentence with a sense of "aboutness",[10] in the sense that TT indicates explicitly what it is that is being talked about and thus it is, in some way, related to the general

[8] If a sentence has a Focus and several Topics in the left periphery, their ordering respects the precedence that results from the structure in Figure 4.8.

[9] When the notion of Contrastive Topic will be introduced, the difference between them will be discussed.

[10] I ignore here other formalised or intuitive notions alternative to "aboutness" that have been associated with TT in the literature, in order to keep the discussion reasonably brief.

notion of "old information": TT by itself does not influence the truth conditions of a sentence,[11] but it influences its felicity conditions.[12]

The theoretical difficulties with TT arise mainly because the otherwise intuitive concept of "aboutness" that comes with it is not clearly definable in a way that encompasses all kinds of cases where such "aboutness" comes about: this has as an inevitable consequence the fact that it is not easy to find diagnostic tools for TT that are general enough and crosslinguistically valid (see Roberts 2011). Therefore, although the whole idea of Topic does play a significant role in the present exposition, since it seems to interact with *ogni* in a way that influences its cumulativity, the discussion will not be in depth. The "aboutness" of TT can be modelled in the following way (see Büring 2015):

- The Context is made up by individuals $i_k$ and properties $P_k$.
- The Context C is defined by the partial function $f_C = \{(i_1, \phi_1), \ldots, (i_n, \phi_n)\}$ such that $\phi$ is a set of properties: $f_C$ is thus an object of type $(e)((et)t)$ that maps each individual $i$ to the set of properties that are agreed to hold of $i$.
- A sentence with an individual $i_t$ in Topic maps $i_t$ to $\phi_t$ and thus changes the context to $C'$ so that $f_{C'}(i_t) = \phi_t$.
- There is an "aboutees" set $A_C$ associated with $C$ which is a set of individuals in the context, such that they have not been introduced to the context.

Thus, (4.19b) creates a context where it is agreed on the fact that the two mistakes were found by Gennaro, and it does so by letting the function that characterises the context map the two errors to the set of properties that contains the property of having been found by Gennaro (eventually alongside other properties that have already been predicated of the two errors).

This is only one way of modelling the "aboutness" notion associated to TT and in fact it is not very explicative. However, it is also important to have a concrete way to state how (4.19a) and (4.19b) differ in their interaction with the discourse, e.g. by looking at the circumstances where their acceptability differ, for example by using tests like the (Italian equivalent of the) WHAT ABOUT or the AS FOR test (Roberts 2011: 1914). Let's consider these two possible discourse backgrounds, i.e. utterances that receive (4.19) as answers:

[11] Other linguistic phenomena related to Information Structure do. For example, Focus (however its theoretical status is assumed to be) does, in combination with so called Focus Sensitive Elements like *only*, *even* and similar. This phenomenon, first labelled by Jackendoff "Association with Focus" (Büring 2016: 261–262) is observable with sentence pairs like *Gennaro only introduced {NINA to me/Nina to ME}* (where capitalisation indicates the element in Focus): the truth conditions of the these sentences differ from each other as to whether nobody except Nina was introduced by Gennaro (first sentence) or nobody except the speaker was introduced to Nina by Gennaro (second sentence).

[12] That is, TT makes a sentence which is otherwise grammatical not acceptable by a competent speaker if inserted in a particular context, as I will show later.

(4.20) a. Cosa ha trovato Gennaro?
what has found Gennaro
*What did Gennaro find?*

b. E cosa mi dici riguardo ai due errori?
and what to me tell.2sg regarding to the two mistakes
*And what do you tell me about the two mistakes?*

The first question makes (4.19b), where *i due errori* is a TT, absolutely unacceptable. The second one, the WHAT ABOUT test, makes (4.19b) the right answer: an answer without topicalisation like (4.19a) sounds very odd at least. If the answer is (4.19b), where the topicalised element is an object, CLLD must be used, else the answer is not felicitous. If the answer to (4.20b) has the topicalised element as subject (something like *The two mistakes were found by Gennaro*), CLLD cannot be used in Italian for independent syntactic reasons, but a characteristic prosodic contour must be used in order to utter it felicitously.

An unsettled question related to CLLD is whether the superficial position of the topicalised constituent is the result of A′ movement (see Cinque 1977) or is an instance of base generation (see Iatridou 1990).[13] I will neither discuss the matter here nor take a position.

Later I will show that a QP headed by *ogni* in the specifier of TopP can indeed be in a cumulative relation with a plurality in some lower position in the clause. Thus (as a sidenote): if, after all, a base generation analysis turns out to be the right one, this could be yet another problematic case for Champollion's generalisation, since this would be a clear case where *ogni* cumulates with something in its syntactic scope. Reconstruction effects undermine this argument since they provide strong motivation for a movement analysis that would eventually make these data compatible with Champollion's c-command condition. Nevertheless, reconstruction effects of the relevant kind (namely the reconstruction of a topicalised phrase in direct object position) can be blocked e.g. by using VP modifiers like *once* and still cumulative readings are available with *ogni*. The situation is quite complex, and therefore I do not want to use these constructions as a further argument against the generalisation about c-command and cumulativity of the singular universal quantifier: this generalisation has, I believe, already been falsified by the data presented in subsection 3.2.1 on page 37. In any case, however, it must be stressed that a movement analysis of CLLD, combined with the fact that a CLLDed object *ogni NP* can be cumulative (in fact, its cumulative reading is the most prominent as I will show later) puts an additional restriction to the c-command condition applied on *ogni*.

This condition says that a quantifier headed by *every* cannot cumulate with something in its syntactic scope. If we assume the facts about CLLD and cumulative *ogni* and an analysis where the CLLD phrase is A′ moved to the left periphery of the clause (see e.g. Cinque 1977), we must conclude that the c-command condition, if applied

[13]To name just two kinds of argument that contrast each other: CLLD seems to be island insensitive to a certain extent but also presents reconstruction effects.

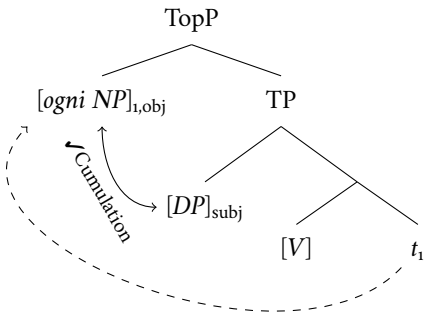



Figure 4.9: CLLD of the object as result of A′ movement.[15]

to Italian[14], has to be reformulated as to consider c-command configurations at the level of representation where (in particular) the quantifier headed by *ogni* is in its base generation position or, maybe, not A′ moved from there. This fact is illustrated in the tree in Figure 4.9: in order to explain this configuration, the c-command condition has either to be dropped or to be reformulated in a restricted way that would consider only the base generation position of *ogni NP* as relevant for the structural possibility of cumulation. The reason why CLLD is interesting for the present discussion is what is perceived as a strong contrast with respect to the cumulative reading between these two sentences:

(4.21) a. Tre redattori hanno trovato ogni errore.
three copy editors have found every mistake
*Three copy editors found every mistake.*

b. Ogni errore, tre redattori l' hanno trovato.
every mistake three copy editors it have found
*Every mistake, three copy editors found it.*

On the one hand, the now well known example (4.21a) has both a distributive and a cumulative reading but, without knowledge about the circumstances the sentence is about, it is not easy to say which reading is more prominent. In fact, I doubt that such a judgment can be made about similar constructions: the two readings are equal with respect to their availability.

On the other hand, sentences like (4.21b) where the direct object *ogni NP* is CLLDed have a cumulative reading that is actually the more prominent one. In fact, in all these sentences, just like in (4.21b), the distributive reading is somewhat marginal:

[14]I ignore here the quite relevant fact that other data have already been presented which falsify this hypothesis for Italian, e.g. the data discussed in subsection 3.2.1, where it has been shown that *ogni NP*, as object of a ditransitive verb, can cumulate with a plurality in its syntactic scope (note that here no A′ movement is involved).

[15]The (here obligatory) coreferent clitic is not represented in the structure for simplicity.

(4.22) a. Ogni parlamentare, (esattamente) cinquanta attivisti l' hanno
every congressman exactly fifty activists him have
contattato.
contacted
*(Exactly) Fifty activists contacted every congressman.*

b. Ogni sciopero dei treni di quest'anno, i miei colleghi lo
every strike of the trains of this year the my colleagues it
hanno subito.
have experienced
*Every train strike of this year, my colleagues have experienced.*

c. Ogni esercizio del libro, Nina e Gennaro lo hanno risolto.
every exercise of the book Nina and Gennaro it have solved
*Every exercise in the book, Nina and Gennaro solved.*

The one thing the sentences in (4.22) have in common, is that the CLLDed *ogni NP* argument is a direct object: these examples show that cumulation is possible with (un)modified numerals, definite DPs and coordinate structures, and in all those cases the topicalisation of the universal quantifier makes the cumulative reading the preferred one.

It is important to ask to which extent this phenomenon is related to *ogni* itself. In fact, if it turned out that topicalisation of direct objects makes cumulative readings stronger in general, this would be an interesting phenomenon indeed, but it could be set aside when considering the specific behaviour of *ogni*. In the case of the sentences in (4.23) no difference is perceived in the prominence of the cumulative reading (which all of the sentences have) if I compare them with the non CLLDed forms.

(4.23) a. Cinque medaglie, tre atleti le hanno vinte.
five medals three athletes them have won
*Five medals, three athletes have won.*

b. Cinque medaglie, i miei figli le hanno vinte.
five medals the my sons them have won
*Five medals, my sons have won.*

c. Venti inviti, Gennaro e Nina li hanno ricevuti.
twenty invitations Gennaro and Nina them have received
*Twenty invitations, Gennaro and Nina received.*

This shows that CLLD, in relation to *ogni*, appears to facilitate the cumulative reading. Of course, the claim is not so strong as I wish it were, because so far it is based on differences in intuition that are quite definite but still not the same in all cases and

across speakers.[16] For one thing, cumulative readings are easily available withouth CLLD too, and thus what is considered here is not a real alternation.

Nevertheless, there are also other contexts where this suggestion about the role of Left Dislocation in the availability of cumulative readings becomes quite solid. In fact, Left Dislocation of subjects in passive sentences is a case where we almost[17] have a real alternation. On page 40 I mentioned cumulative *ogni NP* as passivised object as yet another argument against the c-command generalisation, but there I refrained from tackling the issue. This is because for such sentences, when considered without a discourse context, there is actually no cumulative reading that is generally available and natural, although some factors (includig topicalisation) increase its prominence dramatically. For instance, there is no such reading for the following sentence when uttered out of the blue:

(4.24) Ogni errore è stato trovato da tre redattori.
every mistake is been found by three copy editors
*Every mistake was found by three copy editors.* ?? ✗

Crucially, if the subject *ogni errore* is Left Dislocated[18] as a Topic the cumulative reading is available. In order to make the Left Dislocation evident, a context in the form of a constituent question is provided in order to license the information structure of the sentence under scrutiny: this way, it is sure that *ogni errore* is not in its standard surface position (I assume [Spec,TP]) but instead in the Topic projection above the FocP in the complementiser layer:[19]

(4.25) a. (How did the copy editors find the mistakes? —)
[Ogni errore]$_1$, [con una LENte]$_2$ $t_1$ è stato trovato da tre
every mistake with a lens is been found by three
redattori $t_2$.
copy editors
*Every mistake was found by three copy editors with a lens.* ✓

b. (What happened with the statues in the University's main yard? I heard someone destroyed almost half of them and a couple of days later someone

[16]Although every speaker agrees on the fact that in sentences like (4.22) the cumulative reading is either equally or more prominent than in the "neutral" sentences, there is variation with respect to the entity of this prominence.

[17]I say "almost" and so I stay careful on this point, since I believe, as it is argued in subsection 4.1.2, that there is no syntactic restriction on having a cumulative *ogni* in subject position of a passive sentence. It is just generally difficult to have one there, for reasons I have not been able to clarify as I wish. In this sense, if there is a construction that makes it possible to have a prominent cumulative reading for *ogni* in such position we "almost" have to do with a "real" alternation: the change in prominence of this reading would be quite big, which would add to the interest that such a construction would deserve.

[18]As already mentioned, when it is the subject that is topicalised there is no coreferent resumptive clitic.

[19]I adopt in unglossed examples the notational convention in Büring (2016) where linguistic context is represented in parentheses and "—" signals a change of speaker.

else continued the job…but why? —)
[Ogni statua]$_1$, [in seguito a un burnOUT]$_2$ $t_1$ è stata distrutta,
every statue in following to a burnout is been destroyed
da Nina e Gennaro $t_2$.
by Nina and Gennaro
*Every statue was destroyed by Nina and Gennaro as a consequence of a burnout.* ✓

These two sentences have *ogni NP* as Contrastive Topic (henceforth CT). CT is a construction that in many cases, for many speakers, is more compatible with CLLD of *ogni NP* than TT is,[20] and, when "applied" to *ogni*, makes the cumulative reading definitely more prominent, even in those syntactic configurations for which this reading is not readily available if the expression is considered out of the blue, like the sentences discussed in subsection 4.1.2 (there it was observed that making the restrictor of *ogni* salient leads to the emergence of the cumulative reading in the first place).

CT is a phenomenon that involves the presence in a sentence of two elements one of which in (contrastive) Topic and one in Focus, and is typically elicited as an answer to an appropriate question. Here I want to summarise the treatment of CT presented in Büring (2015), in order to specify what I refer to when I use CT from a theoretical point of view. Of course, the analysis sketchily reported here is not the only one found in the literature, but a comparison is not relevant here. Consider these examples:

(4.26) a. (What did the editors catch? —) The editors caught MISTAKES$_{\text{F}}$.
b. (What did the editors catch? —) THE EDITORS$_{\text{CT}}$ caught mistakes$_{\text{F}}$.

These two sentences, which differ prosodically from each other, generate different pragmatic inferences. (4.26a), as is expected from a sentence with a constituent in Focus, has an inference according to which the editors did not catch anything else than mistakes, whereas the pragmatic inference of (4.26b) says that the editors did not catch anything else than mistakes but also that someone else caught something else. In this sense the Topic is here Contrastive, namely because it introduces a set of alternatives that contrasts with what is being expressed in a similar way Focus (in the common framework of Alternative Semantics) does. Focus interpretation is exhaustive, in the sense that all alternatives are excluded (and this accounts for the pragmatic inference): alternatives like (4.27a) are negated by using a Focus construction like the one in (4.26a). Instead, CT constructions like the one in (4.26b) seem to introduce alternatives without excluding them, thus letting the addressee infer that some alternatives are possible and relevant.

[20] I have not mentioned it yet, but some speakers find *ogni NP* as TT in a CLLD construction odd (see also the "?" judgment in Rizzi 1997: 295). However, there is reason to suspect that there is a certain diatopic variation with regard to this which I have not investigated: those speakers who find this construction marginal (nobody deemed it ungrammatical) were obviously not considered for the judgment about the prominence of cumulative readings in the relevant examples.

Without going into the details of a complete theory of Focus, one could take the difference between Focus and CT+F[21] as being the following: Focus introduces a set of alternative propositions, CT+F a set of alternative questions, which in the case at hand are informally representable as, respectively

(4.27) a. the editors caught $x$

b. what$_x$ did $y$ catch?

For the interpretation of alternatives like (4.27b) a rule is proposed in Büring (2015), according to which in order for a sentence $S$ with a CT+F construction to be felicitous, there must be one question meaning in the CT-alternatives of the sentence that fulfils three criteria: being currently pertinent, logically independent from the meaning of $S$ and being identifiable. These criteria are shown in Büring (2015) to be effective in the right way in restricting the predicted distribution of felicitous CT.

Coming back to *ogni*, every example discussed in this chapter, with the notable exception of those in subsection 4.1.3 where the restriction on the subject position of active sentences holds, can get a very prominent cumulative reading by providing a context that supports having *ogni NP* as CT. It is important to note that the same does *not* apply to the other Italian singular universal determiner *ciascun-*. Each of the following sentences has a cumulative reading which is made clearly stronger by the topicalisation of *ogni NP*, but none would even have such a reading if *ogni* were replaced by *ciascun-*:[22]

(4.28) a. (Who signed all these flags? —)
[Ogni bandiera]$_i$ l'$_i$ hanno firmata [cinque giocatori]$_F$.
every flag it have signed five players
*Five players signed every flag.* ✓

b. (Who introduced your guests to Nina and Gennaro? —)
[Ogni mio ospite]$_i$ l'$_i$ ha presentato [Giovanni]$_F$ a Nina e Gennaro.
every my guest him/her has introduced Giovanni to Nina and Gennaro
*Giovanni introduced every guest of mine to Nina and Gennaro.* ✓

[21]"CT+F" stands for the whole construction, which is characterised by the presence of an element in Focus and one in CT.

[22]This of course applies only to those cases where replacing *ogni* with *ciascun-* does not cause ungrammaticality or syntactic oddness (depending on the speaker): sentences with a CLLDed object *ciascun- NP* are consistently judged as bad.

c. (To whom did Giovanni introduce your guests? —)
[Ogni mio ospite]$_i$ Giovanni l'$_i$ ha presentato a [Nina e Gennaro.]$_F$.
every my guest Giovanni him/her has introduced to Nina and Gennaro
*Giovanni introduced every guest of mine to Nina and Gennaro.* ✓

Examples like these last two show that the issue of CT and cumulativity of *ogni* is not related in any evident way to having the plurality that cumulates with *ogni NP* in Focus: there is no difference with respect to the availability of cumulative readings between (4.28b) where the element in Focus is an atomic individual which obviously cannot enter in a cumulative relation, and (4.28c) where the element in Focus is the relevant plurality denoted by the coordinate structure *Nina e Gennaro*.

In this section the focus has not been on the availability of the cumulative reading of *ogni*, but rather on its prominence. The general observation that can be made on the basis of these data is that *ogni NP*, when its cumulative reading is possible in the first place (i.e. when it is not a subject of an active sentence, according to what has been established in subsection 4.1.3), has a more prominent cumulative reading if it is in Topic (both Thematic and Contrastive Topic) or if its restrictor NP is particularly salient. This change in prominence affects also and most notably *ogni NP* in passive sentences (as passivised object or as Agent), where, without these additional Information Structural factors, a cumulative reading would not be easily accessible (see the discussion in subsection 4.1.2). All these manipulations do not have an equivalent result with respect to the prominence of cumulative readings when applied to expressions other than *ogni NP* (e.g. bare numerals, plural definites, coordinate structures…): this seems to suggest that the correlation between Topic and saliency and cumulativity is limited to quantifiers headed by *ogni*.

## 4.3 Comparative observations

In this brief section I present some data from other languages that are intended to show both the crosslinguistic variability and the complexity of the issue related to the distribution of the cumulative reading of the singular universal quantifier. The languages I discuss data from are German and French. There is no ambition of completeness as I have focussed on a small set of data with the informants, and this discussion is relevant only insofar as it proves crosslinguistic variation to a certain degree.

### 4.3.1 German *jed-*

German has an expression *jed-* that is usually analysed as a determiner which has certain aspects in common with English *every* and Italian *ogni*: it agrees with the head of its complement NP in gender and selects a morphologically singular complement.

For conciseness, I will ignore the cases where *jed-* is stranded (the fact that it can be stranded makes it more similar to *each* and *ciascun-*). As (4.29a) shows, *jed-* is incompatible with collective predicates and basic subject-object asymmetry with respect to cumulativity is found for *jed-* just as expected:

(4.29) a. *Jedes Kind versammelte sich.
every child gathered itself
**Every child gathered.*

b. Jedes Kind hat zehn Vögel gesehen.
every child has ten birds seen
*Every child saw ten birds.* ✗

c. Zehn Kinder haben jeden Vogel gesehen.
ten children have every.ACC bird seen
*Ten children saw every bird.* ✓

German *jed-*, according to some speakers' judgments, provides an interesting backing for the c-command condition proposed in Champollion (2010, 2016).

(4.30) a. Ich habe einmal [$_B$ zwanzig Leuten] [$_A$ jeden Freund von
I have once twenty people every.ACC friend of
mir] vorgestellt.
me introduced
*I once introduced every friend of mine to twenty people.* ✓

b. Ich habe einmal [$_A$ jeden Freund von mir] [$_B$ zwanzig Leuten]
I have once every.ACC friend of me twenty people
vorgestellt.
introduced
*I once introduced every friend of mine to twenty people.* ✗

c. [$_A$ Jeden Freund von mir]$_i$ habe ich einmal [$_B$ zwanzig
every.ACC friend of me have I once twenty
Leuten] $t_i$ vorgestellt.
people introduced
*I once introduced every friend of mine to twenty people.* ✓

In all the above sentences the *jed- NP* constituent is the direct object and, as can be shown with the usual tests, c-command relations between the bracketed constituents match linear precedence in all the sentences in (4.30). This being said, the permutation of the bracketed constituents in (4.30a) and (4.30b), which is the manifestation of a peculiar form of optional reordering of arguments called *scrambling*, yields a result which is consistent with the c-command condition: it seems that the only difference between the two sentences is the scope that *jed- NP* and another plurality denoting

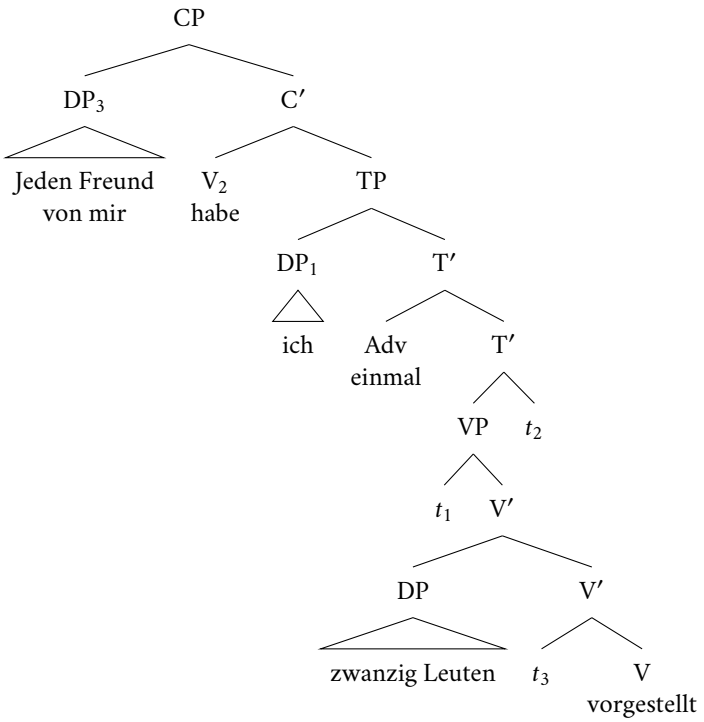



Figure 4.10: The Surface Structure of a sentence where V2 takes place.

expression have with respect to one another and this difference correlates neatly with a difference with respect to the availability of the cumulative reading the way Champollion (2010) predicts.

(4.30c), for which a syntactic derivation is given in Figure 4.10, is apparently a counterexample: the cumulative reading is available even if the plurality B is in the syntactic scope of A. Under the standard treatment of languages like German (SOV languages with so called V2), the direct object *Jeden Freund von mir* is in the Specifier of the Complementiser Phrase, with the finite verb *habe* occupying its Head position. V2 has namely the consequence that, whenever C° is not occupied (typically, in not embedded declarative sentences), the finite verb overtly moves to that position and some other phrase to [Spec,CP]. However we want to characterise these two phenomena, V2-triggered movement to [Spec,CP] and scrambling of arguments are different phenomena: for one thing, one is optional (scrambling) and the other one is obligatory.

A further difference between these two phenomena is also an asymmetry in the possibility to reconstruct. As Binding and other scope related phenomena show, constituents moved to [Spec,CP] can indeed reconstruct into their base generation position, which in (4.30c) would result in having *jed- NP* in the syntactic scope of the other plurality: this would be a point in favour of the c-command condition, especially since it also correctly predicts an asymmetry between (4.30a) and (4.30b),

where the syntactic phenomenon involved is different for an independent set of reasons. However, the speakers I have had access to who deem sentences like (4.30c) as having both a distributive and a cumulative reading in the first place are quite univocal in recognising that a conversational context in which the friends of the speakers (i.e. the restrictor of the *jed-* quantifier) are given strongly improves the acceptability of the cumulative reading. Having *jed- NP* in Topic also makes the cumulative reading more prominent, whereas the out of the blue uttering of such sentences makes this reading less readily available. Note however that there are speakers for whom a cumulative reading in these cases is excluded anyway:[23] I have not investigated the variation with respect to this.

The most interesting difference between *jed-* and *ogni* with respect to the availability of cumulative readings that comes out from these data is that the c-command condition applies to *jed-* when it comes of scrambled arguments as (4.30b) shows, whereas this is not the case for *ogni*. So, again, the c-command condition should be reformulated in a more restricted way it is to be applied for the description of the distribution of cumulative *jed-*: in fact, when *jed- NP* is in [Spec,CP] as a result of V2 movement, it is found (at least by part of the speakers) to be cumulative.

However, the factors described in section 4.2 seem to work in an analogous way with respect to *jed-* as well, i.e. Information Structure seems to play a role in making the cumulative reading more prominent in case it is licensed in the first place, and therefore purely structural description of the distribution of cumulative *jed-* might fail to capture important aspects of the meaning of *jed-* and its interaction with other pluralities, just as it is the case with *ogni*.

### 4.3.2 French *chaque*

In this section I consider the cumulative readings of the French determiner *chaque*,[24] which presents a lot of similarities to *every* and *ogni*, both from a syntactic and a semantic point of view. French, like German, lacks a second singular universal determiner. The following data show the semantic properties of *chaque* in those cases which are crucial for the present discussion.

(4.31) a. Trois étudiants ont trouvée chaque erreur dans ce manuscrit.
three students have found every mistake in this manuscript
*Three students found every mistake in this manuscript.* ✓

b. Chaque étudiant a trouvé trois erreurs dans ce manuscrit.
every student has found three mistakes in this manuscript
*Every student found three mistakes in this manuscript.* ✗

[23]Note that the unavailability of cumulative readings for sentences like (4.30b) falsifies a possible application of the analysis in Kratzer (2000) on German *jed-*.

[24]I especially thank Louise Raynaud who provided me with very helpful comments about her judgments and Nicolas Peslerbe for the amount of time he dedicated to it.

c. Chaque erreur dans ce manuscrit, trois étudiants l' ont
every mistake in this manuscript three students it have
trouvé.
found
*Three students found every mistake in this manuscript.* ✓

d. Chaque erreur dans ce manuscrit a été trouvée par trois
every mistake in this manuscript has been found by three
étudiants.
students
*Every mistake in this manuscript was found by three students.* ✓

Some informants found the CLLD construction (4.31c) somewhat odd but nobody deemed it as unacceptable. Indeed, a group of informants felt that CLLD makes the cumulative reading more prominent, whereas others did not perceive a strong difference. (4.31d) and analogous constructions with the *chaque NP* in subject position of a passive sentence in relation with a plural Agent is the most interesting: it seems that in French this kind of construction has a cumulative reading that is readily available, according to most of my informants. I have not conducted a research on the diatopic variation with respect to this, but probably there is some of it here: the fact that at least a variety of French allows cumulation in such a configuration without any "extra" help e.g. in form of manipulation of IS makes *chaque* different from the corresponding determiners in the languages I have looked into.

Thus, French *chaque* presents the same fundamental asymmetry of *ogni*, *every* and *jed-*, as the contrast between (4.31a) and (4.31b) shows: a quantifier headed by *chaque* cannot have any cumulative reading if it is in subject position of an active sentence. However, it seems relatively easy to have cumulative readings with *chaque*, and this is shown by (4.31d): according to a consistent group of informants, a passive sentence where *chaque NP* is the passivised object has a cumulative reading which is readily available without any particular need for enforcing or facilitating it.

## 4.4 General remarks

The data presented and discussed in this chapter show that there is crosslinguistic variability in the distribution of the cumulative readings of the singular universal quantifier. One might then conclude, in total disregard of typology, that the attempt of producing a unified analysis that accounts for the phenomenon in the different languages (say the English *every* and the Italian *ogni*) is a pointless one. However, the discussion of *ogni* started by recognising that many fundamental aspects of the distribution of its cumulative readings correspond to the ones of *every* (e.g. the asymmetry between the object and the subject position), and this holds of German *jed-* and French *chaque*. In fact, the similarities are such that one could hope to reduce the behaviour of these various determiners with respect to their cumulative readings to some common

principles.[25] One of these principles should be that no cumulative reading is available if the singular universal quantifier is in subject position of an active sentence, i.e. in what has been labelled here as "surface subject" position. Another principle, which seems to hold of *jed-*, *chaque* beside *ogni*, is that, *ceteris paribus*, mere manipulation of the context of the utterance can help make the cumulative reading of the singular universal quantifier more prominent in many cases, especially those where, because of the syntactic properties of the sentence[26], such reading is not easily accessible.

As a concluding speculation, I want to come back on the main empirical finding with respect to *ogni* which has been presented in this chapter, namely the restriction on the superficial subject position. This restriction stands out because it really seems to be inviolable, as e.g. enforcing expressions like *in totale* 'between them' simply cause ungrammaticality or unacceptability if added. In other syntactic positions, like the indirect object position, the behaviour of *ogni NP* with respect to its cumulative readings is not homogeneous, and in fact, as was pointed out on page 44, the availability of cumulative *ogni NP* in indirect position seems to be impossible to be predicted in a principled way[27]: on the other hand, the surface subject position of an active sentence is a position where cumulative *ogni* can never be found.

The question that should be answered is then: what is special about the surface subject position? Unless asymmetric Neo-Davidsonian assumptions, like the ones presented in subsection 2.1.3, are made,[28] it is not obvious to me how the surface subject position is to be generally distinguished from other argument positions from a purely semantic point of view. From a syntactic point of view, the most obvious fact related to the surface subject in the languages considered in this thesis (Italian, English, German, French) is that it agrees on number with the verb. Since the singular universal quantifier selects (as the name is intended to suggest) a morphologically singular restrictor NP, the number feature of the verb will also be singular. One might advance the speculation that this singularity blocks the cumulative reading for it forces the interpretation according to which the predicate applies to the subjects individually.

[25] Of course, I am not claiming that I am in a position to present these common principles here, for more extensive and wider crosslinguistic research should probably be conducted in order to solve this issue.

[26] I refer to the "syntactic properties of the sentence" because I want to exclude those cases where a cumulative reading is not available due to implausibility, i.e. due to factors that are essentially non linguistic.

[27] Of course, I am not at all claiming that future research will necessarily fail to solve this issue: most probably the present investigation has not been able to capture some essential factor that makes this prediction possible.

[28] Note however that, as was made clear during the discussion in chapter 2, Neo-Davidsonian approaches make the distinction between arguments on the basis of their Thematic Roles, not on the basis of their syntactic configuration — in fact, this turned out to be a problem for the analysis in Kratzer (2000). This means that what I call here "surface subject" can be distinguished from other arguments in an asymmetric Neo-Davidsonian framework only as long as the (wrong) stipulation is made that there is a Thematic Role which is uniquely assigned to the argument in that position. Beside resulting in other undesirable consequences, this would probably force one to make the assumption I rejected on page 27, namely that the agentive subject of an active sentence and the agentive PP of a passive sentence bear different Thematic Roles.

This is indeed just a speculation, since it is not at all clear how such an insight could be represented in a compositional way. However, this is arguably less than a speculation, because in the languages under discussion the very same agreement pattern is found in passive sentences, where (at least in Italian and in French) the singular universal quantifier *ogni/chaque NP* does have cumulative reading even if it agrees in number with the verb.

Therefore, an explanation of the restriction associated with the surface structure of active sentences based on the number feature of the verb, stipulative and difficult to represent as it may be, would have to be formulated so that it considers only active sentences and ignores the passive constructions where the same agreement behaviour is found. This is the reason why such speculations are not an appealing ground on which to build an analysis. The question that should be answered remains here unanswered.

# Chapter 5

# Conclusion

In the previous chapter I presented Italian data that are relevant to the question of the cumulative readings of the determiner *ogni*, a question that has been traditionally characterised as a subject-object asymmetry. The data themselves suggested to split the issue in two parts. One question has been the identification of the syntactic positions in which *ogni* never has a cumulative reading. The other question has been whether there exist factors unrelated to *ogni* itself that influence the availability of these readings. In both cases, only partial results have been achieved. In this chapter, I summarise what these results are, what they show and I discuss what further investigation could look into and where future work might lead.

## 5.1 What has been done

In chapter 2 and 3 it was proven that two different analyses of the cumulative reading of *every*, proposed in Champollion (2010) and Kratzer (2000), do not predict the behaviour of *only*. At best, they are not applicable to Italian and possibly other languages in their current forms. This left the "basic" issue of why there exists such a contrast as the one between (5.1a) and (5.1b) completely unsettled:

(5.1) a. $[\text{every NP}]_{\text{subj}}$ V $\text{NP}_{\text{obj, pl}}$ *dist*: ✓ *cumul*: ✗

b. $\text{NP}_{\text{subj, pl}}$ V $[\text{every NP}]_{\text{obj}}$ *dist*: ✓ *cumul*: ✓

The main focus of the present work has been to provide a more general description of the distribution that encompasses the basic pattern in (5.1) and what has been concluded is that:

- the distribution of the distributive reading of the Italian singular universal quantifier *ogni NP* is not reducible to either Thematic relations or c-command relations, which is what is proposed for English *every* in Kratzer (2000) and Champollion (2010) respectively — instead, it seems that the distribution is correctly described by structural notions like what has been labelled here "surface subject" (of an active sentence) that are not easily definable;

- Information Structure seems to affect the prominence of the cumulative readings of the singular universal quantifier *ogni NP*.

With regard to this issue, the results can be summarised as follows:[1]

(5.2) a. The category of what is here represented as $NP_{pl}$ is not relevant: whether it is a definite plural, a bare numeral or a coordinate structure, this factor does not influence the availability of the cumulative reading of *ogni*.

b. When the *ogni NP* is a direct object, it can cumulate either with the subject or with the indirect object: the argument that does not enter in the cumulative relation is the Share of a distributive relation with the *ogni NP*. A weak reading where all three arguments cumulate might be obtained if enforced with certain expressions like *between them*.

c. When the *ogni NP* is an indirect object, it can cumulate with the subject, but cumulation with the direct object seems in many cases not to be available and cannot be forced: the indirect object position has, in this respect, a very unclear status.

d. Contra Champollion (2010, 2017), a c-command (viz. precedence) relation does not affect the distribution of the cumulative reading, especially when cumulation is between the two objects of a ditransitive verb.

e. Contra Kratzer (2000), an *ogni NP* with the Agent role can cumulate (and cumulation can be forced) with the Theme argument in a passive sentence.

f. When an *ogni NP* is the Theme argument, it can cumulate with the Agent argument in a passive sentence (forcing this reading, which is in many cases needed, is perfectly acceptable).

g. Generally there seems to be a preference for cumulative readings when the restrictor of *ogni* is either made salient in the discourse or topicalised with the appropriate syntactic construction, both as a Thematic Topic and as a Contrastive Topic.

h. When an *ogni NP* is the superficial subject[2] of an active sentence, the cumulative reading is not available, regardless of any other factor, and forcing expressions like *between them* cause unacceptability of the sentence.

From an empirical point of view, two points still present critical aspects. As for (5.2c), the distribution of cumulative *ogni* in indirect object positions (and indeed also as an adjunct) has not been defined and more empirical work should be done in order to settle this question. I have not been able to find any consistent correlation between, say, cumulative *ogni* and other factors (saliency, lexical properties of the predicate…).

[1] Of course, for the cumulative reading to be perceived as available, plausibility conditions must be met. This is an obvious condition which holds across the board.

[2] This formulation encompasses cases like (4.16) where the argument is assumed to be base generated as an object, as the verb is unaccusative.

Perhaps, if such "idiosyncratic" status of the indirect object in this regard is found to be crosslinguistically relevant, extensive comparative research could provide help on this. As for (5.2g) and (5.2h), it has been established that, in Italian, (contrastive) topicality and saliency of the restrictor of *ogni* or the whole QP generally strengthen its cumulative reading, and in some cases makes it available even without cumulativity enforcing expressions where it would otherwise be unavailable (see the discussion of passive sentences on page 63).

The first point is critical especially from an empirical point of view since, as already mentioned, the research conducted so far and reported here has not been able to solve the idiosyncrasy that is related to cumulative *ogni* in indirect object position, in the sense that no criteria are evident that discriminate the cases in which such an *ogni NP* can cumulate with the direct object or not.

To make it worse, individual informants themselves are not consistent with their judgments with respect to these cases. Note that this Italian result is particularly interesting because an *every* in indirect object position is exactly the configuration prominently taken as an example in the literature:

(1.9a) [$_A$ Three video games] taught [$_B$ every quarterback] [$_C$ two new plays].
(Schein 1993: 57)

Here, *every quarterback* cumulates with the subject, and in fact the Italian translation of the sentence has exactly the same cumulative-distributive reading. However, this piece of evidence that cumulation with the subject is generally possible while cumulation with the direct object is presumably subject to several still obscure constraints is a further interesting lead that supports the idea that cumulation is not expressed in the *ogni*-QP.

On the other hand, these cases show, in a slightly different form, that some fundamental subject-object asymmetry ought to be modelled when analysing these phenomena. Finally, on the basis of this, it could be argued that however cumulative behaviour of *ogni* is to be represented, this should eventually be done in a way that entails information about Thematic relations, as a purely structural account might be inadequate: recall that, in Italian as in other languages, there is "more general freedom in the relative ordering of verbal DP and PP complements" (Anagnostopoulou 2003: 179), so that the two complements of a ditransitive verb can appear in either order in the VP.

The second point, about the apparent relation between topicality and cumulative *ogni*, is empirically robust as far as it has been tested here, but it is extremely unclear to me how such relation could be represented compositionally. In fact, I would not have any proposal as to how a correlation between topicality and cumulative reading of the singular universal quantifier could be obtained in formal terms.

However, there is some sort of hierarchy in the constraints that resulted from this investigation, and the one stated in (5.2h) seems to be inviolable, for whatever reason: that is, topicalisation of an *ogni NP*, just as any other manipulation of the sentence, does not make the cumulative reading available if the QP is in the Specifier

of the functional phrase (let's say TP) and the sentence is an active sentence. In fact, in subsection 4.1.3 it has been established that the inability to cumulate is not related to the base generation in subject position, since this restriction is present with unaccusative and raising predicates as well, where the surface subject *ogni NP* is moved from the object position and from the subject position of the embedded predicate respectively.

The fact that *ogni NP* in this position can never be cumulative regardless of any manipulation suggests that saliency and topicalisation can only make the weak truth conditions prominent if this is not excluded in a principled way, i.e. if the expression has certain syntactic properties: such expressions *per se* would allow cumulative construals nevertheless, but in certain cases (e.g. passive sentences, see subsection 4.1.2) these readings are not readily available perhaps for pragmatic reasons, and having *ogni NP* in (contrastive) Topic can under certain circumstances eliminate or weaken these pragmatic restrictions.

## 5.2 Possible developments

Again, there is no evident theoretical move that captures this complex behaviour and these interactions between different semantic aspects. However, such a move would probably entail a referential analysis of QPs headed by *ogni*, along the lines of what has been presented in subsection 3.1.2, so that a plural individual is available in the composition to enter a cumulative relation (to be modelled as pluralisation of the arguments of a verbal predicate). This is what is proposed in Champollion (2010), except that the c-command condition (which was there suggested but not derived from the analysis itself) should be abandoned in favour of conditions that correctly predict the distribution described here (which would ideally be implemented in a principled way). To get to a solution to the problem, two paths could be pursued which have been ignored in this discussion:

- A crosslinguistic investigation of the cumulative readings of singular universal quantifiers should be carried out in order to determine to what extent the phenomenon depends on the specific morphologic and syntactic properties of a language. The limited data presented in section 4.3 seem to suggest that there is remarkable variability in this respect.

- This matter seems suited to experimental studies. This would result in more reliable data that represent the judgments and the variation among speakers more accurately. In fact, certain experimental settings would overcome the difficulty that has arisen in certain cases when speakers reported difference in the prominence of a reading. Although this non experimental research has yielded consistent results, a way to obtain quantitatively more precise results could show patterns that support new insights.

The problem presented here interacts in various ways with phenomena which are often themselves problematic. No solution has been found: instead, it has been successively shown that the solution is arguably quite far from being found.

# References


Adger, David (2003): *Core Syntax. A Minimalist Approach*. Oxford University Press (cit. on p. 15).

Anagnostopoulou, Elena (2003): *The Syntax of Ditransitives: Evidence from Clitics*. Vol. 54. de Gruyter (cit. on pp. 39, 75).

Bach, Emmon (1986): 'The Algebra of Events'. In: *Linguistics and Philosophy* 9, pp. 5–16 (cit. on p. 17).

Barwise, Jon and Robin Cooper (1981): 'Generalized Quantifiers and Natural Language'. In: *Linguistics and Philosophy* 4.2, pp. 159–219. URL: http://www.jstor.org/stable/25001052?origin=JSTOR-pdf (cit. on p. 2).

Bayer, Samuel L. (1997): *Confessions of a Lapsed Neo-Davidsonian. Events and Arguments in Compositional Semantics*. Outstanding Dissertations in Linguistics. Routledge (cit. on p. 23).

Beck, Sigrid and Uli Sauerland (2000): 'Cumulation is Needed: A Reply to Winter (2000)'. In: *Natural Language Semantics* 8, pp. 349–371. DOI: 10.1023/A:1011240827230 (cit. on pp. 7, 31, 32, 81, 83).

Beghelli, Filippo and Tim Stowell (1997): Distributivity and Negation: The Syntax of *Each* and *Every*. In: *Ways of Scope Taking*, ed. by A. Szabolcsi. Springer Netherlands, pp. 71–107. ISBN: 978-94-011-5814-5. DOI: 10.1007/978-94-011-5814-5_3 (cit. on pp. 2, 4).

Belletti, Adriana and Luigi Rizzi (1988): 'Psych-verbs and Θ-theory'. In: *Natural Language & Linguistic Theory* 6, pp. 291–352. DOI: 10.1007/BF00133902 (cit. on p. 27).

Büring, Daniel (2015): (Contrastive) Topic. In: *The Oxford Handbook of Information Structure*, ed. by C. Féry et al. Oxford University Press. DOI: 10.1093/oxfordhb/9780199642670.013.002 (cit. on pp. 59, 64, 65).

— (2016): *Intonation and Meaning*. Oxford Surveys in Semantics and Pragmatics. Oxford University Press. DOI: 10.1093/acprof:oso/9780199226269.001.0001 (cit. on pp. 59, 63).

Carlson, Greg (1998): Thematic Roles and the Individuation of Events. In: *Events and Grammar*, ed. by S. Rothstein. Dordrecht: Springer, pp. 35–51. DOI: 10.1007/978-94-011-3969-4_3 (cit. on p. 15).

Champollion, Lucas (2010): Cumulative readings of *every* do not provide evidence for events and thematic roles. In: *Logic, Language and Meaning*, ed. by M. Aloni et al. Springer Berlin Heidelberg, pp. 213–222. ISBN: 978-3-642-14287-1. DOI: 10.1007/978-

3-642-14287-1_22 (cit. on pp. 6, 23, 29, 33, 35, 37, 40, 41, 43, 51, 54, 67, 68, 73, 74, 76, 81, 83).

Champollion, Lucas (2016): 'Ten Men and Women Got Married Today: Noun Coordination and the Intersective Theory of Conjunction'. In: *Journal of Semantics* 33, pp. 561–622. DOI: 10.1093/jos/ffv008 (cit. on p. 67).

— (2017): *Parts of a Whole: Distributivity as a Bridge between Aspect and Measurement*. Vol. 66. Oxford Studies in Theoretical Linguistics. Oxford University Press (cit. on pp. 3, 23, 35, 37, 41, 54, 74).

Chomsky, Noam (1981): *Lectures on Government and Binding*. Dordrecht: Foris (cit. on pp. 15, 38, 56).

Cinque, Guglielmo (1977): 'The Movement Nature of Left Dislocation'. In: *Linguistic Inquiry* 8.2, pp. 397–412 (cit. on p. 60).

Dowty, David R. (1987): 'A note on collective predicates, distributive predicates and *all*'. In: *Proceedings of the Eastern States Conference on Linguistics (ESCOL)*. Ohio State University, pp. 97–116 (cit. on pp. 3, 4).

— (1989): On the Semantic Content of the Notion of 'Thematic Role'. In: *Properties, Types and Meaning. Volume II: Semantic Issues*, ed. by G. Chierchia et al. Dordrecht: Kluwer, pp. 69–129. DOI: 10.1007/978-94-009-2723-0_3 (cit. on p. 14).

Fillmore, Charles (1968): The Case for Case. In: *Universals in Linguistic Theory*, ed. by E. Bach et al. New York: Holt, Rinehart and Winston, pp. 1–90 (cit. on p. 15).

Fox, Danny (2002): 'Antecedent-Contained Deletion and the Copy Theory of Movement'. In: *Linguistic Inquiry* 33.1, pp. 63–96 (cit. on p. 35).

— (2008): On Logical Form. In: *Minimalist Syntax*, ed. by R. Hendrick. Blackwell, pp. 82–123. DOI: 10.1002/9780470758342.ch2 (cit. on p. 32).

Gil, David (1995): Universal Quantifiers and Distributivity. In: *Quantification in Natural Languages*, ed. by E. Bach et al. Vol. 54. Studies in Linguistics and Philosophy. Springer, pp. 321–362. DOI: 10.1007/978-94-017-2817-1 (cit. on pp. 1, 5).

Gruber, Jeffrey S. (1965): 'Studies in lexical relations'. Massachusetts Institute of Technology PhD Thesis. URL: http://hdl.handle.net/1721.1/13010 (cit. on p. 15).

Heim, Irene R. (1982): 'The Semantics of Definite and Indefinite Noun Phrases'. University of Massachusetts PhD Thesis (cit. on p. 2).

— (1991): Artikel und Definitheit. In: *Semantik: Ein internationales Handbuch der zeitgenossischen Forschung*, ed. by A. von Stechow et al. Berlin: de Gruyter, pp. 487–535 (cit. on p. 34).

Iatridou, Sabine (1990): 'Clitics and Island Effects'. In: *University of Pennsylvania Working Papers in Linguistics* 2 (cit. on p. 60).

Keenan, Edward L. (2014): '*In Situ* Interpretation without Type Mismatches'. In: *Journal of Semantics* 0, pp. 1–20. DOI: 10.1093/jos/ffu016 (cit. on p. 31).

Keenan, Edward L. and Denis Paperno, eds. (2012): *Handbook of Quantifiers in Natural Language*. Studies in Linguistics and Philosophy 90. Springer. DOI: 10.1007/978-94-007-2681-9 (cit. on p. 1).

Koopman, Hilda and Dominique Sportiche (1991): 'The Position of Subjects'. In: *Lingua* 85, pp. 211–258 (cit. on p. 54).

Kratzer, Angelika (2000): 'The event argument and the semantics of verbs, chapter 2'. Manuscript. Amherst: University of Massachusetts. URL: http://semantic sarchive.net/Archive/GU1NWM4Z/The%20Event%20Argument%20and%20the%20Semantics%20of%20Verbs.%20Chapter%202.pdf (cit. on pp. 11, 15–19, 21, 23, 25, 27, 35, 43, 51, 54, 69, 71, 73, 74, 81, 83).

— (2008): On the plurality of verbs. In: *Event Structures in Linguistic Form and Interpretation*, ed. by J. Dölling et al. de Gruyter, pp. 269–300. DOI: 10.1515/9783110925449.269 (cit. on p. 30).

Krifka, Manfred (1986): 'Nominalreferenz und Zeitkonstitution: Zur Semantik von Massentermen, Pluraltermen und Aspektklassen'. University of Munich PhD Thesis (cit. on p. 30).

Kroch, Anthony S. (1974): 'The semantics of scope in English'. Massachusetts Institute of Technology PhD Thesis. URL: http://hdl.handle.net/1721.1/13020 (cit. on p. 2).

Landman, Fred (2000): *Events and Plurality: the Jerusalem Lectures*. Dordrecht: Kluwer (cit. on pp. 3, 13).

— (2004): *Indefinites and the Type of Sets*. Oxford: Blackwell (cit. on p. 19).

Larson, Richard K. (1988): 'On the Double Object Construction'. In: *Linguistic Inquiry* 19.3, pp. 335–391 (cit. on p. 39).

Lasersohn, Peter (1989): 'On the Readings of Plural Noun Phrases'. In: *Linguistic Inquiry* 20.1, pp. 130–134 (cit. on p. 30).

Lin, Jo-wang (1998): 'Distributivity in Chinese and its Implications'. In: *Natural Language Semantics* 6, pp. 201–243. DOI: 10.1023/A:1008299031574 (cit. on pp. 33, 34).

Link, Godehard (1983): The Logical Analysis of Plural and Mass Terms: A Lattice-Theoretical Approach. In: *Meaning, Use and Interpretation of Language*, ed. by R. Bäuerle et al. Berlin: de Gruyter, pp. 302–323 (cit. on pp. 3, 17, 29, 30).

Matthewson, Lisa (2001): 'Quantification and the Nature of Crosslinguistic Variation'. In: *Natural Language Semantics* 9.2, pp. 145–189. DOI: 10.1023/A:1012492911285 (cit. on p. 32).

May, Robert C. (1978): 'The grammar of quantification'. Massachusetts Institute of Technology PhD Thesis. URL: http://hdl.handle.net/1721.1/16287 (cit. on p. 7).

Montague, Richard (1973): The Proper Treatment of Quantification in Ordinary English. In: *Approaches to Natural Language: 1970 Stanford Workshop on Grammar and Semantics*, ed. by J. Hintikka et al. Dordrecht: Springer, pp. 221–242. DOI: 10.1007/978-94-010-2506-5_10 (cit. on pp. 11, 33).

Parsons, Terence (1990): *Events in the Semantics of English*. Cambridge: MIT Press (cit. on pp. 14, 15).

— (1995): 'Thematic Relations and Arguments'. In: *Linguistic Inquiry* 26.4, pp. 635–662 (cit. on pp. 15, 16).

Partee, Barbara H. (1987): Noun Phrase Interpretation and Type-shifting Principles. In: *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, ed. by J. Groenendijk et al. Dordrecht: Foris, pp. 115–144 (cit. on pp. 32, 33).

Partee, Barbara H. and Mats Rooth (1983): Generalized Conjunction and Type Ambiguity. In: *Meaning, Use and Interpretation of Language*, ed. by R. Bäuerle et al. Berlin: de Gruyter, pp. 361–393 (cit. on p. 16).

Quine, Willard van Orman (1960): *Word and Object*. Cambridge: MIT Press (cit. on p. 29).

Reinhart, Tanya (1981): 'Definite NP Anaphora and C-Command Domains'. In: *Linguistic Inquiry* 12.4, pp. 605–635 (cit. on p. 39).

Rizzi, Luigi (1997): The Fine Structure of the Left Periphery. In: *Elements of Grammar: Handbook in Generative Syntax*, ed. by L. Haegeman. Springer Netherlands, pp. 281–337. DOI: 10.1007/978-94-011-5420-8_7 (cit. on pp. 57, 58, 64).

Roberts, Craige (2011): Topics. In: *Semantics. An International Handbook of Natural Language Meaning*, ed. by K. von Heusinger et al. Vol. 2. de Gruyter Mouton, pp. 1908–1934 (cit. on p. 59).

Scha, Remko (1981): Distributive, collective and cumulative quantification. In: *Formal Methods in the Study of Language*, ed. by J. Groenendijk et al. Amsterdam: Mathematical Center Tracts, pp. 483–512 (cit. on pp. 6, 7, 81, 83).

Schein, Barry (1993): *Plurals and Events*. Vol. 23. Cambridge: MIT Press (cit. on pp. 6, 11, 18, 75, 81, 83).

Schmitt, Viola (2013): 'More Pluralities'. University of Vienna PhD Thesis. URL: http://othes.univie.ac.at/28744/1/2013-03-14_9904220.pdf (cit. on pp. 31, 32).

Schwarzschild, Roger (1996): *Pluralities*. Vol. 23. Dordrecht: Kluwer. DOI: 10.1007/978-94-017-2704-4 (cit. on p. 34).

Sharvy, Richard (1980): 'A more general theory of definite descriptions'. In: *The Philosophical Review* 89.4, pp. 607–624. DOI: 10.2307/2184738 (cit. on p. 34).

Sportiche, Dominique (1988): 'A Theory of Floating Quantifiers and its Corollaries for Constituent Structure'. In: *Linguistic Inquiry* 19, pp. 425–449 (cit. on p. 4).

Sternefeld, Wolfgang (1998): 'Reciprocity and Cumulative Predication'. In: *Natural Language Semantics* 6, pp. 303–337. DOI: 10.1023/A:1008352502939 (cit. on p. 30).

Thomas, Guillaume and Yasutada Sudo (2016): 'Cumulative readigs of *each*'. URL: www.uni-goettingen.de/de/document/download/7b63835e4f7eae4b9639a19202b29541.pdf/Thomas%20sudo.pdf (visited on 10/07/2017) (cit. on pp. 21, 22, 40, 48, 81, 83).

Tunstall, Susanne L. (1998): 'The interpretation of quantifiers: semantics & processing'. University of Massachusetts PhD Thesis (cit. on p. 22).

Winter, Yoad (2000): 'Distributivity and Dependency'. In: *Natural Language Semantics* 8, pp. 27–69 (cit. on pp. 81, 83).

Zimmermann, Malte (2002): 'Boys buying two sausages each: on the syntax and semantics of distance-distributivity'. University of Amsterdam PhD Thesis. URL: http://hdl.handle.net/11245/1.194584 (cit. on p. 22).

# Abstract

In this thesis I consider some aspect of the semantics of *ogni*, an Italian determiner that is very similar to the English *every* from a syntactic and a semantic point of view. *Every* is known in the literature for licensing distributive readings across the board but cumulative readings only in some contexts: this is a phenomenon that, in various ways, has drawn quite a lot of attention in the recent literature in formal semantics (see e.g. Champollion 2010; Kratzer 2000; Schein 1993; Thomas and Sudo 2016).

Different characterisations and different analyses of this phenomenon have been proposed. One significant problem that these tasks have to deal with is that distributive and cumulative quantifications are themselves semantic issues, the analysis of which a general consensus has not yet been reached (see a.o. Beck and Sauerland 2000; Scha 1981; Winter 2000).

This alternation in the availability of cumulative readings characterises *ogni* too, but the literature on this is very scarce or simply non existent. The present thesis is an attempt to fill this gap to a certain extent.

Thus, the work is structured as follows. First, two influential and radically different approaches to the problem are summarised and their theoretical but especially empirical shortcomings are highlighted. Then a more accurate description of the distribution of the cumulative readings for *ogni* is attempted, and some potentially interesting relations between cumulativity and information structural phenomena are described and discussed.

The virtual goal of providing an exhaustive and (from a theoretical point of view) economical description and an analysis of the whole phenomenon is not accomplished here. However, the factors that are related to the cumulative readings of *ogni* will have to be investigated both crosslinguistically and from a wider theoretical perspective, so that more fundamental semantic aspects of cumulativity and plurality might eventually come to light.

# Zusammenfassung

In dieser Arbeit werden unterschiedliche Aspekte der Semantik von *ogni* betrachtet. *Ogni* ist ein italienischer Determinierer, der aus syntaktischer und semantischer Perspektive dem englischen *every* sehr ähnlich ist. *Every* ist in der Literatur dadurch bekannt, dass es distributive Lesarten generell, kumulative aber nur in bestimmten Kontexten erlaubt. Dieses Phänomen wird in der neuen Literatur zur formalen Semantik unterschiedlich behandelt (vlg. z.B. Champollion 2010; Kratzer 2000; Schein 1993; Thomas und Sudo 2016). Die verschiedenen Formen der Auseinandersetzung mit theoretischen Begriffen wie distributiver bzw. kumulativer Quantifizierung in der Literatur, machen das Phänomen und dessen Bearbeitung zusätzlich komplex (vgl. u.a. Beck und Sauerland 2000; Scha 1981; Winter 2000).

Eine solche Alternation in der Verfügbarkeit von kumulativen Lesarten charakterisiert *ogni* auch, dies wird in der Literatur allerdings wenig bis gar nicht thematisiert. Die vorliegende Arbeit ist daher ein Versuch, den Datenbedarf diesbezüglich einigermaßen zu decken.

Dementsprechend ist die Arbeit folgendermaßen strukturiert. In Kapitel 2 und 3 werden zunächst zwei wichtige und voneinander grundsätzlich verschiedene Auseinandersetzungen mit dem Problem zusammengefasst sowie deren theoretische und insbesonderes empirische Schwächen dargestellt. Danach wird in Kapitel 4 versucht, eine adäquatere Beschreibung der Distribution der kumulativen Lesarten von *ogni* zu schaffen. Darüber hinaus werden einige potentiell interessante Zusammenspiele zwischen der Kumulativität von *ogni* und der Informationsstruktur dargestellt und diskutiert.

Das Ziel, eine umfassende und erklärungsadäquate Analyse des gesamten Phänomens zu erarbeiten, wurde in dieser Arbeit nicht erreicht. Dennoch sollen die Faktoren, die hier als relevant für die Kumulativität von *ogni* dargestellt werden, komparativ und aus einer breiteren theoretischen Perspektive untersucht werden, um damit möglicherweise grundlegende semantische Aspekte von Kumulativität und Pluralität ans Licht zu bringen.