Verbs in Child Grammar

The Acquisition of the Primitive Elements of the VP at the Syntax-Semantics Interface

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En memòria del meu pare
de la meva àvia
i de Maria Teresa Ynglès

Una massa d'informazioni freddamente oggettive, incontrovertibili, rischierebbe di fornire un'immagine lontana dal vero, di falsare quel che è più specifico d'ogni situazione. Supponiamo che ci arrivi da un altro pianeta un messaggio di puri dati di fatto, d'una chiarezza addirittura ovvia: non gli presteremmo attenzione, non ce ne accorgeremmo nemmeno; solo un messaggio che contenesse qualcosa di inespresso, di dubbioso, di parzialmente indecifrabile forzerebbe la soglia della nostra coscienza, imporrebbe d'esser ricevuto e interpretato.

da *Quattro storie sul tempo e sullo spazio*,
in *La memoria del mondo*

Italo Calvino

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Abstract

An issue in the study of language acquisition that has attracted much attention is the nature of early verbs. At around the age of 2, children start to combine words and to produce the first verbs. Verbal items appear later than nouns and refer to the relational concepts in the world that are represented in syntax through the argument structure. This dissertation aims to examine the features of the first verbal productions in Italian. Since the appearance of verbs implies the mastery of a procedure of mapping between syntactic positions and semantic roles, the topic under examination has consequences not only for the description of the timeline of the acquisition of the lexicon, but also for the definition of a general model of the interface between syntax and lexical semantics in the early stages. The proposal is that syntactic-semantic features are at work early in child grammar in determining the clausal derivation.

Verbs involve structural and idiosyncratic meaning: while structural meaning is derived by the few syntactic frames (number and features of the arguments) which a verb can appear in, idiosyncratic meaning is given by the relations in the world that each verbal root denotes. The architecture of the syntax-semantics interface for verbs implies a mapping procedure from few syntactic frames to many relations in the world and/or vice versa.

The structural meaning of early verbs is explored through an analysis of the distribution of the overt arguments and the auxiliaries in a corpus of spontaneous speech of children and adults. The results will show that the lexical classes of verbs influence the distribution of null subjects and the choice of the position in which the subjects are expressed in the sentences. Verb classes also seem at work in the selection and the distribution of the auxiliaries: children properly select auxiliaries depending on the lexical-syntactic information encoded in the VP layer.

At the age of the appearance of the first verbs, children are simultaneously learning the syntactic derivations that involve the IP and the CP layers. Some differences between child and target grammar are found in the syntactic domains used for the spell-out at syntax-phonology interface: a lower initial spell-out domain may disfavor the derivations to high clausal positions where scope discourse semantic features like Topic and Focus are checked.

Two experimental tasks are designed to observe the effects of the presence of an overt object in the VP in determining the aspectual reading. The interaction between the perfective aspect encoded in the present perfect (*passato prossimo*) and the lexical aspect of the VPs is

investigated in the production and comprehension of perfective compound tenses. The results show that children do not use the present perfect with all verbs like adults: the aspectual information encoded in the VP, both the structural meaning linked to the projection of the objects and the idiosyncratic meaning of the verbal root, influences children's understanding of aspectual perfective morphology till the age of 7.

The main conclusions of the present work show that the relations at syntax- semantics interface are already well established when the first verbs are uttered by children and influence the pattern of distribution of overt/null arguments, the clausal derivation to scope-discourse semantic position, and the aspectual interpretation. While we cannot determine whether the first verbs are bootstrapped by the semantic or the syntactic representations, we can argue that both the structural and idiosyncratic meanings encoded in the VPs are at work in the different stages of acquisition of a language.

Introduction

This thesis is about the characteristics of early verbs in the acquisition of Italian. The verb is a member of the morpho-syntactic class of words that: typically signals events and actions; constitutes, alone or in a phrase, a minimal predicate in a clause; governs the number and types of other constituents which may occur in the clause, and in inflectional languages may be inflected for such specifications as number, person and tense. The appearance of the first verbal items determines an increase in the complexity of the produced utterances: children start to put together words and to enlarge the vocabulary size (Bates, Dale and Thal, 1995). While in the previous stage children used nouns to individuate some referents in the world, by introducing verbs into their productions, they are able to refer to the relations between the referents (Gentner,1982). So, verbal items involve the introduction in the language of a particular type of referential items and of structural information that allows the creation of complex sentences. But do first verbs denote the same structural and referential properties in both child and adult grammar? And do the characteristics of early verb structures change across the different stages of the acquisition of language? The aim of the present work is to address these questions through the analysis of natural data about the syntactic and lexical-semantic features of first verbal utterances.

The first step in examining the features of early verbs is defining the relations holding between the lexical-semantics and the syntax in the verbal phrases. The verbs describe events but they require participants of varying types, depending on the event described, in order to properly depict a particular scene and form a grammatical sentence. These participants are the arguments of the verbs. *Break* is a verb that needs only one argument to form a grammatical sentence. In (1) the noun phrase the *window* is the argument of *break* which describes it as having undergone a change of a specific kind.

(1) The window broke.

Break can also describe a complex event where an entity causes a change in an object.

(2) John broke the window

While *John* in (2) is an *agent* and is initiator of the action, *window* in (1) and (2) is the *patient* or the *undergoer*: the entity undergoing the effect of some action. These semantic roles are mapped

into syntax: agents are usually mapped into subject positions and the undergoers into object positions. The phenomena involved in the mapping between semantic roles and overt syntactic positions are commonly defined as the relations at the lexicon-syntax interface. In Chapter 1 we will review some influential models proposed in the literature to account for the mapping between the lexical meanings and the syntactic structures. We will describe the relation at the lexicon-syntax interface as involving two types of meanings: the structural verb meaning that refers to the syntactic environment in which a verb is uttered and the idiosyncratic meaning that refers to the relational concept encoded in the verbal root. How structural and idiosyncratic meanings intervene in the acquisition of the lexicon is the topic of the second part of Chapter 1 where we will provide a timetable of the acquisition of the lexicon. The differences in the lexical-syntactic mapping procedures for nouns and verbs determine varying mechanisms of acquisition: respectively a *world to word mapping* and a *sentence to world mapping*(Gleitman 1990). Depending on whether we assume either lexicon or syntax to be responsible for the bootstrapping of verb meaning, we can have two developmental proposals of the process of acquisition: respectively the semantic or the syntactic bootstrapping.

We perform an analysis of the structural characteristics of early VPs and their longitudinal development based on a syntactic and semantic review on how the arguments are projected by each verb class: we will provide the data of a corpus of spontaneous speech and two experimental tasks.

The clausal subjects are analyzed in their occurrences with different lexical verb classes: verbs differ on the loci of generation of the subjects. While Unaccusative subjects are generated in an internal position and are generally understood as patients/undergoers, Unergatives and Transitives project subjects in a *v*P external position and are interpreted as agents/initiators. These lexical-syntactic features of the subjects influence the pattern of omission: external arguments seem to be more likely to be omitted than internal subjects. Since Italian is a *pro* drop language and null subjects are licensed by the rich agreement morphology on verbs, the omission of the subjects has generally been accounted for in terms of informational structure (Serratrice, 2005). In Chapter 2 we propose an analysis of the spontaneous speech: the results show that children omit a slightly higher number of subjects than adults and the null subjects are crucially linked to the structural position of external arguments. The loci of projection of the subjects within the VP influence the distribution of subjects in the spontaneous speech and inform us that the structural meaning of verbs is already at work in determining the pattern of the overt/null subjects' distribution. A grammatical account based on the l-syntactic structure of

first verbs can back up the Informational Structure account on the subject omission in Italian: Informational Structure, in fact, works within the boundaries of the grammar.

Overt subjects found in the spontaneous speech are further analyzed for their position in overt syntax in Chapter 3: whether they are preverbal or postverbal. The loci of generation of the subjects within the VP layer, once more, influence the position of overt subjects. While external arguments are produced in a preferential preverbal position, internal arguments are more likely to be uttered postverbally. The scope-discourse semantic features checked in the IP trigger this pattern of linearization: postverbal subjects in Italian represent new information and are checked in a low FocusP in the IP layer (Belletti, 2001,2004) or in the VP layer in the case of Unaccusatives. Internal arguments are, usually, patients or undergoers; they are inherently linked to the event denoted by the verb at the lexicon-syntax interface and typically encode new information: internal arguments in both adults and children's data are more likely to be produced postverbally. The comparison between the distribution and the position of overt subjects suggests that children tend to omit more external arguments (preferentially SV) than internal arguments(preferentially VS): they produce more overt subjects with Unaccusatives since there are two available positions for postverbal subjects (Belletti, 2004, Bianchi & Belletti 2014). Adults do not show this pattern since they omit more with Transitives. We will argue that the differences found between adults and children are not linked to an erroneous mapping between the lexical semantics and the syntax but to an early production limitation that intervenes at spell-out to phonology: the derivation of clausal subject to higher position in the IP/CP maybe limited by a lower spell-out domain in the early stage (Friedman and Costa, 2009,2011).

The effects of the distribution of overt objects are considered in Chapter 4. The projection of direct objects has a relevant role in the attribution of the lexical aspect of the event structure of the VPs: in Italian the presence of an overt object (internal argument) triggers a telic aspectual reading of the event denoted in the VP layer. Telicity, in fact, can be determined compositionally, through an internal argument (structural meaning), or directly by the aspectual features of the verbal head (idiosyncratic meaning). The aspect encoded in the VPs interacts with the aspectual properties of auxiliary morphology of the perfective forms of present perfect (*passato prossimo*). We checked the relation between the projection of an overt object and the distribution of the perfective auxiliaries for our general purpose of describing the structural verb meaning at work in child Italian. We observed, in the corpus of spontaneous speech, that children have a delay in producing the first perfective forms with Unergatives. We designed two

experimental tasks to check the role of the direct objects in the analysis of aspect in early Italian. The first experiment is a production task in which children were forced to use the perfective morphology with all verb classes (with or without overt objects). The second experiment is a comprehension task in which children had to interpret the perfective reading encoded in the present perfect (*passato prossimo*) across verb classes: once more the variable was the presence of an overt object in the VPs. The results show that children till the age of 7 link the perfective aspectual reading mainly to the compositional telicity: that is, to the projection of an overt object. Nevertheless in few cases they also refer to the idiosyncratic meaning of verbs in order to assign the perfective reading. These findings suggest that both the structural meaning and the idiosyncratic meaning are at work in language acquisition in determining the distribution of aspectual morphology, but in the very early stage we can find a pattern crucially linked to the presence of an overt object. In our perspective, the effects of the structural and idiosyncratic meaning at the lexicon-syntax interface are found at different rate in the entire process of acquisition of Italian. The non adult-like behaviors are linked to the interaction with functional projections outside the scope of the lexicon-syntax interface. The verbs, from their very first appearance, seem to be projected with the proper syntactic and semantic information.

These findings provide a partial answer to the two main questions we formulated at the beginning of this section.

The first question was about differences in the structural and referential properties of verbs in child and adult's grammar. We can suggest that children project verbs at the lexicon-syntax interface in an adult-like way. The primitive elements at work in determining the verb meaning seem to be properly employed: the distribution of subjects, the projection of objects, and the idiosyncratic meaning of the lexical verbal root. The non adult-like behaviors are restricted to derivations involving either functional projections higher than VPs in which scope-discourse semantic features are checked or lexical-syntactic classes that are not used frequently in the context of acquisition (parents' stimuli).

The second question was about the characteristics of verbs during the different stages of acquisition. We can suggest that verbal l-structures do not differ along the different stages of acquisition, but the overt realization of the structural meaning and its interpretations varies across periods. In Chapter 5, we propose a longitudinal analysis of our findings in which we identify different stages of acquisition. At each stage children's performance can be accounted for in terms of adjustments in the fulfillment of the requirements of the scope-discourse semantic interface and in the aspectual interpretation of the event structure.

Chapter 1. The atoms of VP and their acquisition.

1.0 Introduction

The verbal items are heads of maximal projections that determine the creation of chunks, made of different constituents bearing various interface relations: interfaces with the lexicon, the argumental and scope-discourse semantics and the phonology. These items, obviously, differ from other morpho-syntactic classes such as the one of nouns. A noun is a member of a class that includes words that refer to people, places, things, ideas, or concepts. Nouns are selected by the predicates of the sentences and in inflectional languages may agree in number and/or gender with the verbs. So, sketchily, while nouns refer directly to an object (or an abstract entity) in the world, verbs refer to the event types that one or more objects in the word undergo.

These minimal semantic features of verbs are mapped into syntax in different ways. We find verbs that represent events in which a given object or entity in the world performs an *action* or *activity* such in (1) or in which an object undergoes a *process* or a movement described by the verb (2)

(1) The clown plays the guitar
(2) The train arrived at the station

The verbs in (1) and (2) show different syntactic features, for example *play* in (1) can be used in passive sentence like (3) while the verb *arrive* can not undergo the same process of passivization as in (4).

(3) The guitar was played by the clown
(4) *The station was arrived by the train

So, intuitively, we can see that the semantic features play a relevant role in determining the syntactic properties of a verb.

How are, then, organized or linked into syntax the semantic features of a verb? Different proposals have been put forward. This chapter is devoted to overviewing the analyses provided by some influential frameworks in order to account for the diverse semantic values and their

surface overt syntactic behavior. After the classification of the semantic and syntactic features involved by verb structures, we will review the analyses that have been proposed for their acquisition.

In the first sections we will highlight the differences between frameworks on the way they account for the relation between lexicon and syntax, we will use Marantz (2013)'s categories: the lexicalist approaches that claim that verbal syntactic structure is projected from a structured lexicon (section 1.2) and the constructivist approaches that claim that verb meaning is read off from the syntactic structure (section 1.3). Each type of approach makes different predictions on acquisition (section 1.4) that will be the main topic of the following part of the chapter.

In the following sections we will be analyzing the conceptual differences between nouns and verbs (section 1.5) describing Gentner's (1982) generalization (section 1.6) and reporting data in which nouns and verbs are seen in the process of acquisition: verbal elements are acquired later than nominals. In section 1.7 we will then describe two proposals in the literature about the bootstrapping of verb meaning: semantic bootstrapping (Pinker 1994) and syntactic bootstrapping (Gleitman 1990).

The function of the present chapter is to provide the theoretical background in which our analysis of the structural verb meaning in acquisition will rely on.

1.1 The Lexicon-Syntax Interface

The general and complex task of acquiring a language is the background of the present work. When we learn a language, we learn to match a physical acoustic element, the phonological string, with different levels of linguistic representation in our brain. In detail, we refer to lexicon-syntax interface as the relations bearing between a lexical item and its pre-syntactic structure. Verbs and arguments represent the principal items at work at this interface. Different types of analysis of this relation are available in literature. We will sketch them using theoretical tools from both Government and Binding, and Minimalism in a dialectic perspective.[1]

[1] For an overview of the Model of Grammar of Principles and Parameters we refer to Chomsky (1981), for the minimalist program to Chomsky (1993,1995, 2001).

Current understanding of argument structure within linguistics has incorporated the results of various lines of exploration that Marantz (2013) divides in two big groups: the lexicalist and constructivist traditions. Lexicalist approaches are linked to the theoretical insights started with Chomsky's "Remarks on Nominalization" (1970): verbs are stored in the lexicon as items that project syntactic structures from the argument structures associated to each of them. Constructivist approaches, in Marantz's classifications, are the ones linked to the work of Hale & Keyser (1993, 2002): they emphasize the role of syntax in constructing the meanings traditionally attributed to argument structure.

Lexicalist approaches rely on the general assumptions of the framework of Government and Binding of Chomsky (1981). The argument structure (or subcategorization frame) of a given morpho-syntactic item consists in the number and type of elements that are selected from a lexical item. For example a Transitive verb like *break* in (5) has an argument structure in which two elements are selected: the agent (John) and the object that undergoes the action represented by the verb (the vase).

(5) **John** broke **the vase**

The syntactic realization of thematic roles in argument structure is constrained and secured by the Projection Principle and the θ-Criterion (Chomsky, 1981) for which the representations at syntactic level are projected from the lexicon and each of them bears only one thematic role (and each thematic role is assigned to only one syntactic position) in the optic of the Uniformity of Theta Assignment Hypothesis (UTAH) proposed by Baker (1988) in (6).

(6) **Uniformity of Theta Assignment Hypothesis** (Baker 1988: 46)
Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-Structure.

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Within constructivist approaches, Hale & Keyser (2002) propose a syntactic lexical primitive structure that they call *Lexical Syntactic Structure (LSS).* A LSS is a representation of argument structure in the form of a head that projects its category to the phrasal level and determines within that projection structural relations with its arguments (its complement and, if present,

its specifier). Hence, the notion of *argument structure* by which verbs are lexically characterized is a syntactic entity, characterized by syntactic structures projected by lexical heads.

The model of verbs' representation put forward by Hale & Keyser (1993,2002) is based on the assumption that the predicative categories are associated with syntactic structures referred to as *l-structure* (lexical structure). The event properties of predicates are syntactically decomposed.[2] These syntactic structures go under the name of *l-syntax* in order to distinguish it from the syntax of the entire sentence referred to *s-syntax*,[3] like TP and the other functional categories responsible of the overt clausal realization as FocusP or TopicP.

Within the grammatical architecture of Chomsky's minimalist program (1993,1995), syntax is the sole generative engine of grammar. Although the semantic and phonological representations of sentences are subject to their own constraints and principles and constructed with units appropriate to the interfaces with meaning and sound, they are dependent on syntax for their hierarchical and compositional structure. The smallest syntactic domains available at semantic and phonological interface are the phases, structures that are interpreted cyclically. So in a model in which syntax determines the basic relations between chunks of grammatical information to be sent at interface, the 'late insertion' of lexical elements is also an available option as in the account of Distributed Morphology (Halle and al., 1993). The minimalist architecture of grammar seems to be more compatible with constructivist approaches in which syntax has a core role in determining the environment in which lexical items can be inserted through the operations of feature checking.

Both types of approaches agree that verb meaning is built up from the interaction between the syntactic frame in which the verbs are found and the verbal root as it is stored in the lexicon. Although different proposals have been developed in order to account for verb meaning, all of them share a common insight: 'there are "constructional" meanings which are independent of the particular lexical items that make up the sentence...'(Zubizarreta and Oh, 2007: 1).

The notion of constructional meaning varies across theories. The variation is linked to whether the constructional meaning is stored in the lexicon or is built up syntactically. The

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[2] Marantz [2013:pp.153, fn.1] points out that: 'Crucially important to the contemporary move from the theta roles to event structure was the work of Jackendoff (e.g., 1987), who identified theta roles with positions in the primitive predicates into which verb meanings would decompose, and Hale and Keyser (e.g., 1993), who "syntacticized" the event structures that Jackendoff identified as lexical properties'.

[3] We will back on the interaction between the l-syntax of verbs and overt s-syntax in Chapter 3.

common insight is that there are *structures* that carry meaning. This is what we refer to as the *structural verb meaning*; it is the meaning that the verbs of the same class share, for example the part of meaning which is common in the sentences in (7). We refer to them as the "closed class item", since they are given in each language, like the prepositions, the conjunctions or the determiners.

(7) a. Sara eats a lot of food
b. Sara drinks a lot of water

The difference between the two sentences is given by the two verbal roots *eat* and *drink*. What is involved by the two lexical entries *eat* and *drink,* regardless of the syntactic frame in which they are found in, is what we refer to as the *idiosyncratic* meaning. We can refer to them as "open class items". Their root is given in a target language; they may appear in different syntactic frames and may vary across languages or within the same language diachronically. Their existence is almost arbitrary.

With respect to our proposal, the atoms of verb meaning are: on the one side *the structural verb meaning* and on the other side *the idiosyncratic verb meaning*. Before introducing the problematic of the acquisition of the verbs, we will present the lexicalist approach of Levin and Rappaport Hovav (1995) and Rappaport Hovav and Levin (1998) in which structural meaning is given in the lexicon (section 1.2) and two constructivist approaches for which structural meaning is read off from the syntactic structure of the event denoted by the verb (section 1.3): the classical l-syntactic one inspired by Hale and Keyser (1993, 2002) and the 'functional' one of Borer (1994,2005) or Van Hout (1998) which states that all structural meaning is given in syntactic functional heads.

1.2 Lexicalist Approaches: Levin & Rappaport Hovav

Verb classes are distinguished according to the type of arguments they project in overt syntax. Burzio (1986) identifies two classes of intransitive verbs. With Unergative verbs (8.a) the single argument bears the agent theta role, it is understood as the doer of the action, and it is projected in an external argument position. With Unaccusatives (Ergatives in Burzio's terms)

the single argument bears the theme theta role, the subject is understood as the undergoer of the action, and it is projected in an internal argument position, as in (8.b).[4]

(8) a. **Unergative Verb: NP** [$_{VP}$ V]

b. **Unaccusative Verb: _____** [$_{VP}$ V **NP**/CP]

(9) a. Paul eats (Unergative Verb)

b. Paul arrives (Unaccusative Verb)

Intuitively we can see that while the external argument in (9a) is the 'performer' of the action, in (9b) the argument undergoes a process described by the verb *arrives*. We can add the Transitive verb class that projects two arguments: an agent/doer projected in an external argument position and a theme/undergoer in an internal argument position in (10) and (11).

(10) **Transitive Verbs: NP** [$_{VP}$ V NP/CP]

(11) Paul buys two apples. (Transitive verb)

This different locus of generation of arguments for each verb class accounts for various syntactic phenomena. The argument of the Unaccusatives shows a syntactic behavior similar to the object of Transitives, while the argument of Unergatives shows a syntactic behavior similar to the subject of Transitives.

Following the statements of the UTAH, we would expect that analogous syntactic positions share a one to one mapping into thematic roles: that is, external arguments correspond to agents while internal argument to themes. Anyway, the only universally agreed-upon of the various mapping universals is that agents appear in subject position in all languages. No other thematic role behaves quite so predictably. Thus, the theme, the element affected by the predication of the verb, can appear in the subject or object position and the experiencer (the element that experiences the state predicated by the verb) can appear in the object, subject or indirect position in psychological verbs as shown in Belletti & Rizzi (1988).

[4] Burzio's generalization in its original formulation states that a verb can assign a theta role to its subject position if and only if it can assign an accusative case to its object. Accordingly, if a verb does not assign a theta role to it subject, then it does not assign accusative case to its object.

The lexicon, in fact, can be seen as the domain of idiosyncrasies across and within languages. Children acquiring a language should create a rule for each verb: it will be a very heavy and slow computational operation. Levin and Rappaport Hovav propose a structured lexicon where variability is reduced through some structured templates.

Levin and Rappaport Hovav in their publications (Levin and Rappaport Hovav 1995, Rappaport Hovav and Levin 1998) propose a lexical decomposition, directly in the lexicon, in which both aspects of verb meaning are encoded. The *idiosyncratic meaning* is given in terms of constants: that is, the phonological string of each verb. On the other hand the *structural meaning* is given by a small number of lexical-semantic templates formed via the combination of:

- *Primitive predicates* such as ACT, CAUSE, BECOME, STATE.
- *The modifiers* of the primitive predicates such as MANNER and INSTRUMENT.
- The variable number and characteristics of the arguments.

The meaning of a verb results form the association of a constant with a particular lexical-semantic template, the "event-structure template". We give in (12) the basic inventory of the "event-structure template" where Levin & Rappaport Hovav identify Vendler's classification (1957) of events into states, activities, accomplishments, and achievements.[5] The constants or

[5] Vendler (1957)'s classic four-way classification. All verbs can be classified as denoting states, activities, achievements, accomplishments. We define them following Rosen's (1999) analysis in (1) through (4).

(1) *Activities*
Events that go on for a time, but do not necessarily terminate at any given point.
E.g. *Terry walked for an hour*

(2) *Accomplishments*
Events that proceed toward a logically necessary terminus.
E.g. *Terry built two houses in one year*

(3) Achievements
Events that occur at a single moment, and therefore lack continuous tense.
E.g. *The vase broke*

(4) States
Non-actions that hold for some period of time but lack continuous tenses.
E.g. *Terry knows the answer*
?? *Terry is knowing the answer*.

As (4) shows another factor is relevant in describing the events encoded in a verb: the tense in which the verbs appear. We can see that *states* (4) for examples cannot appear with continuous form. The interaction interface effects between the grammatical feature of tense system and the event structure of a verb will be addressed in the 4th chapter, when we will talk about the acquisition of the compound tense forms.

open-class item, are drawn from a fixed ontology (e.g., manner, instrument, state, etc.) and are represented within the angle brackets of the event template. Each constant is also associated with a name (i.e., a phonological string).

(12) a. [*x* ACT<*MANNER*>] (activity)
b. [*x* <*STATE*>] (state)
c. [BECOME [*x* <*STATE*>]] (achievement)
d. [*x* CAUSE [BECOME [*y* <*STATE*>]]](accomplishment)
e. [[*x* ACT<*MANNER*>] CAUSE [BECOME[*y* <*STATE*>]]] (accomplishment)
(Rappaport Hovav and Levin, 1998:108)

Furthermore, they propose the Canonical Realization Rule for which each minimal element of meaning encoded in the constants has to be syntactically expressed. Furthermore, each lexical-event structure is realized syntactically through two well-formedness conditions. The *Subevent Identification Condition* (13) and the *Argument Realization Condition* (14)

(13) **Subevent Identification Condition**
Each subevent in the event structure must be identified by a lexical head (e.g., a V, an A or a P) in the syntax.

(14) **Argument Realization Condition**
a There must be an argument XP in the syntax for each structure participant in the event structure.
b Each argument XP in the syntax must be associated with an identified subevent in the event structure.

The Argument Realization Condition is the version of Levin & Rappaport Hovav of the Theta Criterion stated by Chomsky (1981) for whom each theta-role (argument) is borne by something in the syntax, in a one-to-one relation.

The event structure templates are then projected into syntax through some *linking rules*: they determine which participants in the event template are linked with which grammatical function in the syntax. Levin and Rappaport Hovav (1995) proposes two basic linking rules :

(15) **Immediate Cause Linking Rule (ICLR)**
The argument of a verb that denotes the immediate cause of the eventuality denoted by that verb is its external argument.

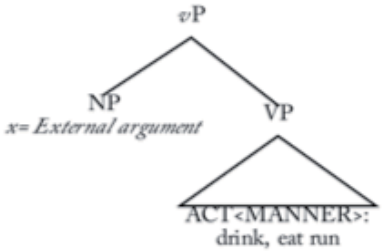
(16) **Direct Change Linking Rule (DCLR)**
The argument of a verb that denotes an entity undergoing a directed change denoted by the verb is its internal argument.

ICLR states that when we have an *agent* in the lexical event structure, it will be projected in syntax as an external argument. Conversely, when we deal with a theme or patient we will have in overt syntax an internal argument as follows from DCLR.

Unergatives are monoargumental verbs that project only external arguments: they are projected into syntax through the Immediate Cause Linking Rule. Unergatives are mostly activities like *run, eat, drink* and they will have the event structure template in (12a), where the constants will refer to the subevent ACT. Since *x* is the immediate cause of the eventuality denoted by the verb, for the ICLR, we will find in syntax an external argument in the specifier position of a functional *v*P head as in (18).

(17) [*x* ACT<*MANNER*>] (activity)

(18) Unergative verb of activity

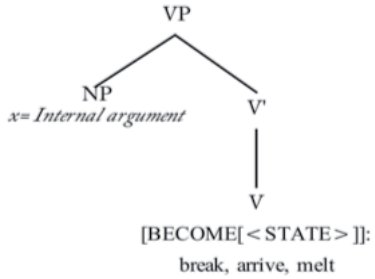


In the case of Unaccusatives the internal object projected in syntax is an *x* entity which undergoes a directed change denoted by the verb as (16). The majority of Unaccusatives denotes, in fact, achievement events (19). Verbs like *break*, *melt* and also verbs like *arrive,* in which the constant STATE implies a locative or a path, project an internal argument in

syntax as in (20): the nominal argument *x* undergoes a change denoted by the subevent BECOME *STATE* .

(19) [BECOME [*x* <*STATE*>]] (achievement)

(20) Unaccusative verb of achievement



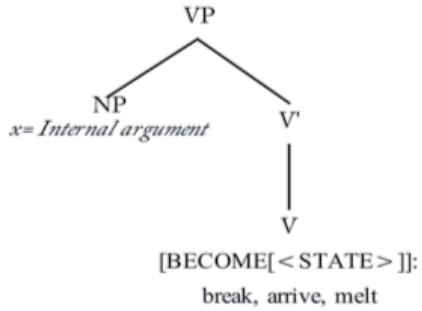
The same is true for the projection of Transitive verbs that are accomplishments in sentences like *Paul melted the ice* where *Paul* is the causer of the accomplishment. The argument that is an entity that undergoes a change is projected as an internal argument for (16), while the one that is the causer is projected as an external argument for (15). Verb constants like *melt* or *break,* in their causative transitive version, have a syntactic structure like (22). Two types of causative events are recognized: internally caused (*bloom, rot, rust, sprout*) are associated with the template in (21a) and externally caused (*break, dry, melt*) are associated with the template in (21b).

(21) (Causative accomplishments)

a. [*x* CAUSE [BECOME [*y* <*STATE*>]]]

b. [[*x* ACT<*MANNER*>] CAUSE [BECOME[*y* <*STATE*>]]]

(22) Transitive (causative) accomplishments



There is, anyway, no full coincidence between the verb classes of Burzio and the typical event structure template of Levin and Rappaport Hovav:

- Not all Transitives are (causative) accomplishments.
- Not all Unergatives are activities.
- Not all Unaccusatives are achievements.

We will not review all these cases of L&RH mapping rules, but there is a high variability in the type of event structures that lay behind few syntactic frames.[6] We find verbs with alternating behaviors: for example verbs like *break* that show Transitive-Unaccusative alternation depending on whether it is an accomplishment or an achievement. Other verbs show a Transitive-Unergative alternation like *run*. Across languages we find many types of alternation: in (23 and (24) the Italian verb *correre,* to *run,* can be used as an activity (23) or as an achievement (24).

(23) Giacomo corre.
Giacomo runs
(intented as *Giacomo is performing the activity of running)*

(24) Giacomo corre via.
Giacomo runs away
(intended as *Giacomo is going away running*)

Due to Levin & Rappaport Hovav's approach, the eventive structure is assigned to a verbal root only in the lexicon: this assignation is almost arbitrary. The variable behavior of verbs across and within languages depends on the assignation of a verbal root to different eventive lexical templates. Once the lexical event classes are identified, systematic operations (*linking rules*) allow the projection in few syntactic frames.

In Levin & Rappaport Hovav's approach, syntax becomes a mirror of the well structured organization of the lexicon. Children in their task of acquiring verbs should first recognize

[6] They also formulate an extra linking rule for all the arguments that cannot be put forward by the *ICLR* and *DCLR. The Default linking Rule* that states that: 'an argument of a verb that does not fall under the scope of the other linking rules is its direct internal argument'. This allows L&RH to account for alternate behavior verbs such as Unergative activities *'John runs'* that becomes '*John runs a mile*'.

lexical verb classes, then assign each constant to the correspondent event structure, and finally project it into syntax. Argument structure is a lexical device that gives its output to syntax.

Following this framework, the *linking rules* are determinant in the process of acquisition of verbs: children need to map the lexical templates into syntactic chunks.[7] In the terms of the present review: following Levin & Rappaport Hovav's account, the *idiosyncratic* and the *structural* meanings are both found in the lexicon and then projected into syntax. The opposed view is the one for which the eventive structure is given in syntax: next section is devoted to present the constructivist approaches.

1.3 The Constructivist approach: Hale & Keyser.

Constructivist approaches are based on the assumptions that structural meaning is read off from the syntactic structure of the event and not by lexical eventive templates. The first constructivist approach was the one of Hale & Keyser (1993, 2002). Nevertheless, Hale & Keyser's (H&K) model shares important insights with Levin & Rappaport Hovav (L&RH): L&RH code eventive structure of verbs in terms of relation between some semantic predicates (CAUSE, ACT, BECOME), H&K encode the eventive structure in terms of syntactic relations. Other authors, like Borer and Van Hout, decompose the event in syntactic shells in which a semantic feature checking mechanism applies through some functional heads (EP, AGROP) and not through semantic predicates resulting by the relations holding within a head projection. We go through the details of both types of constructivist frameworks below.

Hale & Keyser (2002) propose a primitive lexical syntactic structure that they call *Lexical Syntactic Structure (LSS).* In LSS, argument structure is represented in the form of a head that bears syntactic relations with its arguments (its complement and, if present, its specifier). Hence, the notion of *argument structure* by which verbs are lexically characterized is a syntactic entity, represented by syntactic structures projected by the lexical heads.

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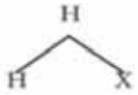
[7] *Linking rule*s have often been claimed (Pinker 1989, 1994) to be innate: Pinker proposes that phrase-structure and verb subcategorization frames are learned by the use of innate linking rules in the general context of the 'semantic bootstrapping' of verb meaning. Nevertheless, Bowerman (1990) contends that linking patterns are not innate but they are learned. She showed that children had more trouble with verbs that should be easy to link than with those that should be more difficult. The hypothesis that linking rules are learned is also supported by the fact that at a relatively advanced age, the children began to produce errors that are best interpreted as over-regularizations of a statistically predominant linking pattern to which they had become sensitive through linguistic experience. We will back on the insights of the Semantic Bootstrapping of Verb meaning Pinker (1982, 1994) in section 1.7.1.

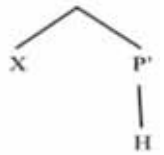
The verb's lexical specification includes an LSS in this approach. Each type of LSS is related to a different event-semantic relation. Given that there are a limited number of lexical categories (verb, adjective, preposition and noun) Hale & Keyser assume that there are an equally limited number of different LSS types. The possible relations a lexical head can have are the ones in (25).

(25) The basic relations in argument structure

- **Head - complement.** If *X* is a complement of the head *H*, then *X* is the only sister of *H* .(*X* and *H* have a relation of mutual c-comand)

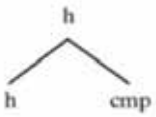


- **Specifier – head.** If *X* is the *spec* of one head *H*, and if P_1 is the first maximal projection of *H* (for example *H'*, not empty), then *X* is the only sister of P_1 .



By the recursive use of these two relations, different argument structures are generated.[8] For example, a head that has a complement but not a specifier will project an argument structure as the one in (26), where "h" represents the head and "cmp" represents its complement. If the morpho-syntactic category in *h* is a verb, in (26) we will have a mono-argumental predicate.

(26)



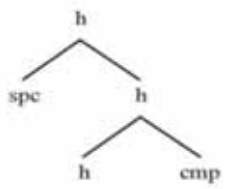
We can also find some heads that do not project either a specifier or a complement, as in the atomic configuration in (27).

(27) h

[8] Hale & Keyser define four types of possible argument structure; we will simply describe three of them. The present ones are used in our analysis of verb classes for the description of chidren's acquisition process. We will not address the discussion about the basic lexical syntactic structures and their descriptive adequacy here. For a discussion about this topic see Mateu (2002).

If we imagine a head holding both the relations synthesized in (25), we will have a lexical head which projects both a complement and a specifier as in (28).

(28)



The heads that enter into these basic configurations are not represented by a fixed morpho-syntactic category. In (28), for example, we can have in the position of "h" adjectives, verbs or nouns depending on the language.

Each verb class is derived compositionally through the interaction of basic structures as the ones in (26)-(28). H&K in their work describe these compositional operations as applying at a lexical level that, in their terms, is a pure syntactic level. This syntactic representation of lexical items is defined *l-syntax* (lexical syntax) in opposition to *s-syntax* (sentence syntax) that refers to the syntactic representation of the whole clause. H&K recognize different verb classes using the basic configurations above and the insertion of different morpho-syntactic categories.

The syntactic distinction between Unaccusative and Unergative verbs is one of the core arguments of H&K's analysis. More specifically, they propose that Unaccusatives, unlike Unergatives, are associated with an l-structure that contains a DP in the specifier position as in (29) (the version of (28) with the morpho-syntactic categories). DP is the clausal subject of Unaccusatives, the object that undergoes the change predicated by the verb. Two types of Unaccusatives can be distinguished depending on the nature of the XP element in complement position. If the complement denotes a path with an endpoint, the XP is a (complex) locative PP and it determines the l-structure of the Change of Location verbs (29.a) such as *go* and *come*.[9] While if the complement denotes a state or a location, the complement is

[9] The complexity of the PP will determine different types of 'Location' events: a complex PP composed by a (locative) P embedded under a (directional) P, as in *John went into the church,* denotes a clear change of location since it expresses a path with an endpoint. On the other hand verbs with a simple locative PP, such as in *John is in the store,* have stative meanings but they are also Unaccusatives: the Spec-head relation within the VP determines Unaccusativity. For a detailed analysis see Hale & Keyser (2002), Mateu (2002), or Zubizarreta & Oh (2007).

an Adjective and it determines the l-structure of the Change of state verbs (29.b) such as *melt* and *break*.

(29) **[$_{VP}$ DP [$_{VP}$ V XP]** (General Unaccusative l-structure)

a. [$_{VP}$ DP [$_{VP}$ V [PP]] (Change of location)

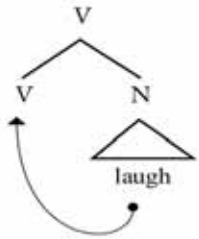
b. [$_{VP}$ DP [$_{VP}$ V A] (Change of state)

On the other side, the subject of an Unergative structure is not an argument of the verb at all. It originates in the sentential part of the syntax (or s-syntax) in the specifier of *v*P projection: that is, the agent position. H&K furthermore argue that Unergatives are denominal verbs associated with the general structure in (30).

(30) [$_{vP}$ DP *v* [$_{V}$ V N]]

Lets' try now to define what denominal verbs are. If we take the structure in (30) and we attribute to the *h* the morpho-syntactic category V and to *cmp* the morpho-syntactic category N, we have the class of denominal verbs such as *laugh* in (31). This verb is derived through the incorporation of the noun *laugh* into an empty verb matrix *V*. As we have already said, the subject is added in an s-syntax functional projection such as a *v*P.

(31)



Denominal verbs like *laugh* are compatible with the analysis of Unergatives: they select an internal object (different from the Transitives objects) and allow the presence of an external argument. In this class we can add also the verbs which show a Transitive/Unergative alternation: consumption verbs like *eat* or *drink,* which are activities and have a structure like the one in (30), admit also a Transitive version as *Paul eats apples* or *Paul drinks beer*. The

object in this case will be a *cognate* object or a *hyponymous* object (hyponym of the incorporated noun). It will be projected in the position of the N, e.g. *laugh* in (31). In this case the object is not generated in a specifier position like the one of Unaccusatives, but it has a status linked to the position of the noun incorporated in the verbal head.[10] This analysis is not linked to the predicate ACT as in Levin & Rappaport Hovav, it simply replaces the noun incorporated in the verbal root. The relations within the maximal projection of the VPs are the ones that determine the features of the event denoted by the verb.

In general terms, Transitives are associated with an l-strcuture resulting by adding a *v*P shell to the Unaccusative structures: the external argument is licensed in the specifier of the *v*P and in the lower VP shell both a specifier and a complement are given. The resulting general l-structure of Transitives in (32) is connected to a causative reading on the event (or subevent) within the lower VP shell: the internal argument is the specifier of the VP, while the other complements are represented by the XP.[11]

(32) $[_{vP}$ DP *v* $[_{VP}$ DP $[_{VP}$ V XP]]]

The tenet of Hale & Keyser's analysis is to recognize verb classes through the basic configuration of complements and specifiers and the morpho-syntactic elements that enter in these configurations. Contrary to Levin & Rappaport Hovav, they do not need to postulate a complex lexicon, since all the operations take place at *l-syntax*.

If verb classes are as the ones proposed by Hale & Keyser, children learning a language do not need to learn any *linking* rules but the relational properties between lexical items that determine the overt syntax of verbs. Thus, *structural meaning* is linked not to lexical primitive predicates but to syntactic recursive operations operating on the top of few norpho-syntactic categories that allow the generation of all the range of VPs found in natural languages. A

[10] For a discussion on the status of denominal verbs and their cognate object, see also Mateu (2002) or Zubizarreta & Oh (2007).

[11] Not all Transitives are causatives. We can identify three subclasses of Transitives. The first subclass is the Transitive counterpart of the Unergative/Transitive alternating verbs (consumption verbs) like *eat an apple*: the external argument is the spec-*v*P and the VP does not present any specifier but a cognate/hyponymous object. The second class is the one of Transitive Causatives like *John broke the vase*: as in the change of state Unaccusatives the complement of VP is a state (generally expressed through A). The third class is the one of Transitive non-Causatives like *John saddled the horse:* as in many change of location verbs the complement of the VP is a complex PP. For an extensive analysis of the features of the prepositions in the VP complements of the location/locatum verbs that are involved in non-causative Transitives see Mateu (2000, 2002, 2007).

variant of this proposal is based directly on overt operations in syntax through functional categories.

1.3.1 The Functional version of the constructivist approach: Borer & Van Hout.

Borer and other authors claim that the *structural meaning* of a verb is not given in the lexicon neither at l-syntax but in the eventive structure which is given in overt syntax.

Event structure, within the systems developed by van Hout (1996, 2004), Borer (1994, 1998,2005), and Ritter and Rosen (1998), is not determined by properties of the vocabulary in the lexicon but rather by the optional merger in syntax of specific functional heads with particular semantic values. Substantive vocabulary items, in turn, function as modifiers of the emerging event structure. Following Borer (2005), at the lexical level nouns and verbs are stored in the same way like *referential concepts*: the relational characteristics of verbs are totally given in syntax.[12] This implies, in the acquisition process, that children have to acquire not the event structure template within the lexicon, but just syntax.

Borer (2005) proposes that '..the optional merger of nodes which give rise to varying event structures, together with the modifying nature of substantive vocabulary items, gives rise to the emergence, for any particular vocabulary item, of multiple event structures and multiple argumental interpretation…' (Borer 2005: pp.3).

Events like accomplishments, states, activities and achievements are categorized along some aspectual features. For aspect we refer to the *situation aspect* of a verb: the aktionsart or the lexical aspect that refers to the atemporal contours of the event.[13] The aspectual properties relevant in Borer's account are, for example, whether an event is stative, dynamic, punctual or durative. The situation aspectual properties also encode whether the event denoted by the verb has a natural terminus or not (telicity). When a natural terminus is encoded we are dealing with a *telic* event, as in verbs like *arrive,* which denotes the arrival at some place or

[12] Gentner (1982) defines the difference between the concepts represented by nouns and the ones represented by verbs using the referential concepts vs relational concepts opposition. We will back on this distinction in next section.

[13] The situational aspect is not the only one encoded in an event as it results in its syntactic derivation. The *grammatical aspect* (or viewpoint aspect) operates on top of situational aspect. The use of grammatical aspect implies that a speaker chooses a certain perspective to report on an event. The temporal perspective of the event is usually determined by tense morphology. We will be back on this topic in the 4th Chapter.

stage. On the other hand, when we deal with verbs like *laugh* we cannot recognize on the verb a natural terminus, and we are dealing with an *atelic* event. Another property that is aspectually relevant in the determination of an event, in Borer's account, is the agentivity: the action involved in the event, the ACT predicate in L&R's terms. Borer (2005) predicts massive 'ambiguity' for any verb. She quotes the examples of Clark and Clark (1979) in (33):

(33) a. The factory horns sirened throughout the raid
b. The factory horns sirened midday and everyone broke for lunch
c. The police car sirened the Porsche to a stop
d. The police car sirened up to the accident site
e. The police car sirened the daylight out of me
(Borer 2005:3)

Borer notes that if the syntax of the arguments and the event structures in (33a-e) are to be attributed to the properties of some verbal lexical entry *siren*, we would have to assume that there are five distinct entries, or event structure templates, for *siren*: the one in (33a) associated with an *atelic agentive* reading, and meaning *to emit a siren noise*; the one in (33b) associated with a *telic agentive* meaning *to signal through emitting a siren noise*; the one in (33c) associated with a *telic agent-patient* and meaning *to force by emitting a siren noise*; the one in (33d) associated with *telic-agentive*, and subcategorizing a particle, meaning *to hurry while emitting a siren noise*; and finally, in (33e), *siren* would be associated with a *stative* and an *experiencer*, and would mean *to frighten by way of emitting a siren noise*.

'Of course, the common denominator here is the emission of a siren noise, which, indeed, appears to be the meaning of *to siren*, but it is entirely clear that in each of (33a-e), the event denoted is modified by the emission of a sound, rather than determined by that emission. Thus at least in (33a-e), we must assume that the syntax of the event (and the syntax of the event's arguments) does not emerge from five different lexical entries for *siren*. Rather, it is the syntax which determines the interpretation of the event and its arguments, as well as the specific nuance contributed to that interpretation by the vocabulary item *siren* which modifies that event…'(Borer 2005:pp.3). She proposes syntactic structures that can account for this variation, we repeat them in (34) and in (35) we show few examples. In brackets we added the Dowty (1986)'s telicity test for telicity: the contrast between durative versus time-frame

adverbial phrases. Durative phrases (e.g. for two hours) select atelic predicates, while time-frame adverbials (e.g. in two hours) select telic ones.

(34) a. *Transitive, Telic*:
[EP DP1 [TP ~~DP1~~ [ASPQ DP2 [VPV]]]] (in two hours/*for two hours)
NOM ACC

b. *Transitive, Atelic*:
[EP DP1 [TP ~~DP1~~ [FP DP2 [VPV]]]] (*in two hours/for two hours)
NOM PRT

c. *Intransitive, Telic*:
[EP DP1 [TP ~~DP~~1 [ASPQ ~~DP1~~ [VPV]]]] (in two hours/*for two hours)
NOM

d. *Intransitive, Atelic*:
[EP DP1 [TP ~~DP1~~ [VPV]]]] (*in two hours/for two hours)
NOM

(35) a. *Transitive, Telic*:
[EP *Kim*1 [TP ~~*Kim*1~~ [ASPQ *the piano*2 [VP *move*]]]] (in two hours)
NOM ACC
originator *subject-of-quantifiable-change*

b. *Transitive, Atelic*:
[EP *Kim*1 [TP ~~*Kim*1~~ [FP *the piano*2 [VP *move*]]]] (for two hours)
NOM PRT
originator *default participant*†

c. *Intransitive, Telic*:
[EP *Kim*1 [TP ~~*Kim*1~~ [ASPQ ~~*Kim*1~~ [VP *move*]]]] (in two hours)
NOM
subject-of-quantifiable-change

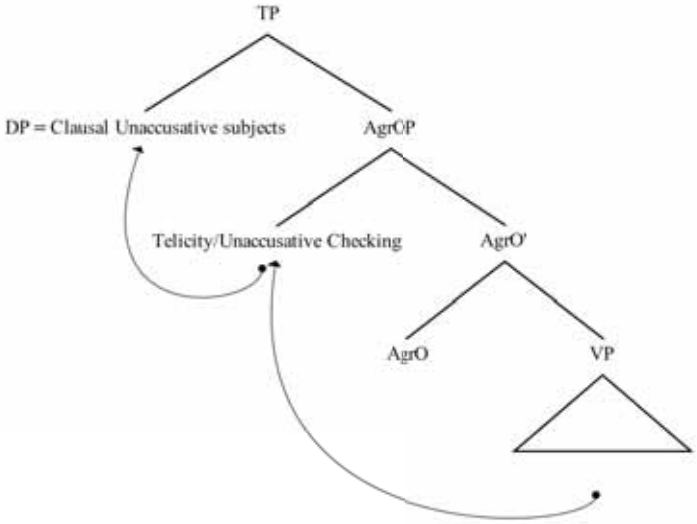
d. *Intransitive, Atelic*:
[EP *Kim*1 [TP ~~*Kim*1~~ [VP *move*]]]] (for two hours)
NOM
originator

Borer uses the TP projection common to the traditional Chomskyan[14] syntactic approaches. Tense Phrase is a functional projection that assigns the tense morphology to the verbal head and also assigns the nominative case to the DP in its specifier position.[15] Borer uses two more functional projections the EP and the ASPQ responsible of the differences in the determination of the eventive structure. These functional projections are used to check semantic features. We can see that all the subjects of the sentences (Kim in (35)) pass through the TP where the nominative case is assigned, then they move to the EP. The EP is an eventive (non-stative) node; it determines that we are dealing with non-stative events. The most important functional projections for the determination of the eventive syntactic structure is the ASPQ phrase. ASPQ is a quantity node which induces telicity. Unless the DP in [Spec, EP] is already assigned an interpretation in some other functional projections (e.g., [Spec,ASPQ]), it is interpreted as the *originator* of the (eventive) event headed by E. The DP in [Spec,ASPQ], is interpreted as the *subject of a quantifiable change*. Borer assumes that a quantity DP, in turn interpreted as *subject of quantifiable change*, is necessary to give rise to telicity. Finally, Borer assumes that ASPQ (may) check *accusative* Case for the DP in its specifier (the *subject-of-quantifiable-change*), as in (34a) and (35a).

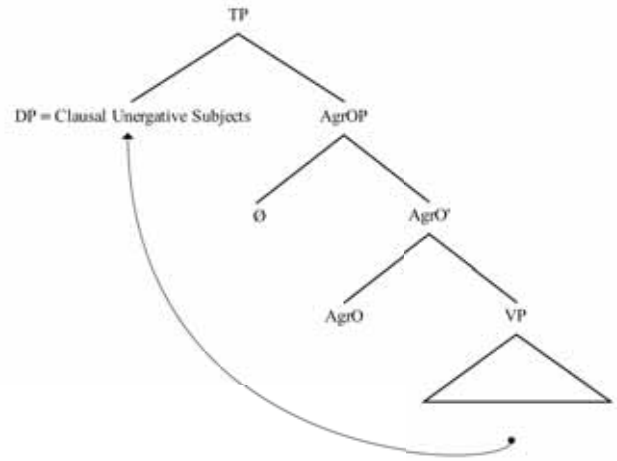
Similarly, Van Hout (2004) argues that in Dutch we can distinguish Unergatives and Unaccusatives on the basis of their telicity. She puts forward that the functional projection AgrOP, traditionally used in the Government and Binding framework[16] as a projection in which accusative case is assigned, is the responsible of the telicity checking. In the case of Unaccusatives in (36) a DP projected in the verb is moved first to the spec of AgrOP where it checks telicity features: the DP is the subject of a quantifiable change. Then, the DP is moved to the spec position of the TP in order to be the subject of the sentence. In the case of Unergatives the DP, since it does not share any telicity features, is moved directly to the position of the specifier of the TP as in (37).

[14] See Haegeman (1994) for an overview on the difference between the IP and the AGRP and TP in the issue of the split IP.
[15] We refer to the NP as DP following the assumption of Abney (1987) for which nouns are projected in a functional projection headed by a Determiner.
[16] For a general introduction on the characteristics of AgroP in Governement and Binding framework see Haegeman (1994) or Belletti (1998).

(36) Unaccusatives in Van Hout (2004)



(37) Unergatives in Van Hout (2004)



So, following Van Hout the traditional distinction between Unaccusatives and Unergatives of Perlmutter (1978) is given by the checking of the telicity feature in the AgrOP projection and not simply by the generation as internal or external argument within the VP. Verb Classes are then recognized on the basis of the feature checking on a functional projection.

The main idea behind these approaches is that the event structure is completely developed in syntax: the semantic feature checking arises in syntax. Specific syntactic event structures correspond to what we have been defining as verb classes. The lexical content is just a mere modifier, there are not complex predicates or minimal units of verb meaning in the lexicon, the event identification and semantic of a verb is totally developed in syntax. The big picture as it results from these approaches allows us to analyze verb classes comprehensively on the basis of the event type they describe; anyway, it doesn't account (and it doesn't need to) for the regularities found at lexical level. For example, the fact that similar lexical entries have similar syntactic behaviors seems to be linked to the existence of some lexical features that work analogously as modifiers of the syntactic structure.

Following these approaches, children, learning verbs, should acquire the eventive syntactic structure. They do not need to learn any linking rule, neither complex lexical predicate classification, the lexical element should simply be learnt like the referential part of the eventive syntactic structure.

1.4 Structural meaning and acquisition.

In the three approaches presented above we have seen three different ways of accounting for the same regularities found in verbal productions across languages: the presence of verb classes (classes of syntactic phenomena involving a verb in Borer's terms). They all coincide on the existence of two types of meanings. While the *idiosyncratic meaning* in all of them is almost arbitrary and it is linked to a referential counterpart in the world, the *structural meaning* is the most relevant element since it allows us to account for verb structures. The characteristic of the structural meaning at issue is whether it is given at lexical level (Levin & Rappaport Hovav) or at syntactic level (Borer, Van Hout, Hale & Keyser).

Depending on the approach we follow for the identification of verb classes, whether lexicalist or constructivist, the difference in the definition of structural meaning implies diverse modalities of acquisition. Due to the objective difficulties in accessing the internal lexical representation especially in the early stage of language acquisition, in the present work we will be mainly using a constructivist approach. This choice is also determined by the scope of our analysis: we are considering the acquisition of the syntactic frames in which lexical roots are inserted. We will be referring to the atoms of verb structural meaning as the smaller

syntactic unit that enters into the derivation of verbal structures. We have presented the lexicalist approaches since their insights have influence on the frameworks that define acquisition as a mapping procedure from concepts into syntax (the linking rules). These approaches predict a module of language parallel to narrow syntax and that is based on the conceptual organization:[17] we will be referring to them in many occasions in the course of the present work.

The analysis that we think more suitable for accounting for the developing of syntax is the one that allows the differentiation of first syntactic appearances on the basis of minimal syntactic relations that can (or cannot) determine an eventive reading: the Hale & Keyser approach. A framework that uses dedicated semantic functional projections is more suitable for explaining the aspectual implication of the structural meaning in both comprehension and production of aspectual markers such as the auxiliaries.[18] We will be using both constructivist frameworks alternatively: both approaches allow a structural analysis of the syntactic frames in which first verbs are inserted. Next sections are devoted to introduce the topic of the appearance of verb (and their structural constituents) in child language.

1.5 Labeling the world through language

One of the deepest mysteries in the study of language is how children learn the meanings of words. At around the end of the first year of life, infants start to produce their first words. As first step they recover the speech unit within the continuous speech signal through an operation of *phonological bootstrapping model of lexical acquisition* (Christophe & Dupoux, 1996; Christophe et al. 1997) exploiting a number of acoustic cues like stress, lengthening and the types of sound they hear.

Once children own a lexicon made of phonological units, they have to associate this items with a meaning. Guasti (2002) defines it as the *Two-Step Model of Lexical Acquisition*: for which children first identify phonological strings and then associate a meaning to them.

The first linguistic items children acquire are nouns. Children start to associate the phonological item to a meaning as the result of a strategy of joint attention with adults at the moment when adult speaks (see Bruner, 1978; Baldwin, 1991; Bloom 1997). The word-

[17] The semantic bootstrapping of verb meaning Pinker (1994, 1989) in section 1.6.
[18] This will be the topic of 4th Chapter.

learning task involves associating a word with what is perceived when the word is spoken; in other terms, it is a *word-to-world mapping procedure*. Infants make some assumptions on the meaning of words: these assumptions are called *bias. Biases* help in word learning by favoring certain kinds of hypothesis of *meaning-matching* over others. In literature different types of biases are described: they are hypotheses about the perceptual and logical organization of the objects in the world that children make, such as the *whole object bias*, the *mutual exclusivity bias,* and the *taxonomic bias* (Markman 1994), or the *shape bias* (Landau et al. 1992).

Nevertheless, Bloom (1996) argues that there are reasons to doubt that these precise constraints (bias) are present in the minds of young children. He argues that the counterexamples of words not strictly linkable to the biases are also present in the language of very young children. He proposes that, instead of the biases alone, there is a mechanism of syntax-semantics mappings in the domain of nominals that makes it unnecessary to posit special word-learning constraints. Bloom uses, as the pertinent elements of the syntax-semantics mappings, items that have linguistic and psychological supports: that is, the difference between mass and count nouns and the difference between NP and bare nominals. In the terms we have been using so far for verb meaning (structural vs idiosyncratic), the quantifiers in the NP or the singular/plural morphology of count nouns represent the structural part of nouns' meaning. Through an operation of mapping for example between quantified NPs to individuals and mass nouns to kinds, children are able to succeed in the *world-to-word* mapping.

In our respect, it is important to note that at least in the very early stage children acquire words following some guidelines in labeling entities in the world with linguistic items. Such guidelines are both conceptually (Markman's biases) and linguistically (Bloom's mappings) driven: children can get to associate a linguistic item with an entity (individual, kind or substance) in the world.

In the case of verbs neither one of the constraints, biases and mappings above can be useful, further assumptions need to be made in order to understand the process of acquisition of verbs. Next section is dedicated to analyzing the difference between nominals and verbs in acquisition: we will see that the operations will not be a *world to word mapping* but a *sentence to world mapping*.

1.6 Noun and Verbs: Gentner and the Natural Partition Hypothesis

Words do not all connect to the world in the same way. Some words basically point and refer to things in the world, while others organize the world into semantic systems and name it according to the system. Gentner (2006) defines a *natural partitions hypothesis*: the noun class has the privilege of naming the highly cohesive bits of the world, whereas verbs and prepositions have the job of partitioning the leftovers - a diffuse set of largely relational components (Gentner, 1981, 1982; Gentner & Boroditsky, 2001). The contrast between concrete nouns and verbs is in part the contrast between local individuation and individuation as part of a semantic system. Gentner argued that '…there are in the experiential flow certain highly cohesive collections of percepts that are universally conceptualized as objects, and [...] these tend to be lexicalized as nouns across languages. Children learning language have already isolated these cohesive packages -the concrete objects and individuals- from their surroundings' (Gentner 1982: pp. 324).

In other words, many concrete nouns refer to naturally individuated referents. In contrast, even fairly concrete verb meanings (such as those of motion verbs) make a selection from the available relational information, and just which information is selected varies across languages (Talmy, 1975, 1985). This brings Gentner's (1981, 1982) to her second theoretical claim: that verb meanings are more variable cross-linguistically than noun meanings in (38).

(38) When we lexicalize the perceptual world, the assignment of relational terms is more variable crosslinguistically than that of nominal terms[...]. Predicates show a more variable mapping from concepts to words... . (Gentner, 1982:pp.323)

This claim-termed *relational relativity* was inspired in large part by Talmy's (1975) seminal research, which convincingly demonstrated that verb semantic structures vary substantially across languages. Talmy showed that languages differ in which semantic elements are incorporated into motion verbs: the path of the moving figure (as in Spanish), the manner of its motion (as in English), and/or the shape of the moving figure (as in Atsugewi). Talmy did not himself claim that verbs are more variable in their semantics than nouns. His findings for verbs offered a path toward understanding why children learn nouns before verbs. If verb

meanings are linguistically shaped, then learning how verbs refer to world is embedded in language learning. In contrast, if at least some noun meanings are "given by the world," then these nouns can be learned before the infant has penetrated the semantic of her/his language.

Gentner's hypothesis that names for concrete objects should be learnable very early is supported by two other lines of evidence. First, there is the finding by Spelke (1985, 1990) and Baillargeon (1987) that prelinguistic infants can form stable object concepts even during their first year of life, suggesting that objects can be individuated and parsed out from the perceptual flow purely on the basis of experience. The second line of support was Brent Berlin's anthropological work on biological categories, which suggested considerable cross-linguistic uniformity in naming, at least for some kinds of biological categories (Berlin, Breedlove, & Raven, 1973). Berlin and his colleagues asserted that generic categories (which Rosch et al. (1976), later called basic *level categories*) in biology tend to "carve nature at the joints" and that these categories are remarkably stable across cultures. Extrapolating from biological terms to other concrete nouns is of course a bit of a leap, but it suggests a generalization: that some noun referents are stable across cultures and languages. This insight is synthesized in what Gentner (1982) defines as the Relational Relativity (39).

(39) *Relational relativity* combines the idea that verb meanings are cross-linguistically variable with the idea that some noun meanings are relatively stable across languages.

It states that verb semantics varies more across languages than does noun semantics, at least for concrete nouns. Relational relativity is an outcome of a difference in word-to-world mapping transparency, which in turn stems from a deep difference in the way in which nouns and verbs connect to the world. For concrete nouns and proper nouns that name animate beings, the referents are naturally individuated out of the stream of perception. In contrast, there is no natural individuation for the referents of verbs. Verb meaning includes only part of the available relational information, and just *which* information they include varies across languages (e.g., Bowerman & Choi, 2003; Casad & Langacker, 1985; Levinson, 1996; Slobin, 1996; Talmy, 1985; Mateu 2002; Mateu & Rigau, 2002) This theoretical framework implies that the mapping between word and referent is more transparent for concrete nouns than it is for verbs.

The assertion that concrete nouns have a mapping from language to world more transparent than verbs has important implications for acquisition: it implies that nouns will predominate over verbs in children's first vocabularies cross-linguistically. The natural partition account puts forward that children learn concrete nouns early because, as object-reference terms, they have a particularly transparent semantic mapping to the perceptual-conceptual world. Verbs and other predicate terms, however, have a less transparent relation to the perceptual world. The claim of the natural partitions hypothesis is that even a prelinguistic infant already individuated many entities. Thus, for many nouns, she or he has only to attach the noun to a referent that she or he has already isolated. This is not the case for relational terms such as verbs and prepositions; their referents are not simply "out there" in the experiential world, they are linguistically selected. To learn what a verb means, the child must discover which aspects of the situation enter into its meaning in her language (Gentner, 1982; Gentner & Boroditsky, 2001).

Of course, not all nouns are easily individuated: these claims apply only to concrete nouns including proper nouns that name animate beings and not to abstract and relational nouns (for further discussion of relational nouns, see Gentner, 2005; Gentner & Kurtz, 2005). This view suggests that noun referential bindings are the natural starting point for language acquisition, and that these early-learned bindings may facilitate other aspects of language learning: object-reference mappings may provide natural entry points into language initial set of fixed hooks with which children can bootstrap themselves into a position to learn the less transparent aspects of language. Noun-object bindings, thus, could provide a basis for working out the more variable aspects of language, including the binding of semantic relations to verb structures (see Fisher, 1996; Gleitman, 1990, we will back on it in paragraph 2.5).

The natural partitions/relational relativity (NP/RR) hypotheses makes two key predictions for acquisition: (1) there will be a universal early noun advantage in acquisition, and (2) possessing a stock of nouns will help children in learning less transparent relational terms -notably verbs and prepositions. There is considerable support for the first prediction. Nouns predominate over verbs in early production and comprehension in English (Gentner, 1982; Goldin-Meadow, Seligman, & Gelman, 1976; Huttenlocher, 1974; Huttenlocher & Smiley, 1987; Macnamara, 1982; Nelson, 1973) and other languages (Au, Dapretto, & Song, 1994; Bornstein et al., 2004; Caselli et al., 1995; Gentner & Boroditsky, 2005; Kim, McGregor, & Thompson, 2000; Pae, 1993). Further, children appear to take novel words as

names for objects (Landau, Smith, & Jones, 1998; Markman, 1989, 1990; Waxman, 1991; Waxman & Hall, 1993), even as early as 13 months of age (Waxman & Markow, 1995). Woodward and Markman's (1998) review of the evidence confirmed an early predominance of names for objects and individuals in early vocabulary and a later increase in the proportion of relational terms, consistent with the second prediction. The "nouns before verbs" pattern in acquisition may be one instance of a very general pattern of order of learning. Learners of a new domain commonly show a *relational shift:* they focus on object properties before they are able to focus on relations (Gentner 1988; Gentner & Rattermann, 1991; Rattermann & Gentner, 1998).

In sum, Gentner argues: that words connect to the world in very different ways, that (concrete) nouns do so more transparently than verbs, and that verb meanings are more linguistically shaped than (concrete) noun meanings. Although many factors at all levels contribute to determining what is learned early by children, these semantic-conceptual factors are certainly among the core influences on how words connect to the world. The operation that children should perform when they start to produce the first verbs is defined by Gleitman (1990) as a *sentence- to-world* mapping procedure, in contrast with the *word-to-world* mapping procedure which is involved in the acquisition of nominals. The dichotomy hypothesized by Gentner (1982) can be synthesized in the contrast between the *referential concepts* implied by nouns semantics and *relational concepts* implied by verbs. Logically, only once the referents are individuated it is possible to talk about the relation among them.[19]

This insight needs to be confirmed by the experimental and developmental data: in next paragraph we will present some experimental data that will ratify whether nouns/referential concepts are learned before than verbs/relational concepts. In next section we will go through a brief description of the timetable of the appearance of lexical items in child speech. This digression at this point is motivated by the exigency of depicting the developmental background in which our analysis of the atomic structural meaning of verbs will be inserted.

[19] Gentner's view is more compatible with the analysis of verb structural meaning of Hale & Keyser in (section 1.3) than with Borer's theory (section 1.3.1). While Hale & Keyser identify 'nouns' that enter in the derivation of verbs, Borer isolates lexical roots that are mere non-relational elements that intervene as modifiers of the eventive syntactic structure.

1.6.1 An overview of the timetable of lexicon in acquisition: nouns before verbs Identifies

Few children produce any words before age one. Most say their first recognizable words in the next three months or so. By the age of 2, they may be able to produce anywhere from 100 to 600 distinct words. By age of 6, they have a vocabulary of around 14,000 in comprehension, with somewhat fewer in production. These numbers imply that they acquire words between age 2 and 6 at a rate of 9 to 10 words a day.

Several researchers have proposed that children go through a *one-word stage* before they learn how to combine two or more words in a single utterance (e.g., Dromi 1987). Robb, Bauer & Tyler (1994) found considerable variation in age for when children reached the 10-word and then the 50-word mark (Tab.1).

Tab 1. Age of acquisition for 10- and 50-word vocabularies in six children. Source: Robb, Bauer & Tyler (1994:40).

Child	Sex	Lexicon size	
		10 words	50 words
S1	M	1;0	1;5
S2	F	1;1	1;6
S3	M	1;2	1;7
S4	F	1;2	1;8
S5	M	1;4	1;10
S6	F	1;3	1;7

Clark (1979) analyzes the first 40-50 words reported in diary studies for a variety of languages. This survey showed that children's first 50 words fall into a fairly small number of categories (see Tab.2). These diary reports coincide fairly closely with the first 50 words produced by at

least 50% of the sample for the first six months of language production measured by the McArthur infant and toddler communicative development inventories.[20]

Tab 2. Early words in children's speech. Source: Clark (1979).

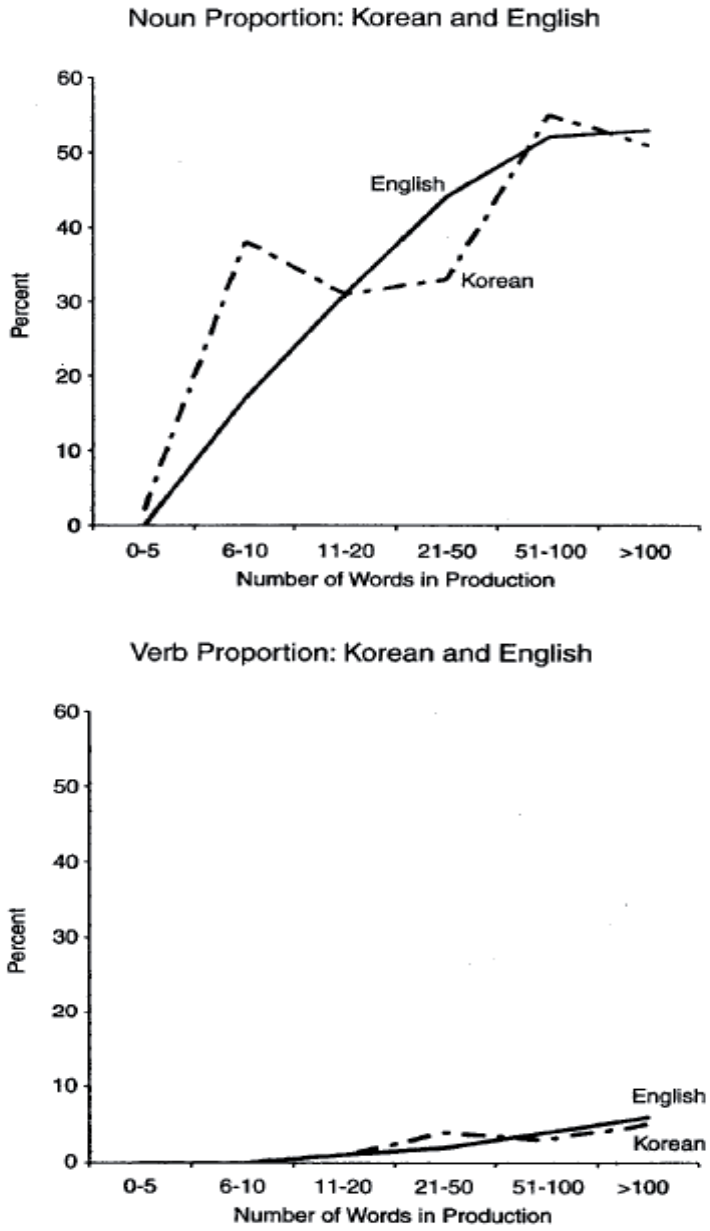
People: dada/papa, mama/mummy/mommy, baby
Food: juice, milk, bread, cookie, drink
Body parts: eye, nose, mouth, ear
Clothing: hat, shoe, diaper/nappy, coat
Animals: dog, catty/kitty, duck/hen, cow, horse, sheep
Vehicles: car, truck, boat, train
Toys: ball, block, book, doll
Household objects: cup, spoon, bottle, brush, key, clock, light
Routines: bye-bye, night-night, upsy-daisy, hi
Activities or states: up, down, out, off, back

As we can see in Tab.2 children produce basic words that confirms Gentner's generalization: that is, no verbs appear in the first period, and furthermore the type of words involve a clear referential status.

The hypothesis for which children produce fewer verbs than nouns in their early period was also confirmed by a cross-linguistic study by Pae (1993). She performed a comprehensive study on the characteristics of the first words. She used a checklist adapted for Korean (as well as observation) to assess the vocabularies of 90 children of monolingual families living in Seoul between the ages of 12 and 23 months. She found a strong noun advantage throughout. At 51-100 words (that is, also in the stage immediately following the one word stage) the children's productive vocabularies contain 50-60% nouns and about 5% verbs. Indeed, as shown in figure 1, Pae found that the properties of nouns and verbs in the productive vocabularies of Korean children were comparable to those found in English by Kim et al. (2000) as resumed by the graph in Fig.1.

[20] The MacArthur Communicative Development Inventory (CDI) is a standardized parent reporting system used to assess monolingual children's lexical growth (see Camaioli et al.1991).

Fig.1 Proportion of nouns and verbs in early acquisition in Korean and English productive vocabularies (adapted from Pae, 1993).



The conclusion is that verbs are very rare in the first spoken words of child vocabulary, rather most items are nouns with a scattering of social items ("bye-bye") and spatial prepositions

(Goldin Meadow et al., 1976; Dromi, 1987; Clark, 1979). After the early period in which nouns are predominant in children production, in a later period there is the appearance of verbs and children experience the so –called 'lexical spurt': we describe it in next section.

1.6.2 The appearance of verbs and the lexical spurt

After several weeks or months of adding rather slowly to their initial repertoire, many children appear to increase their rate of words rather suddenly. This increase typically occurs about 1;5 and 1;7 as they approach the 50-word level in production (Bloom, 1973; Nelson, 1973) and often consists of an increasing number of words for objects. Several researchers have argued that this spurt in words produced marks the point at which children show that they have recognized the symbolic value of words, when they realize that everything has a name (see, e. g. McShane, 1980). The main reason of the lexical spurt seems to be linked to the acquisition of the world-to-word mapping, that is, to associate a linguistic item with a referent in the world.

Another explanation (Clark, 1993, 2003; Dromi, 1987) is that a vocabulary spurt reflects changes in children's articulatory skill at producing words. It marks advantages in motor skill rather than insight into the symbolic value of words. For example, some children's attempts at words in the first few weeks of production are a long way from the adult targets and may go unrecognized at first. These children appear to practice intensively on each new word they attempt to articulate before they try another, they give clear evidence of a vocabulary spurt just prior to their first production of two-word combinations.[21]

The general fact is that at about 20-24 months children experience a so-called "vocabulary spurt", learning between five and nine new words a day up to the age of 6 years (see Carey, 1968). Another concomitant fact, as anticipated above, is that when infants start using between 50 and 200 words, most of them start to put together words (Bates, Dale and Thal, 1995). When they are using around 400 words, a correlation is also observed between vocabulary size and sentence complexity. As Guasti (2002) argues, '..one may conjecture that this correlation is a sign that children have access to some new source of information for

[21] Not everyone agrees with the characteristics of the lexical or vocabulary spurt: the age at which the lexical spurt is found in production varies across children. Furthermore the fact that children are first borns or not seems to influence the characterstic and the age at which the lexical spurt takes place (Goldfield and Reznick ,1990). For an overview on the literature of the lexical spurt see Clark (2003).

learning word meaning: that is, syntactic information' (Guasti 2002:pp.81). Verbs start to appear more consistently in children's speech; although nouns represent still the word class most produced. The first verbs are produced: once children manage the mapping of the referential concepts into linguistic items, they start to reproduce relational concepts through language.

Ninio (1999a) examined the longitudinal language development of 16 children – one learning English, the others learning Hebrew. She demonstrated that the first verbs children use are relatively small in number and are semantically general. Ninio noted that first Transitive verbs fall into three general categories: 'obtaining' verbs (*want, get, give, take, bring, find*); 'creating' verbs (*do, make, prepare, build, draw*); and 'consumption/perception' verbs (*eat, drink, see, hear*). In a complementary report, Ninio (1999b) found that first intransitive verbs for 20 Hebrew-learning children were *come, go* and *fall.* By this data we can argue that once a child has a name for things, she can manage to represent the relation within objects through the use of verbs. Although first verbs have general meanings, they can be useful in the process of the vocabulary growth, because through the relation represented by verbs, children can pick the meaning of objects not immediately available in the speech context, but whose meaning can be inferred linguistically. It is very important that, in general, as soon as children overcome the one word-stage, they are able to combine concepts and to start to produce the relations within lexical items through verbs. Both processes are linked: on the one hand they learn more nouns for objects by the linguistic stimulus containing verbal relational elements, while on the other hand through the combination of novel nouns they are able to identify the relations within objects and to reproduce them in the predication. In other words, infants start to reproduce the world-relations through some linguistic features, and through language they also start to learn new items to describe the world. The syntactic combination of discrete nouns for object seems to be the new relevant element that appear in children's knowledge and that allow them to start to perform the so called *sentence-to-world mapping*. Next section is devoted to the analysis of the hypothesis about the acquisition of the inherent dichotomy in verb structures: the structural verb meaning vs the idiosyncratic verb meaning.

1.7 The bootstrapping of Argument Structure

In this section we point out few considerations about the general characteristics of verb meaning in child speech and how it could be acquired. While the idiosyncratic part of verb meaning seems to undergo a pattern of variation across language and individuals, for the structural meaning some structural patterns are found.

When we refer to the idiosyncratic meaning of verbs we refer to their referential meaning, independently from the syntactic context in which verbs are found: that is, the label used to identify a relation in the world. In general, it is difficult that children use in their first utterances verbs with an abstract idiosyncratic meaning, such as *'it seems to*', or psychological states like '*know*'. Activities and some clear accomplishment and achievement are the first type of verbs found in children's speech.[22]

When we talk about the structural meaning of a verb we have to differentiate between: on the one side its argument structures, that is, the meaning of a verb as it results by the co-occurrence of the selected arguments (syntactic frame), and on the other side the derivational morphology such as the suffixes, the affixes and the construction with auxiliaries.

Verbs in the early stages do not often appear with all arguments, although it is difficult to find mismatching in the argument structure of the acquired verbs.[23] When children start to produce verbs, they do not have problems with the meaning of subjects or objects: the roles of agents or patients seem to be clear by their appearance the very early stage, as found by some experiments on infants' comprehension (Gleitman & Gillette, 1995; Pinker 1994). In production, depending on the parallel developing of the syntactic constraints, infants may omit some of the arguments: subjects (also in no-null subject target language) or in a minor rate objects. These phenomena of omission are not linked to problems in the operation of *sentence to world* mapping, as the results of the experiments on comprehension suggests, but they are linked to the parallel developing of syntax: structural meaning is detectable only

[22] Some authors claim that, depending on the target language, children will use some types of verbs more than others (Gagarina & Gülzow 2008): Japanese children tend to learn intransitive verbs that denote motion with specific path or definable goal before than others (Tsujimura, 2008). Hebrew children do not show this pattern since they produce at the same rate Transitive and Intransitives (Ninio, 1999a, 1999b). Anyway, in general, in the very first stages children tend to use verbs with a not abstract idiosyncratic meaning. Nevertheless there are cases in which children, depending on the input context, can produce every type of verbs independently from the idiosyncratic meaning.

[23] In this section we are merely sketching the characteristics of the argument structure in acquisition. Since it will be the main issue of next Chapters (2,3 and 4).

through the mediation of clausal syntactic operation (Chapter 2 and 3 are devoted to develop this proposal).

Obviously, adults' verbal inputs show a proper idiosyncratic and structural meaning. But, which came first, the chicken or the egg? Do children use syntax (or structural verb meaning) to infer idiosyncratic meaning or *vice versa*?

If structural verb meaning relies on decomposition at lexical level, as in Levin & Rappaport Hovav's model, we would expect a lexicon to syntax mapping, while in models in which verb structural meaning is anchored to a syntactic representation of the eventive structures, like the ones of Borer or Hale & Keyser, the mapping should go from syntax to lexical semantics.

Below we will overview two frameworks that account for verb acquisition: the first one is based on Pinker's (1982, 1994) assumptions that verb syntax is bootstrapped by verb semantic features and is named *semantic bootstrapping* (this analysis coincide with the view of Levin & Rappaport Hovav for adult's syntax-semantic interface). The second framework is the *syntactic bootstrapping* (Gleitman 1990) which claims that verb meaning can be bootstrapped only from the syntactic frames. Such a proposal is compatible with the analysis of syntax-semantics interface based on syntactic functional projections that determines the semantic context in which a verb can appear (Borer, Hale & Keyser).

Both frameworks are based on an operation of bootstrapping. The word 'bootstrapping', in fact, is conceived of as a learning process, in which existing knowledge/skills facilitate the learning/acquisition of other kinds of knowledge/skills. The bootstrapping problem in grammar acquisition (as argued in Pinker 1987, 1994) arises because a grammar is a formal system consisting of a set of abstract elements, each of which is defined with respect to other elements.

1.7.1 Semantic Bootstrapping (Pinker)

The basic idea of Pinker is that children can bootstrap the syntax of verbs by using semantic/conceptual information. This hypothesis, called semantic bootstrapping, is inspired by the observation that semantic entities are structurally realized in certain canonical ways (Baker, 1988; Grimshaw, 1979). The basic claim is that children have access to semantically transparent notions such as person, thing, action, agent and patient. These are elements of the

semantic representation of sentences that children hear and use inductively for deriving the sentences' syntactic counterparts (e.g. the syntactic category of words). These approaches invoke the assumption that the appropriate lexical representation of verbs contains information on the syntactic projection of its arguments, making the latter deterministically dependent on the former. Such a view on learning verb meanings is compatible with Levin and Rappaport Hovav's analysis, for which verb meaning (also *structural verb meaning*) is build of lexical primitive predicate in the lexicon and then it is projected into syntax through a set of linking rules. Pinker analysis is based on three main assumptions:

1. The observation learning, although no associative, is fundamental to learn verb meaning.
2. Children have pre-stored conceptual structures that allow the learner to organize her/his perceptual world and to represent it through the language. Furthermore, this conceptual knowledge is well structured: it is not a rich set of hypotheses, but it is a set of few very rich hypotheses.
3. Verb meaning is divided in verbal root and verbal frame: the former is the real meaning comparable to the meaning of nouns (what we have been calling *idiosyncratic meaning*) while the latter is given by the syntactic frame a verb can appear in.

Verb, in his terms, '[…] is ambiguous in a critical way, because in most languages a verb can appear in a family of forms, each with a distinct meaning component, plus a common meaning component that runs throughout the family. For example, many verbs can appear in transitive, intransitive, passive, double-object, prepositional object and other phrases […] we can say that all these forms share the same verb *root.* We can then call the syntactically distinct forms of a given root its *frames.'* (Pinker 1994: pp.395)' (i.e. fig.2).

Fig.2. Matrix of verb forms where each verbal root in the column on the left is marked for its appearance in a given syntactic frame in the upper row. (Pinker 1994)

	Frames					
	NP_	NP_NP	NP_S	NP_PP	NP_NP-PP	NP_NP-S
Roots						
eat	×	×				
move	×	×		×	×	
boil	×	×				
open	×	×				
kill		×				
die	×					
think	×		×	×		
tell		×			×	×
know		×	×	×		
see		×	×	×	×	
look		×		×		

In the figure the meaning of the *x*'s differ along two dimension. The *root meaning* refers to the aspects of meaning that are preserved in a given root across all the frames it appears in (the idiosyncratic meaning).

The *frame meaning* is not inherently linked to the verb root but it is in general linked to a Transitive/Intrasitive construction and would equally apply to *boil*, *melt, freeze, open*. The frame meaning in this sense is what is shared by verbs appertaining to the same syntactic class; that is, what we have called *structural meaning* of a verb.

Pinker 1994 claims that verbal frame could help learners in distinguishing *frame meanings*, that is, what *the water boiled* and *the ball bounced* have in common. But it does not support children in catching the root meaning, that is, the difference between the *water boiled* and the *ball bounced*. Learning just the frame meaning is like learning the '..*perspective* that one adopts relative to an event: whether to focus on one actor or another, one affected entity or another, the cause or the effect' (Pinker 1994: pp. 399).

Linking rules, as the ones proposed by Levin & Rappaport Hovav, become relevant in this approach: only when a root meaning is acquired it can be projected into syntax through a linking rule, and not the opposite, since from the frame meaning it is not possible, following Pinker's reasoning, to perform an inference that allows the catching of the root meaning.

This directionality of acquisition and projection from roots into frames is due to the asymmetry in syntax-semantic interface: 'a grammar is a mechanism that maps a huge set of semantic distinctions onto a small set of syntactic distinctions. […] And because this function is many-to-one, it is not invertible' (Pinker 1994: pp.397).

The root meaning, then, is acquired through observation of the context in which a sentence is produced: the operation of *sentence to world mapping*. He claims that the 'learning through observation' mechanism allows the acquisition of *root meaning*. Anyway, observation learning presents few problems linked to the fact that attending to the situations in which a verb is used is in principle inadequate to learn verb meaning: an event in the world can be described by different verbs uttered by the parents, for example in a situation in which a boy is pushing a car, the parents can say *Mickey is pushing a car*, they can also say *Mickey is moving a car*, since *moving* entails *pushing.* Then, the same situation can be described by different verbs such as *Bill chases Fred* and *Fred is fled by Bill.* Furthermore, mental verbs like *think, guess, suppose, wonder* cannot be acquired directly by observation. In general parents do not invariably use a verb when its perceptual correlates are present.

Pinker claims that these are apparent problems because children cannot learn the meaning of a verb root from a single situation. It would be a very simple associationist view. Pinkers claims that infants observe how a verb is used across multiple situations, they will find situations for example in which the verb *push* is used for instances of pushing without *moving,* or, for the case of paired verbs that describe the same situation like *flee* and *chase,* in which *Bill* can chase Fred even if Fred isn't fleeing but hiding in a garbage can. Children can make hypotheses on the different observational situations in which the same verbal *root* is used, and they can infer the meaning of the sentences in which verbs are found through the attention to the world and the previous knowledge of linguistic items co-occurring in the sentences.

This implies that children can entertain hypotheses about causes, mental states, goals, and speaker's intentions. Gleitman (1994) claims that these hypotheses make the learning task even harder because the high richness of such representational abilities yields a combinatorial explosion of logically possible hypotheses for the child to test. Pinker answers to these criticisms arguing that children own a cognitive sophisticated mechanism for which they produce a small set of rich and structured hypotheses and not a rich set of hypotheses.

Pinker proposes that children have representational machinery available to build the semantic structure. It constitutes the mental representations at work in the observational

context of the sentence to world mapping: the *Universal Lexical Semantics.* It is a computational device analogous to Chomsky's *Universal Grammar* (see Moravscik, 1981; Markman, 1989; Jackendoff 1990). Following Chomsky (1965), children succeed in learning the syntax of a language because their language acquisition circuitry (the *Universal Grammar*) constraints them to hypothesize only certain kinds of grammatical rules and structures (those actually found in human languages), although there are an infinite number of grammars compatible with any finite set of parental sentences. Analogously, the Universal Lexical Semantics (ULS) provides children with a set of structured and rich hypothesis of the type: '*object with shape X', 'object with function Y', 'the agent X who causes an event Y*', but not '*object with shape X or a Buick', 'the agent X who causes the water to boil'.*

Furthermore in the *ULS* there are constraints (similar to bias on nouns' acquisition in Markman, 1989) on how children's lexicon maybe built up, and on how word's meaning may be related to another. Infants, for example, do not posit a particular meaning for a new word if it is identical to some existing word's meaning: a kind of *no-synonyms bias*. Infants, through this bias, can capture soon the difference between *give* and *receive*, by looking for the different context of uses of the two verbs, since they can not be perfect synonyms: they will be looking the case in which *I receive* something even if no one *gave* it to me.

This framework supports the idea of Levin & Rappaport Hovav about the structure of syntax-semantics interface at work in adults. The USL is an acquisitional device formed by few well-structured hypotheses that allow the building of the *lexicon templates* described in Levin & Rappaport Hovav's lexical decomposition that determines the final structural meaning of a verb.

1.7.2 Syntactic Bootstrapping (Gleitman)

Gleitman in 1990 first proposed that children rely on a verb's syntactic subcategorization frame to learn its meaning: infants succeed in learning that *see* means 'perceive visually' because it can appear with a direct object, a clausal complement, or a directional phrase. This position has its roots in Brown (1957) and Katz et al. (1974) who showed empirically how children use grammatical information as a cue to learn certain aspects of word meanings. This idea has been developed along years by different authors (Waxman and Gelman, 1986; Taylor and Gelman, 1989; Gleitman, 1990; Fisher et al., 1994; Blooom, 1994; Gleitman & Gillette,

1995).[24] Since the frameworks of syntactic bootstrapping claims that syntax mediates the process of acquisition of verb, it is compatible with an analysis of the syntax-semantics interface in which the *structural meaning* of a verb is not given in the lexicon but in syntax, what we have been defining as the *constructivist models* (van Hout 1994, 1996; Borer, 1994, 1998; and Ritter and Rosen 1998; Hale & Keyser 1993, 2002).

Gleitman and colleagues founded their analysis of the *syntactic bootstrapping of verb meaning* on the fact that nouns, but not verbs, can be acquired by pairing each sound with a concept inferred from the world circumstances in which that sound occurs. Verb meanings, as argued by Gentner (1982), pose problem for this world-to-word mapping procedure: a verb-mapping model should also be mediated by attention to the syntactic structures in which the relational concepts of verbs are given. The assumptions of this framework are the following:

1. Verbs cannot be learned by observing the situation in which they are used: many verbs refer to overlapping situations and parents do not invariably use a verb when its perceptual correlates are present.
2. Children pass from a *word-to-world* mapping procedure to a *sentence-to-word* mapping procedure, in which the syntactic relevant features of the sentence are the principal actors of the bootstrapping of verb meaning.
3. Children have an innate bias in expecting that a correlation between syntax and semantics hold. Verbs have an argument structure that specifies the number of their arguments. Arguments define participants in the event described by the verb and can be distinguished in terms of the role they play in that event.

Gleitman & Gillette (1995: pp. 417) claims that 'a picture is worth a thousand words, but that's the problem: a thousand words describing the varying aspects of any one picture'. As already argued, the ongoing scene is open to a multitude of linguistic descriptions, and the meaning of a verb is hardly retrieved by simply looking at the scene.

These authors do not postulate any cognitive device analogous to the *Lexical Semantic Universal* Pinker describes. Consequently they claim that the mere observation of the

[24] Along this section we will be referring to version of the syntactic bootstrapping as described by Gleitman (1990), Gleitman & Gillette (1995) and Fisher et al. (1994). For an overview of the differences among authors see Guasti (2002), or Pinker (1994)'s criticisms about the different versions of the syntactic bootstrapping.

environment while a sentence is uttered is not enough, since children should have a very rich system of hypotheses: it would imply a huge computational load for infants that could not easily account for the quick lexical spurt and the absence of mistakes in the produced argument structures. If children had to formulate hypotheses and wait that an utterance had to be framed in different situations, it is not clear how they could produce properly different verb roots at the same time (during the stage of lexical spurt). In their opinion, this sudden switch in children productions, from uttering rare verb forms to use properly many verbal items, raises because a new and strong computational mechanism starts to be at work in language acquisition: syntax.

The observational context plays a fundamental role in the acquisition of verb meaning also for Gleitman and colleagues, but it is available to children in their sentence to world mapping procedure only through the mediation of the powerful 'zoom lens' of syntax: the non-linguistic context is the picture and the syntactic frame in the input is the zoom lens. The 'zoom lens' is the main tool that allows the bootstrapping of verb structural meaning: infants can map the characteristics of the observational context to the structural meaning and infer the idiosyncratic meaning of the verb.

In Gleitman's words: 'In essence our position will be that the set of syntactic formats for a verb provides crucial cues to the verb meanings just because these formats are abstract surface reflexes of the meanings. […] There is very little information in any single syntactic format that is attested for some verb, for that format serves many distinct uses. However, […] the set of subcategorization frames associated with a verb is highly informative about the meaning it conveys. In fact, since the surface forms are the carriers of critical semantic information, the construal of verbs is partly indeterminant without the subcategorization information. Hence, in the end, a successful learning procedure for verb meaning must recruit information from inspection of the many grammatical formats in which each verb participates' (Landau & Gleitman 1985: pp.138-139). Sentence –to-words mapping seems to mitigate many of the problems of word-to-world mapping, including the problem of multiple interpretations.

In this view it is necessary that children already have a basic lexicon of nouns in order to perform the syntactic bootstrapping of verb meaning. For this reason the appearance of verbs is linked to the lexical spurt: when children's lexical dictionary is big enough to be able to infer that the unknown word is a verb. By this stage they can start to analyze the subcategorization frame of verbs from which they will learn the structural meaning. Finally infants can use the

frame meaning as a focus lens on the observational context to acquire the root meaning of the verb.

This last passage is guaranteed by the 3rd assumption above: children have an innate bias in expecting that a correlation between syntax and semantics holds. The relation between syntax and semantics, as noted by Pinker (1994), is from few syntactic structures to many semantic concepts. So, Gleitman claims that at the syntax-semantics interface there is a *correlation* between the two level of linguistic representation: the fact that syntactic structures are fewer, gives to the operation of syntactic bootstrapping a stronger computational power; children can use a small number of frames to discover in the observational context many semantic relations.

The main point of this assumption is the capacity to recruit the argument structure of a verb for determining its meaning. But this hypothesis is strictly related to the statement that children systematically recognize the value of argument structure to figure out global aspects of meaning. Landau & Gleitman (1985) performed an experiment to see whether this information is available in the utterances to which children are exposed. They were analyzing the acquisition of perception verbs by blind children who have restricted access to sensorial observational situation. They noticed that 3 years old blind children could use properly verbs like *look* and *see,* since *look* is active (it involves the deliberate intention to see something) and *see* is not. When asked to touch a chair, but not to look at it, they merely tapped on it, but did not explore it; and when asked to look at the chair, they explored it. Unlike sighted children, blind children take vision terms to refer to haptic perception, when these terms are applied to themselves. Landau & Gleitman presume that blind children use structural information in combination with the extralinguistic context to figure out the meaning of *see* and *look*. If this conjecture is correct, the linguistic input should include the relevant structural information. The authors analyzed the input of one of the mothers and they found that she used *see* and *look* differently from other verbs. For example *see* and *look* were followed by clausal complements, while verbs like *come* and *go* were not (*Look I how do it* vs **I come that you do*). The syntactic environments for *see* and *look* themselves also differed: *look* was used for commands (*Look at this*), while *see* was not (**See this table*). In addition *see, look* and the other verbs were used in a range of different syntactic frames. So, they concluded that the syntactic information was present in the input.

Such a perspective is compatible with the constructivist accounts (van Hout ,1992, 1996; Borer, 1994, 1998; Ritter and Rosen, 1998; Hale & Keyser, 1993, 2002) for which the structural meaning is totally developed in syntax through a functional syntactic projections decomposition: the idiosyncratic meaning (or root meaning) of the verb is like a modifier[25] that works on the top of syntactic representations. As Borer (1994) claims, syntactic bootstrapping theories pattern with her theory of syntax-semantics interface since in the process of acquisition of verb meaning children act like adults do: the syntactic configuration of arguments determine their interpretation and semantics.

In our respect choosing one approach over the other is linked only to the possibility of each framework to account for the systematic behaviors found in the appearance of first verbs. From next chapter on we will be dealing mainly with spontaneous production and comprehension judgment tasks and we will not be able to take a position on syntactic or semantic bootstrapping of verb meaning: the structural verb meaning is the central focus of our analysis and when it appears in children's production the principal interface relations are already acquired. Nevertheless, in the later stages we will be analyzing, clear effects of the syntactic frames are found: the structural verb meaning seems to influence the production of overt arguments (as we will see for the distribution of subjects/object across verb classes in Chapter 2 and 3). Apparently the constructivist approaches and the syntactic bootstrapping models seem to fit with the data we will propose, but this claim is out of the scope of the present work for two main reasons: first because further data are needed about the stage before the lexical spurt that we will not be analyzing here; second, because in later stages lexical-semantic features, linked to the idiosyncratic verb meaning, can account for some stages of the acquisition of aspectual auxiliaries (we will be analyzing it in the 4th Chapter).

1.8 Acquisition at Interfaces

In this chapter we have sketched an overview of the principal theories about the verb structural representations in order to use them as a background of the analysis of first verbs. The lexicon-syntax interface refers to the relations that are given between the lexicon and the

[25] This last observation is compatible with Borer and van Hout analysis, but not with Hale & Keyser's one. These authors give a different status to the verb idiosyncratic meanings, since they propose that lexicon has also an internal structure, which is mapped into functional syntactic projections. To remind their view see section 1.3 and Zubizarreta & Oh (2007) for an overview.

syntactic representation in grammar. The approaches that we have reviewed differ on the way lexical semantic information is mapped into syntax: lexicalist approaches rely on a structured lexicon in which each item is stored in the lexicon with the syntactic relevant subcategorization frames, while constructivist approaches indicate that the lexical elements merely represent idiosyncratic information (like nouns or modifiers) inserted in a syntactic eventive structure that determines the main aspects of verbal meanings.

The verb meaning is given by the interaction between the syntactic frame in which a verb can be found (structural meaning) and the particular relation in the world it represents (idiosyncratic meaning). Children acquiring a language at some point start to produce verb classes that show homogeneous structural relation: structural meaning is already associated to the proper idiosyncratic lexical meaning. Only the analysis of overt early syntax, then, can allow us to perform hypotheses on the way children map lexical meanings in syntactic structures and how lexicon-syntax interface interacts with the acquisition of clausal syntax. We repeat here the considerations that have been proposed in this chapter about the appearance of both the structural and the idiosyncratic meaning.

We have been arguing that the nouns and the verbs imply different mapping procedures: respectively a world to word mapping and a sentence to world mapping. The nouns, in fact, are acquired earlier than verbs, as Gentner (1982)'s analysis has suggested.

Depending on the theoretical approach on lexicon-syntax interface we adopt, we will identify divergent modalities of acquisition for both nominals and verbs. If we adopt a lexicalist approach, the idiosyncratic features are the responsible of the formation of the lexicon-syntax relation in acquisition, if we adopt a constructivist approach we would stress on the role of the structural features.

- ***Idiosyncratic features***:
    - *Acquisition of nominals:* semantic bias on the organization of the perceptual world like hypothesis and bias (Markman 1994) ,(Landau 1992).
    - *Acquisition of verbs:* it is guided by the small set of rich hypothesis on the organization of the perceptual world as available in the cognitive device of the *Universal Lexical Semantics*, which for example do not allow synonyms relation within verbs (Pinker 1994).

- ***Structural features:***
    - *Acquisition of nominals:* the mapping procedure between few morphological/syntactic feature of the NP (mass/count distinction and determiners) and lexical classes (Bloom 1994).
    - *Acquisition of verbs:* it is guided by a mapping procedure between the subcategorization frames of verbs and the semantic root meaning of verbs that refers to a relation in the word. Children create the mapping using also the observational context and the previous linguistic knowledge (Gleitman 1990, Fisher et al.1994).

These two ways of accounting for acquisition of lexicon seem to be irreconcilable, but few more considerations need to be done. Grimshaw (1994) proposes a 'Lexical Reconciliation'. She claims that both type of mediation, the syntactic and semantic ones, are indispensable in the learning process since, as she argues, '…language can convey information about word meaning which is in order of magnitude more informative than observation of the world can be' (Grimshaw, 1994: pp.428), but '..there is no way to save a learner from having to learn *some* word meanings simply form observation' (Grimshaw, 1994: pp. 427). The basic claim of Grimshaw is synthesized in a model called *Reconciliation* that preserves the advantage of both kinds of ideas. One way, she asserts, in which it is possible to combine the essential good affects of both types of mapping is giving them different roles in the learning process:

> 'The semantics to syntax mapping principles provide a predictive mechanism, and the observed structures provide a checking mechanism' (Grimshaw 1994; pp 423).

Grimshaw creates a kind of algorithm in the process of acquisition in which the starting point is the observation of the world and, then, depending on the stage of acquisition, children may formulate some semantic hypotheses that can be confirmed through syntactic structure and *vice versa.*[26]

The principal task of this work is to recognize in acquisition the primitive elements of verb meaning: how children learn structural verb meaning and the influences of the

[26] We will not undergo through the details of this algorithm, we will present it when we will propose a model that share the insight of Grimshaw in Chapter 5. For further details see Grimshaw (1994).

idiosyncratic meaning (if there are) on overt syntactic realization. By these considerations, our purpose is not to foresee which framework of the syntax-semantics interface fits best for both adults and children representation of verb meanings, but how each framework can be used to account for distribution of overt subjects in the spontaneous speech, we will propose in Chapter 2 and 3, and production and comprehension of the auxiliary morphology in Chapter 4.

Children's linguistic behavior is not transparent and reducible to a single pattern. We will be using the assumptions we sketched in this chapter to explain the data about the structural verb meaning in acquisition. We can already say that we will not be able to account for the entire process with a sole framework, but a mixed model will be the natural output, since different pattern can be found in learners depending on the age and on the features of the acquired items.

Chapter 2. Early Subjects and Verb Classes

2.0 Introduction

The first verbs and their θ grids are the key players of this chapter: we will try to outline some of their syntactic and lexical-semantic characteristics in acquisition. Starting from the definition of verb classes we gave in the last chapter, we will identify their occurrences in children's productions: since children do not use verbs as adults do, we start to explore the differences with adults in the production of subjects. We performed a corpus analysis on the first spontaneous productions of four Italian children available on CHILDES (MacWhinney & Snow, 1985) and we analyzed the arguments in the syntactic frames in which first VPs appear.[1] The verb classes will be mainly identified by the characteristics of the overt/null subjects co-occurring with the verbal items and, where available, by the presence of direct objects or other NPs. The first Unaccusatives, Unergatives and Transitives are evaluated on the basis of the distribution of overt subjects in the productions.

The features of early subjects are relevant since children in the meantime are learning or developing syntax. The *pro drop* parameter seems to be correctly set in first Italian productions but the general data we found show that children omit more in the earliest stage than in later stages. Different proposals have been formulated to account for the early null subjects in non *pro-drop* languages: although there are interesting pragmatic and grammatical external proposals, grammatical internal explanations, such as the root null subjects (Rizzi, 2005 a, c; Hyams 2012), still seem to account for the structural features of subject omission. We will be arguing on the availability of grammatical explanations also for Italian in the earliest stages: the structural meaning of verbs seems to be the variable responsible for the overt subject distribution.

The locus of generation of subjects in l-syntax becomes relevant in two directions: on the one hand it may allow us to claim that children project different verb structures for each verb class; on the other hand the l-syntactic features of subjects influence the general data of the distribution of null subjects. Verbal structures alone cannot account for the general data we

[1] The Child Language Data Exchange System (CHILDES) is a corpus established in 1984 by Brian MacWhinney and Catherine Snow to serve as a central repository for first language acquisition data. Its earliest transcripts date from the 1960s, and it now has contents (transcripts, audio, and video) in over 20 languages from 130 different corpora, all of which are publicly available worldwide. (MacWhinney, & Snow, 1985).

found; nevertheless, structural verb meaning still plays a central role in determining the characteristics of the complex interface phenomenon of the distribution of overt subjects in acquisition. Our proposal is that since subject drop is free in Italian, children may drop subjects for pragmatic reasons, as adults do, but if there are some performance limitations at discourse-pragmatic interface, other features linked to the structural projection of arguments can intervene.

In this chapter we will try to discuss the role of l-syntactic features in the distribution of null subjects in early Italian productions. We will start sketching the different proposals that have been made for null subject in non *pro-drop* languages in section 2.1, we will then overview the studies about null subjects in Italian in section 2.2. In section 2.3 we will present the data about the distribution of overt/null arguments in our corpus and in section 2.4 we will outline our proposal to account for the early stages of subject drop in Italian.

2.1 Background studies on overt subject distribution in non *pro-drop* languages

The distribution of null/overt subjects in early productions has been a matter of investigation especially for non pro-drop languages. Children acquiring these languages exhibit null subjects till the age of 3 contrary to what is allowed by the adult grammar.

The type of explanations that have been formulated can be divided into three main categories; grammatical accounts, grammar external accounts and informational structure accounts.

2.1.1 Grammatical accounts

The grammatical internal accounts typically assume that null subject is linked to parameter settings. The differences between child and adult language in literature has often been connected either to mismatches in parameter settings or to maturational issues for which some features of the target language become available later in the process of acquisition.

In order to account for null subjects in a non pro-drop language like English, different explanations have been given; some of them are based on the initial setting of the null subject parameter with a wrong value (Hyams, 1983,1986): the first logical account for a systematic deviant behavior is that the null subject parameter is not properly set. However, the difference in the ratio of null subjects between pro-drop languages like Italian and English (Valian 1991)

show that we are dealing with a different phenomenon: Valian found that children behaved differently with respect to null subjects and also overt pronouns; the English-speaking children showed far fewer null subjects (30% vs. 70% for Italian children) and far more overt pronouns than what would be expected if they were speaking a true pro-drop language.

The alternative could be that the pro-drop parameter is off-line, hence unset, during the first 3 years of life: this means that the grammatical representation of subjects in children's grammar is not UG-constrained as there is no specification of either the obligatoriness (as in English) or optionality (as in Italian) of overt subjects. We would therefore expect haphazard or random behavior in this domain. But this is not the case. As data from Valian (1990), Lorusso (2007) and Serratrice (2005) have shown, null subjects in child Italian have roughly the same frequency and distribution as in the adult grammar: approximately the 70% of subjects are null and they occur in both root and subordinate clauses.

The variants of the wrong value of null-subject parameter explanation are linked to different proposals. One of them is the morphological uniformity (Jaeggli and Hyams, 1988) for which null subjects are licensed in languages with uniformly inflected verbal paradigms as Italian or with uniformly uninflected paradigms as Chinese: while Italian children correctly assume a uniformly inflected (and hence null subject) language, English-speaking children incorrectly assume English is a uniformly uninflected (hence also null subject) language. Thus, children acquiring both types of language have null subjects as a grammatical option, but with different identification properties: Italian null subjects are identified by agreement morphology on the verb while in early English they are identified by a (possibly null) topic, as in all discourse-oriented languages like Chinese (Huang, 1984). Problems with this account are linked to the fact that English children properly use verbal morphology (present and past tense) before exiting the null subject stage (cf. Sano and Hyams, 1994; Valian et al.,1996; Ingham, 1998).

On the same line, other proposals have linked early null subjects with topic drop languages that do not present verbal inflections: on the one side the *Topic Drop hypothesis* for which English children early parameter settings coincides with the positive value for the topic drop as in Chinese; on the other side the *Competing Grammar Hypothesis* (Valian, 1991; Yang, 2002) for which children initially entertain the *pro-drop,* the non *pro-drop,* and the *topic-drop* options on an equal footing, wavering between the space of two grammars (Valian) or three grammars (Yang) until sufficient evidence accrues to favor one over the other.

Still all these proposals cannot account for some structural features of early null subject in English (see Hyams (2012) for a discussion) such:

- Null subjects are root initials.
- Asymmetries between null subjects and null objects[2].
- NSs do not occur in a post *wh-* environment with finite verbs[3].
- NSs do not occur in embedded clauses.
- NSs are heavily skewed towards non-finite contexts, especially root infinitives.

Especially, the co-occurrence with root infinitives has changed the perspective on which parametric option is involved to account for early NSs: whether it is a mere pro-drop/topic-drop parameter or either parametric variation linked to inflection [±finite] features and null elements.

The PRO hypothesis goes in this direction: Sano and Hyams (1994) proposed that the null subject phenomenon is not due to a missetting of the null subject parameter, but rather to the fact that an underspecified Infl (responsible for non-finite root clauses) licenses a PRO in subject position.[4] Nevertheless, this approach fails to explain the consistent numbers of null subjects in finite clause (Hamann and Plunkett 1998).

Rizzi (2005c) proposes that subject drop in early English is an instance of another parameter: the 'root subject drop' (RSD). This principle is based on the fact that a subject may be null in the specifier of the root. These null subjects at the edge of the root are accessible to discourse identification.[5]

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[2] In the Competing Grammar Hypothesis of Wang et al. (1992). there is a proper prediction about the asymmetries between null subjects and objects in English and Chinese. These authors claim that English-speaking children access the Chinese grammar only probabilistically, explaining the different ratio of omission between the two languages. The only difference between English and Chinese is linked to the presence of *there* expletive sentences that will drive children to abandon a Chinese-like grammar. Since *there* sentences are very few in the input, English children mantain both type of grammar till the age of 3. For a discussion on this topic see Yang (2002) and the experimental proofs of Wang et al. (1992).

[3] Valian 1990 finds limited null subjects in post-wh environments. Roeper and Rohrbacher (2000) observe that 95% of post-wh null subjects occur in non-finite (bare verb) sentences while only 5% occur in finite contexts.

[4] We refer here to the general PRO hypothesis in the terms of Sano & Hyams (1994). However, different variants of the hypothesis and different data from V2 languages enrich the sketchy definition presented here. The aim of the present section is to provide an overview of the theories developed about null subjects. For a complete review, see Hyams (2012); Guilfoyle (1984); Kramer (1993); O'Grady et al. (1989); Poeppel and Wexler (1993); Sano and Hyams (1994); Phillips (1995); Weverink, (1989).

[5] The null elements are not *pro* but *nc* (null constant): *nc* is a [- anaphoric, - pronominal, - variable] while *pro* is [- anaphoric, + pronominal, - variable] (Rizzi 2005a).

His idea is that children initially assume a positive value of this parameter under pressure from a limited production system. Root null subjects furthermore are also found in a number of adult languages showing that RSD is a true parametric option:[6] adult English or French also have a restricted subject drop option, so-called 'diary register' drop, discussed in Thrasher (1977), Haegeman (1990), and Rizzi (2005c) and illustrated in (1). The dropped subjects are always root subjects.

(1) a. A very sensible day yesterday. ___ saw noone. __ took the bus to Southwark Bridge.

b ___ walked along.... (Virginia Woolf, Diary, from Haegeman 1990)

c ___ m'accompagne au Mercure, puis à la gare...
'(he) takes me to Mercure, then to the station...'

d ___ me demande si ... je lui eus montré les notes...
'(I) ask myself if ... I would have shown him the notes'
(Paul Léautaud, Le Fléau, Journal Particulier, 1917-1930, pp. 60-70)

(From Haegeman 1990, Rizzi 2005c)

RSD is heavily dependent on an assumption of clausal truncation (Rizzi 1993/1994) and, by hypothesis, on the variation that languages show with respect to the level at which truncation is possible. Rizzi's original truncation hypothesis (Rizzi 1993/1994) held that young children (roughly to age 3) lack the grammatical axiom that the root clause = CP. Accordingly, they may have 'minimal projections', where the adults may not, terminating at the VP or IP (FinP)

[6] RSD receives support from a number of adult languages. Rizzi reports on various languages, such as Levantine Arabic (Kenstowicz 1989), Corsican, and certain varieties of Brazilian Portuguese in which subject drop is limited to main clauses, in contrast to what occurs in "true" NS languages like Italian. A similar pattern is observed in Gruyère Franco Provençal (De Crousaz and Schlonsky 2003), in which subject omission is possible only from initial position, hence neither in wh- contexts or with preposed adjuncts. Rizzi also proposes that Germanic topic drop is an instance of RSD.

level.[7] Given a structure of the left periphery as in (2), English children may have the option to take the IP as the root.[8]

(2) Force … Top … Foc … Fin IP (Rizzi 1997).

RSD seems to account for the structural characteristics of early NSs and, since it represents a different parameter, it is compatible with data coming from other languages that allow various types of subject drop also in adult grammar. In conclusion, the insight of the wrong setting of Null Subject Parameter (Hyams, 1986) is replaced by the empirically more accurate parameterization involved in the choice of the root and the different truncation options.

These grammar internal accounts are based on data coming principally from the analysis of the spontaneous speech of infants. The nature of the NSs, also following the early truncation analysis, is caused by some production limitations that do not allow to have CP=root. But what happens in comprehension? Are NSs accepted by children in the stage in which they are dropping root subjects? In order to answer to this question, Orfitelli and Hyams (2007) and Orfitelli (2008) conducted comprehension experiments to see if English-speaking children (in missing subject stage) also understand and accept null subject sentences in comprehension.

The experimental task is based on the truth value judgment (TVJ) methodology of Crain and McKee (1985). The design of the experiment exploits the fact that in English, null subjects are licensed in imperative, but not typically in declarative contexts (diary drop contexts excepted, as noted above): children had an imperative and a declarative scenario. While in the imperative scenario they were supposed to normally accept the subjectless sentences due to the features of imperatives in English, in the declarative scenario they had to reject the subjectless sentences as adults do. Orfitelli and Hyams found a linear correlation between the production of NSs in children spontaneous speech and the comprehension test results: that is, children still in the NS phase accepted also in comprehension the use of subjectless sentences in declarative context, while children that had already passed the null subject stage in production rejected the declarative subjectless sentences.

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[7] In more recent work, Rizzi (2005a) observes that adult languages also vary in the choice of categories that can be taken as the root. Truncation at FocP gives rise to systems allowing null wh operators, and truncation below ForceP would license null complementizers in declarative (as opposed to interrogative) clauses.

[8] The root being VP in the case of root infinitives (Rizzi 1993/1994).

This experiment confirms that NSs are not only determined by performance or production limitations, but they are also a grammatical option. Nevertheless production limitations are also responsible to account at least indirectly (i.e. truncation) for missing arguments in early child productions. Next section is devoted to the grammar external theories.

2.1.2 Grammar External Accounts

Subject omission can be accounted for in terms of production limitation but it is not grammatically licensed (Bloom, L. 1970; Bloom, P. 1991; Valian 1990, 1991). The strongest claim of these authors is that null subject is not a real grammatical option in child language: subjects are either represented as full NPs or as pronouns and then they are dropped during the production of the sentences as a constraint on the output.[9]

More in details Bloom (1991) claims that lexical subjects, such as full NP like *Teddy Bear,* determine a greater processing load than pronouns; thus, the omission is driven on the basis of the heaviness of the nominal element in subject position. Another connected claim is linked to the characteristics of the beginning vs. end of a given sentence. Bloom asserts that processing load is higher at the beginning of the sentence, since the number of the "yet-to-be" expanded nodes is present in the working memory: so the overload of working memory of the initial part of the sentence determines the higher likelihood of omission.

Bloom (1991) on the basis of the claims above (the heaviness of subject NPs and the higher processing load at the beginning of a sentence), performed an analysis of spontaneous speech of three English children. He found that the VP length (measured in words) was a function of the typology of expression of subjects: the shortest VPs with full lexical subject, the longer with pronouns and the longest were the VPs with subject drop. Therefore, the overload in working memory caused by an heavier subject is balanced with a lower number of nodes in the expansion of the VPs. Similar VP length effects were also found in Valian (1991, 1996): VP length decrease as a function of subject "heaviness".

Interestingly; Hyams and Wexler (1993) found the same VP length effects as a function of the heaviness of the subjects also on the spontaneous speech of several Italian adults. However, these authors argue that it is difficult that Italian adults may have a production limitation as children in the early stage. Also the MLU (Mean Length of Utterances) of the

[9] Hyams & Wexler (1993) define these approaches as the Output Omission Models (OOM).

sentences is crucially different. The VP length effect seems to be linked more to a general economic strategy of production determined by the limited capacity of working memory than to a specific limit in earliest stage.

The claim that lexical NPs are more likely to be dropped than pronouns was also challenged by experimental data from Gerken (1991) and Valian et al. (1996) n which English-speaking children in a elicited imitation task were less likely to repeat pronominal subjects than full NPs.

The comprehension experiment of Orfitelli and Hyams (in section 2.1.1) challenges also the production limitation account since children seem to take null subjects as grammatical also in comprehension.

Although these grammar-external accounts fail to capture the grammatical inherent characteristics of the null subjects phenomenon, they give a great help in understanding the big picture in which also production limitation intervenes in accounting for the performances in the very early stages. The intuition of these accounts about the heaviness of NP/pronouns seems to be at work in different languages and stages: these findings inform on the economic principles at work in the cognitive system in interaction with the computational mechanism of grammar.

2.1.3 Informational Structure Accounts

Null elements (pro, PRO, null topics, null constants etc.) are licensed by certain structural positions and /or functional categories. However, syntax does not determine when a particular subject will be omitted. The informational structure (IS) of the sentence regulates the omission of arguments: that is, the preceding discourse, the situational context including speaker/hearer, and the informational value of the subject among other factors. All languages[10] that allow argument drops have conditions on when the argument can, or must be omitted. Conversely, as we have been arguing in the previous sections, the discourse conditions alone cannot sanction missing arguments: for example the English expletive *it* in adults' grammar is not resulting from any informational structure requirements but it satisfies pure grammatical requirement.

[10] Italian-like pro drop languages, German-like topic drop, Chinese-like topic drop languages (Huang , 1984), or mixed systems such as American Sign Language (Lillo-Martin, 1994).

The first account for null subjects in terms of IS was the one of Greenfield and Smith (1976). These authors argued that subject omission is triggered by a pragmatic tendency to drop old information (elements already given in the discourse) and to produce those elements that provide new, focal information. Subject-object asymmetries are due to the fact that the subjects express old or given information more often than the objects: so the objects are not omitted as the subjects are.

The big claim of these approaches is that children (but also adults) are more likely to drop the arguments that are more prominent in discourse (according to a range of features, including newness, contrast, query, absence, person and animacy) and express those arguments that are less prominent and hence less recoverable from context.

Allen (2000) in her analysis of four Inuktitut speaking children argues that the argument omission can be significantly predicted by the degree of 'informativeness' of an argument (as measured by several variables including *newness, contrast, absence, differentiation in context, and person*). Using similar variables, Serratrice and Sorace (2003) also found some significant discourse/pragmatic effects in the distribution of overt versus null subjects in six Italian-speaking children (ages 1;8 and 3;3), reflecting the distribution of the adult language. Serratrice and Sorace are explicit in assuming that the pragmatic principles operate within the boundaries imposed by the grammar, in this case a *pro-drop* grammar.

This last claim seems to be the most relevant in our respect, since also the IS analysis works within the scope of grammar internal accounts: the set of grammatical relations, derived from the values of the parametric options in a given language, represents the scenario on which the informational structure applies and not *vice versa;* if informational structure were the structure on the top of which grammar would have intervened, we could imagine only context oriented languages in which the grammatical options of a language would almost disappear for the distribution of arguments, but this is not the case.

For instance, subjects in non null subject language are found more with root infinitives than with finite verbs (see Hoekstra and Hyams (1998) for a review of data). On informational grounds, they are not neutral to the hierarchy of functional projections responsible of the agreement morphology; children should be more likely to omit subjects when agreement features are specified on the verb.

A pure informational account also fails in accounting that in many languages, including German, French, Dutch, Flemish, children do not drop subjects in post-wh contexts even

though the *wh*-phrase is focalized while the subject is old information (see for a discussion Rizzi 2005c).

Moreover, there is no IS, discourse or situational factor that explains why languages require expletive subjects such as *it,* but their obligatoriness is linked to grammatical requirements and parametric options. In these respects, Hyams and Wexler (1993) found that early null subjects and expletives are in a complementary relation in English: they found that there is a trade-off over time between null subjects and pronouns in longitudinal perspective. The early omissions (acceptable on IS perspective) are then replaced by overt pronominal elements contradicting an eventual holistic discourse informational view.

When grammars allow null subjects (but not null objects), such as in Italian, no overt grammatical constraints seem to intervene on the omission/expression of subject: in the spontaneous productions, the average of subject drop can be explained in terms of Informational Structure. Next section is devoted to the preliminary studies on null subjects in Italian.

2.2 Background studies on overt subject distribution in Italian

Italian allows null subjects due to the rich verbal morphology that permit their identification through the overt features of person and number. Children from the very early stage fix the *pro-drop* parameter: in their spontaneous speech the production of null subjects is similar to the adults' pattern (Lorusso, 2007, Serratrice 2005).

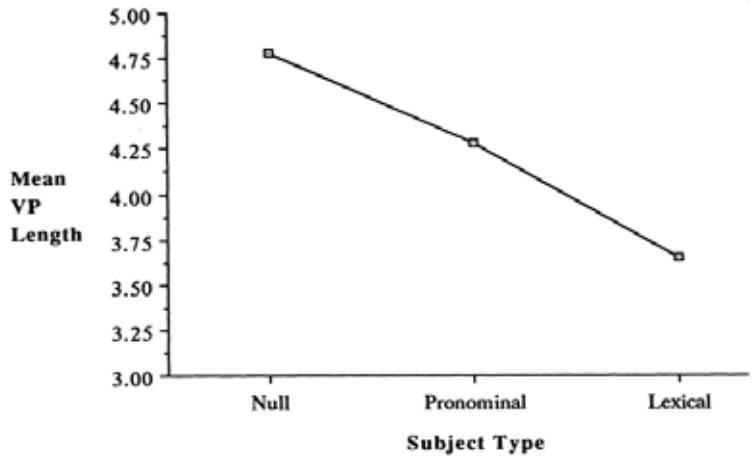
For this reason null subjects in Italian have been a matter of investigation especially in a comparative perspective. Valian (1991), for instance, compared the percentage of early null subjects in English with Italian productions, finding that while in English early null subjects are the 30% in Italian they are the 70%.[11] The difference in ratio between the two languages was taken in Valian's term as a proof of the fact that the two types of null subjects were linked to different phenomena.

Adult Italian has been a topic of study in Hyams and Wexler (1993). They ran a VP length analysis on the spontaneous speech of several Italian adults, they found a VP length

[11] P. Bloom (1991) and N. Hyams and K.Wexler (1993) show a higher rate of subject omission for English-speaking children than Valian obtained, around the 47% instead of the 30%. Anyway, the general argumentation of Valian can be maintained since the general average is quite different between Italian and English children.

effect as a function of subject "heaviness": that is, heavier types of subjects are found with lower mean VP length (figure 1).

Fig.1.VP length as a function of subject type for adult speakers of Italian (Hyams & Wexler 1993)



Hyams and Wexler used this type of data in order to answer to the grammar external account showing that VP length effect is not directly linked to performance limitation in early stage but it is a constant also in adult languages where null subjects are allowed.[12] In our respect, these data are relevant to comprehend the mechanism governing the NSs in Italian since the grammar allows their apparently free omission: performance and working memory consideration can account for subject omission.

Informational structure's considerations seem also to be important in our respect: Serratrice (2005) analyzed Italian children's spontaneous speech:[13] her longitudinal study investigates the distribution of null and overt subjects in the spontaneous production of six Italian-speaking children between the ages of 1 year, 7 months and 3 years, 3 months. The first interesting data is that children produced more overt subjects as their mean length of utterance in words (MLUW) increased.[14]

Behind this general data, Serratrice (2005) argues that as MLUW reaches 2.0, Italian-speaking children can use null and overt subjects in a pragmatically appropriate way: she catalogued subjects on the basis of their informativeness. The arguments that are the most

[12] Hyams and Wexler (1993) insert these data in the general claim that null subjects are a genuine grammatical option in the early stages of children speaking non null subjects language and the performance limitation alone cannot account for it.
[13] Serratrice's (2005) corpus is the same of our analysis: viz., Calambrone in Childes database (see section 2.3).
[14] This data was also found in Lorusso (2005).

informative would be realized overtly and conversely those that are the least informative would be null: she investigated three parameters of informativeness.

First, she tested the hypothesis that person would be a reliable predictor of argument realization: that is, third person subjects are more likely to be realized overtly than first or second persons.

Second, she tested children's sensitivity to the activation state of referents. She performed an analysis only on third person referents, since first and second person referents are always active by definition: the prediction is that the third person subject that were inactive/semi-inactive referents (not active in the discourse-pragmatic context) are more likely to be realized then uninformative ones (active referents in the context).

The last informative value she tested was the disambiguation: the hypothesis relies on the fact that 3rd person active referents with more than one potential antecedent would be realized overtly significantly more frequently than third person active referents that were unambiguous.

The results are very clear: after the MLUW stage of 2.0, 3rd person overt subjects were produced two times more than 1st or 2nd person subjects. Although the pattern is similar at all stages, with lower MLUW the difference between overt 3rd person subjects and others was smaller.

Activation and disambiguation were also found to be significantly associated with argument realization; referents that needed to be activated and/or disambiguated were significantly more likely to be realized overtly than referents that were uninformative with respect to these two features.

These findings pose a challenge to a developmental account that relies exclusively on a generic performance limitation (Bloom, 1990; Valian, 1991). If children are constrained by limited processing capacities, inactive and ambiguous referents should be omitted more frequently than active and unambiguous referents, contrary to what Serratrice found.

The general picture coming from this data is that IS and pragmatic knowledge are at work from the very early stage and, since Italian grammar allows almost free subject drop, children distribute overt subjects depending on their informativeness: informational pragmatic features work on the top of the boundaries of grammar.

Nevertheless, above these general considerations compatible with IS accounts, another grammatical pattern has been claimed to be at work in accounting for overt/null subjects alternation in Italian as proposed by Lorusso, Caprin & Guasti (2005): the loci of generation of subjects in l-syntax influence subject expression/omission. Subjects generated in external

position at l-syntax are more likely to be omitted than the ones generated in internal position. This grammatical approach does not contradict discourse pragmatic findings but both accounts can contribute in explaining NSs distribution in Italian. Since the positive value of the *pro-drop* parameter do not force any overt realization of subjects, two interface relations (and their acquisition) intervene in determining subject drops: on the one side the discourse pragmatic interface (linked to informativeness features) and on the other side the lexicon-syntax interface (linked to the grammatical syntactic features derived by the projection of arguments within the VP shells).

The analysis of corpus we provide in next sections is devoted to find evidences for a grammatical account of the NSs in Italian and to enlarge the perspective of Lorusso et al's (2005) proposal.

2.3 Null subjects in a corpus of spontaneous speech.

The exploration of the features of subject drop in the spontaneous utterances of Italian is based on the analysis of its occurrence depending on the l-syntax of the verbs. Verb classes are the highlights of our perspective. Our aim is to show that grammatical features at work at lexicon-syntax interface intervene in the general phenomenon of subject drop in Italian. To achieve such a goal, in this section we will present the general data about the corpus, the coding of the investigation and the final results.

2.3.1 Corpus

Our analysis of subject distribution along verb classes was performed on a longitudinal corpus of spontaneous productions of four Italian children aged between 18 and 36 months (Calambrone corpus: Diana, Martina, Raffaello, Rosa. (Cipriani et al 1989);[15] CHILDES

[15] Tha corpus of Calambrone was created in 1989 by multidisciplinary team of psychologists of the IRCS "Stella Maris" and computational linguists of the Institute of Computational Linguistic of the CNR (National Research Council) who recorded and transcribed during 5 years (1985/1990) 9 children: 6 normal and 3 with language disorders. Each child was recorded bimonthly and every session lasted from 30 to 45 minutes. The data were collected at home and at the IRCCS "Stella Maris" institute in the town of Calambrone, from which the entire corpus takes its name. Due to its huge amount of transcriptions and the temporal frame represented, Calambrone's corpus has been used in studies on different topics in the acquisition of Italian: article omission (Guasti et. all , 2008), discourse pragmatics (Serratrice, 2005; Serratrice et al., 2004), acquisition of aspect (Lorusso 2007), acquisition of possessives (van der Linden et al. 2005), root infinitives (Schütze, 2004), word order (Gervain et al., 2008) and also in, studies on subject production (Lorusso et al.,2005; Serratrice, 2005).

database. (MacWhinney & Snow, 1985)). We selected 4 of the Calambrone's corpus of normal participants whose videotapings included a period of at least 18 months, since their corpus was useful to perform a longitudinal analysis: Diana, a first-born girl from a family of middle SES, followed from 1;6.07 to 3;0.19 (26 videotapings); Martina, the only daughter from a family of middle SES, followed from 1;7.00 to 3;0.00 (20 videotapings); Raffaello, a first-born boy from a family of high SES: followed from 1;7.08 to 3;3.00 (39 videotapings); and Rosa, a second-born girl from a middle-low SES, followed from 1;3.00 to 3;3.23 (43 videotapings).[16] We resume in table 1 the data about the participants including also the number of files in the CHILDES' database.

Tab.1 Data about the recordings of the participants.

Participants	*Age range*[17]	*MLUW-range*	*Number of Files / Recordings*
Diana	1;8.5–2;6.13	2,2 - 5,5	9
Martina	1;7.18–2;7.15	1,2 - 2,6	13
Raffaello	1;7.07–2;11.20	1,2 – 3,8	17
Rosa	1;10.08–3;3.23	1,2 – 3,2	21

The total amount of children's sentences in the corpus was 17573: the sentences with lexical verbs were 4733.[18] We than obtained a corpus of 2538 declarative finite utterances: imperative, interrogative and negative sentences were discarded. The same operations were performed on adults' corpus:[19] initially we had 4115 sentences resulting from the transcription of 10 files chosen randomly within the children's corpus, then we obtained 1037 declarative utterances with lexical verbs. The data about number of sentences in the corpus is in tab.2.

[16] More information about the corpus are available in Cipriani et al. (1989)
[17] The age ranges are expressed in years, months, and days (years;months.days).
[18] We removed sentences without verbs and the ones with be- copula.
[19] Parents and Caregivers in children's corpus (Calambrone, Childes Cipriani et al. (1989))

Tab.2 Number of the sentences in the corpus of adults and children.

Number of Sentences in the Corpus		
	Adults	*Children*
Total Number of Sentences	4115	17573
Sentences with verbs	2088	4733
Declarative Sentences with Verbs	936	2538

2.3.2 Coding

For each sentence several fields were considered: on the one side, the basic variables of our analysis such as overt subject or verb class; on the other side, longitudinal variables.

In order to be able to capture the longitudinal development of the productions, we noted down for each utterance both the *Age* (between 18 to 36 months) and *mean length of utterance in words* (MLUW). The spontaneous productions show a MLUW range between 1,246 and 5,518. We divided each child's data into three MLUW stages: Stage I (MLUW 1,246 -2,5), Stage II (MLUW 2,5 -3,1) and Stage III (MLUW >3,1).[20]

All verbs were coded for the verb class (Unergatives, Unaccusatives, Transitives) for the presence of forms with auxiliaries (null, auxiliary "be" or "have") and grammatical mood (declarative, imperative, interrogative, negative).[21] Then, we coded the arguments co-occurring with the verbs: subjects (null/overt; preverbal/postverbal), objects (null/overt) and the number of arguments for each sentence.

2.3.3 General data

The present section presents the overall data of subject distribution across verb classes. The first results we propose are the general ones. In tab. 3 we resume the general numbers and percentages of null/overt subjects. Adults and children show a very similar percentage: around

[20] We chose the value of MLUW in order to obtain three homogeneous subgroup. We obtained stage I (MLUW-1= 805 utterances), stage II (MLUW-2=1053 utterances) and stage III MLU-W-3(=680 utterances). Choosing these values we were able to include all children in all developmental stage except Martina who had very low MLUW (the highest was 2,6). See the details about each child in tab.1 above.
[21] We chose just declarative sentences as in tab.2.

70% of null subjects in both groups. These data are compatibles with the ones found in Valian (1991) and Serratrice (2005). Each child shows slight differences with the average percentage (the highest is the 6% difference in Martina) in overt null subject productions, but the data is quite stable across individuals.

Tab.3 General data about the distribution of Null /Overt subjects across children and adults' corpus.

	Null Subjects		Overt Subjects		
	Number	Percentage	Number	Percentage	Total num.
Diana	430	71,67%	170	28,33%	600
Martina	368	66,79%	183	33,21%	551
Raffaello	471	76,34%	146	23,66%	617
Rosa	594	77,14%	176	22,86%	770
Children	**1863**	**73,40%**	**675**	**26,60%**	**2538**
Adults	**688**	**73,50%**	**248**	**26,50%**	**936**

Given the general data, our grammar internal proposal is based on the relation between verb classes and distribution of overt subject. All verbs were considered on the basis of their belonging to the general verb classes of Transitives and Unergatives (external argument subjects) or Unaccusatives (internal argument subjects).

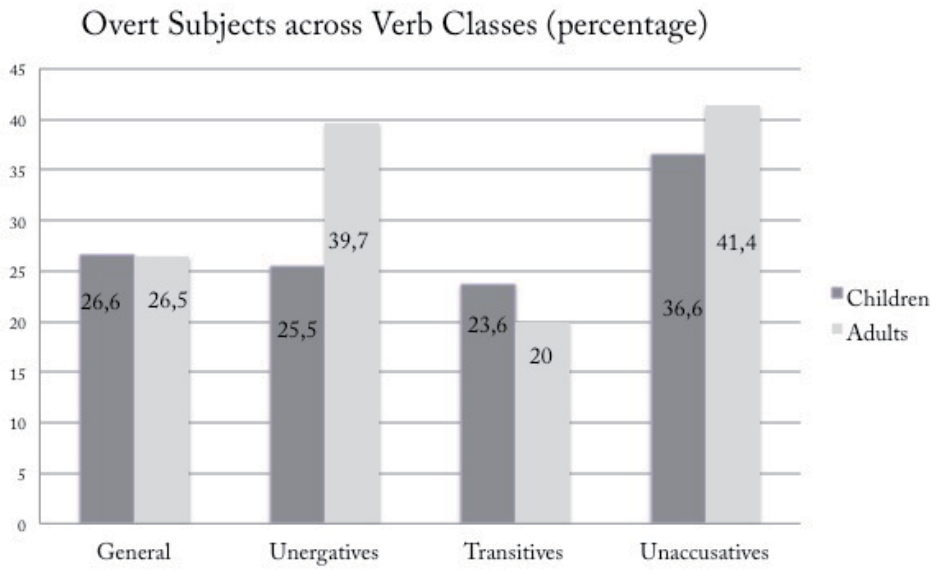
The general results in tab.4 show a tendency in both adults and children in produce less overt subjects with Transitives than with other verb classes. Monoargumental verbs show different patterns: adults produce more overt subject with intransitive (both Unergatives and Unaccusatives), while children produce just more overt subjects with Unaccusatives. Children significantly (p<0, 05) produce more overt subjects with Unaccusative than with other verb classes (χ^2= 36,21 *df=2* for P-Value = 0.00001). If we look at each child, we notice that the pattern of more overt subjects with Unaccusatives is confirmed: the data is statistically significant for Diana (χ^2= 6,04; *df=2* for P-Value = 0.048801), Raffaello (χ^2= 21,16; *df=2* for P-Value = 0.000067) and Rosa (χ^2= 14,8; *df=2* for P-Value = 0.000611), while for Martina there is a strong tendency although not statistically significant, since it is signficant at P <0.10 (χ^2= 3,9; *df=2* for P-Value =0,142274).

Tab.4 General data about the distribution of overt subjects across verb classes in children and adults' productions (absolute numbers and percentage).

	Overt Subject across Verb Classes					
	Unergatives		Transitives		Unaccusatives	
	N.	%	N.	%	N	%
Diana	12	23,53	113	26,40	45	37,19
Martina	24	26,97	115	32,67	44	40,00
Raffaello	22	25,00	70	18,23	54	37,24
Rosa	11	26,19	109	19,43	56	33,53
Children	*69*	***25,56***	*407*	*23,59*	*199*	*36,65*
Adults	*35*	***39,77***	*129*	*20,00*	*84*	*41,38*

The strongest difference between adults and children is in the different use of overt subject with Unergatives which is statistically significant (χ^2= 6,50; *df=1* for P-Value <0.010787). We show this data graphically in fig. 1 where we can see the high difference (more than 14%) in the percentage of overt subject with Unergatives between adults and children.

Fig.1 Chart of the distribution of overt subjects across verb classes in children and adults' productions.



2.3.4 Longitudinal Data

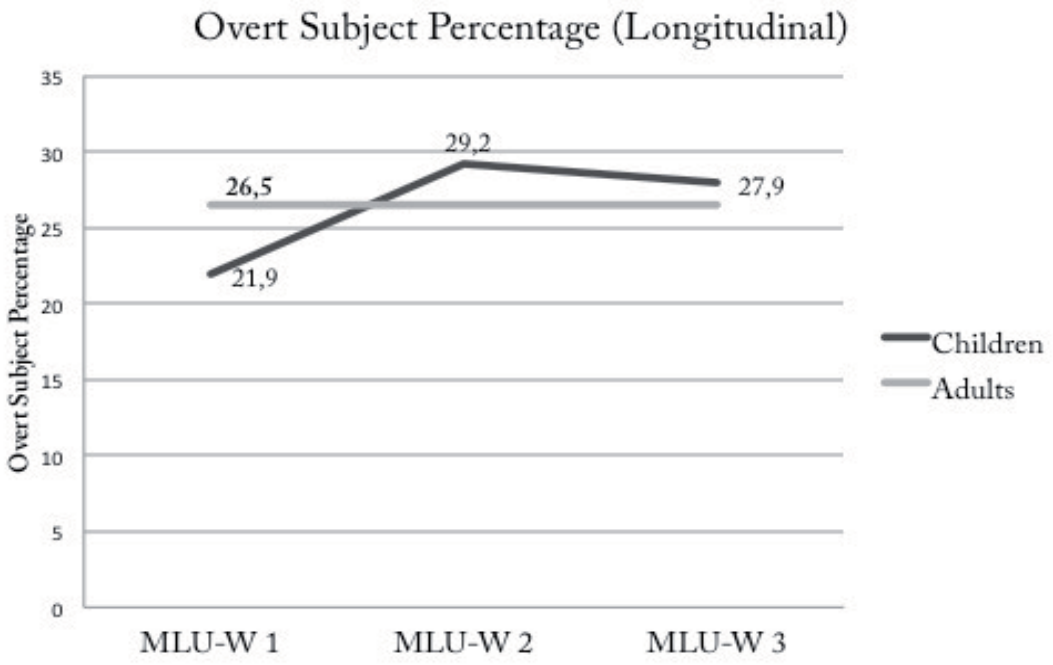
In this section we filter the general data through the introduction of the longitudinal variables. The pattern we have been observing in the general data is not maintained along all the stages found in the corpus. As anticipated in the coding subsection (see footnote 20) we split children's corpus into three macro-groups differing for the value of the Mean Length of Utterances per Word. About the distribution of overt subjects, in stage I (MLUW >2,5) children omit more subjects than in stage II (MLUW 2,5; 31) or III (MLUW> 3,2).

At first stage children produce a statistically significant higher proportion of null subjects than in later stages (together) for (χ^2= 12,82365927; *df=1* for P-Value < 0.000342), The fact that in the very early stage children do not show percentages similar to later stages allow us to think to a different/underspecified grammar to account for. The data in tab 5 are also represented in the chart in fig. 2.

Tab.5 General data about the distribution of Overt subjects across verb classes in children and adults' productions (absolut numbers and percentage).

Overt Subject Distribution Longitudinal						
	Stages					
	I		II		III	
Child	N.	%	N.	%	N.	%
Diana	9	(23,07%)	18	(20,69%)	143	(30,17%)
Martina	82	(28,37%)	101	(38,55%)	__	__
Raffaello	46	(18,78%)	73	(29,67%)	27	(21,43%)
Rosa	40	(17,24%)	116	(25,33%)	20	(25%)
Total	177	(21,99%)	308	(29,25%)	190	27,94

Fig.2 Chart of the distribution of percentages of Overt subjects across different stages.



The distribution of NSs across verb classes is reported in the three different stages of the MLUW in tab. 6. Except the very first stage where the difference in percentage with later stages is confirmed, all children produce more overt subjects with Unaccusatives.

Tab.6 Longitudinal data about the distribution of overt subjects across verb classes in children and adults' productions (absolute numbers and percentage).

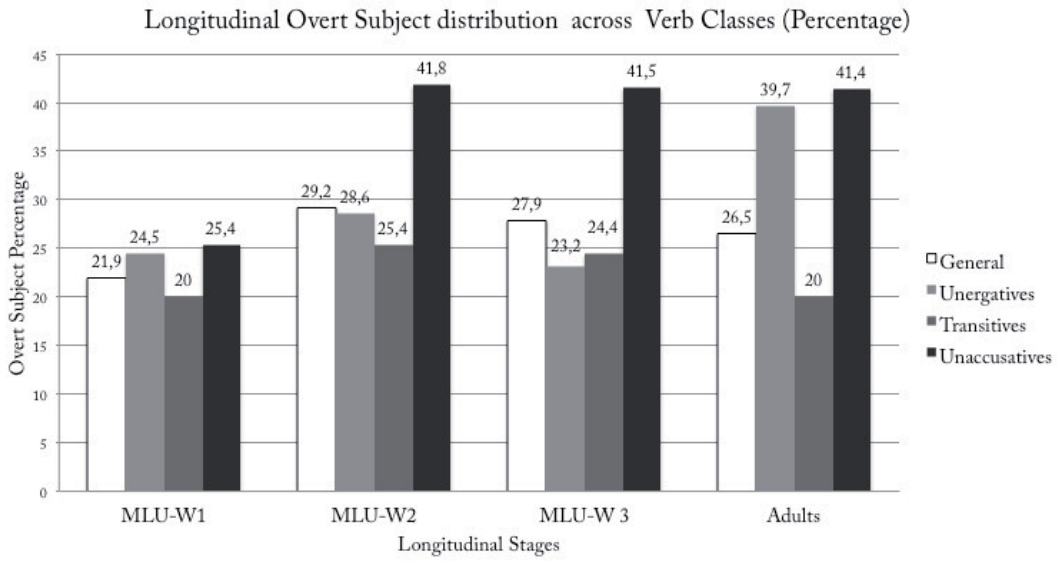
Overt Subject Distribution across Verb Classes (Longitudinal)							
		Stages					
		I		II		III	
Child	Verb Class	N.	%	N.	%	N.	%
Diana	Unergatives	2	(33%)	0	(0%)	10	(27%)
	Transitives	5	(25%)	15	(23%	93	(27%)
	Unaccusatives	2	(15%)	3	(23%)	40	(42%)
Martina	Unergatives	19	(30%)	6	(19%)	__	__
	Transitives	48	(25%)	67	(42%)	__	__
	Unaccusatives	15	(45%)	29	(38%)	__	__
Raffaello	Unergatives	11	(21%)	11	(37%)	0	(0%)
	Transitives	20	(15%)	34	(22%)	16	(17%)
	Unaccusatives	15	(25%)	28	45%	11	(46%)
Rosa	Unergatives	3	(14%)	7	(40%)	0	(0%)
	Transitives	26	(18%)	71	(20%)	12	(21%)
	Unaccusatives	11	(17%)	37	(46%)	8	(35%)
Total	Unergatives	35	(24%)	24	(28%)	10	(23%)
	Transitives	99	(20%)	187	(25%)	121	(24%)
	Unaccusatives	43	(25%)	97	(42%)	59	(42%)

At stage I (MLUW<2,5) we do not find any significant difference on the distribution of subjects with Unaccusatives: overt subjects are produced almost at the same average with all verb classes. Moreover, at stage I there is a strong variation between individuals and verb classes: there is not a clear pattern at work, contrary to what happens on later stages where there is a significant higher use of overt subjects with Unaccusatives.

The differences between stage I and stage II and III is statistically significant for (χ^2= 13,18607742; *df=2* for P-Value <0.00137): that is, only when children's sentences have a MLUW higher than 2,5 there is a preferential distribution of overt subjects with Unaccusatives.

We resume this finding in the chart in fig.3 where the different data of the MLU are compared with adults' data.

Fig.3 Chart of the distribution of percentages of Overt subjects across different stages.



The first clear data is that at MLUW<2,5 (stage I) the average percentage of overt subjects is lower than in adults' production for both Unergatives and Unaccusatives. In later stages (II and III) on the one hand the number of overt subjects with Unaccusatives increases and is similar to adults' percentage; on the other hand overt subjects with Unergatives are systematically fewer than in adults productions (χ^2=4,031636319; *df=1* for P-Value <0.044656). The longitudinal data of overt subjects across verb classes confirm the general trend in fig.2: when MLUW is lower than 2, 5 null subjects are equally distributed across all the verb classes. We can identify in Italian acquisition an early period in which omission is higher then in later periods. The comparison with later stages enlightens that NSs are distributed mainly with intransitive verbs (since on later stages they consistently produce more overt subjects with Unaccusatives).

2.3.5 Null Objects

Our main aim is to show that early null subjects can be linked to grammatical features at work in the lexicon-syntax interface. For the very same reason we also expect to find asymmetries

between subjects and objects. Italian also allows, in particular circumstances, the omission of direct object: a *pro (*or arbitrary *pro)* can be licensed through case assignment by an AgrS in subject position or by a V-head in object position. Different mechanisms are at work to recover the features of the null element: overt verbal morphology for subjects, or a V-governed subject position of a small clause for object as the examples in (3).[22]

(3) a. Ritengo [che *pro* sia simpatico]
'I believe that (he) is nice'
Referential argument

b. Questa musica rende [*pro* allegri]
'This music renders happy ([+pl, +m.])'
arbitrary/generic

c. Il comportamento di Gianni ha reso [*pro* improbabile [che Maria rimanga]]
'Gianni's behavior rendered unlikely that Maria stays'
Nonargumental

(Adapted from Rizzi 1986)

In our respects *pro* in subject position is more likely to be licensed and recovered than object *pro*s, since the latter are limited to very definite structural condition and definite reading (see footnote 22). In our grammatical account, regardless of informational structure, we expect to find an asymmetry between null subjects and objects: that is, fewer null objects than null subjects. The data in tab. 7 shows that the percentage of null objects in children speech is around the 33%, while null subjects are around the 73% (see tab.3): we are dealing with different types of omission.

[22] Rizzi (1986) describes the parametric options of licensing and recovering *pro* in object position across languages. The main claim is that in Italian V can be a case-licenser for *pro* in object position when it is a null expletive subject of a small clause and its referential features (number and person) can be recovered through the same small clause. Nevertheless different types of *pro* are found in different environment: as nonargument, quasiargument and referential-argument. A particular case of object *pro* is the arbitrary /generic one in which also gender number and person can be recovered within the SC. For a complete discussion and analysis of the different types of *pro* we refer to Rizzi (1986) or in terms of weak /strong agreement to Pollock (1989).

Tab.7 General data about the distribution of Null objects in the corpus of children and adults.

	Null Objects	
Child	Number	Percentage
Diana	128	29%
Martina	147	40%
Raffaello	106	27%
Rosa	179	35%
Children	*561*	*33%*
Adults	*93*	*14%*

If we compare adults with children, we find that adults use null objects half of the times (14% against 33%). This is also because children do not omit object only in the cases described by Rizzi (1986) but the general percentage is influenced by clitic omission.[23] Different studies have shown that in early stages, number of clitics is low and their use is delayed (Guasti, 1993/94; Cipriani et al., 1993; Antelmi, 1997). In the examples in (4-7) we report some sentences in which clitic omission occurred in our corpus of spontaneous speech, "0w' indicates that a preverbal object clitic was omitted.[24]

(4) io 0w piglio in tetta # và@w (Diana, 02,06,13, MLUW= 4,718)
Io (lo) piglio in testa
I it (cl-omitted) take into the head
I take it on the head

(5) no 0w conoccio . (Martina, 02,05,21, MLUW=2, 372)
Non (lo) conosco.
(I) Not (it-clitic omitted) know
I do not know it

[23] We will not address here the insight of clitic omission in Italian, we will refer to Tedeschi (2009) for a discussion and experimental proofs of null objects and null clitics as a unique phenomenon and an overview of the different approach to clitic omission: grammatical (Wexler, Gavarró & Torrens 2004) or pragmatic (Serratrice et al 2004).
[24] As in the transcription methods of the corpus of Calambrone in Childes (Cipriani et al., 1989).

(6) anco 0w rotto io ! (Raffaello, 02,00,10, MLUW=1,821)
manco (l'ho) rotto io!
Not even (it-clitic omitted) (have) broken I
I have not even broken it

(7) sennò 0w mando in terra (Rosa, 02,11,30, MLUW=2,591)
Sennò (lo) mando in terra.
Otherwise (it-clitic omitted) send on the floor
Otherwise I will send it on the floor.

So, under the general percentage of direct object drop in children we need to include also the initial missing object clitic stage, so we can understand the difference in percentage between children and adults.

As for NSs, also for null objects we found a longitudinal pattern: all children show an increase in producing overt object across the different MLUW stages as data in tab.8 show.

Tab.8 Longitudinal data about the distribution of null objects across different MLUW stages.

Null Object Distribution Longitudinal						
	Stages					
	I		II		III	
Child	N.	%	N.	%	N.	%
Diana	11	(52%)	32	(44%)	86	(24%)
Martina	98	(50%)	49	(28%)	__	__
Raffaello	64	(45%)	34	(22%)	8	(9%)
Rosa	58	(45%)	107	(32%)	14	(24%
Total	*231*	*(47%)*	*222*	*(30%)*	*108*	*(21%)*

From our perspective, object drop is interesting in comparison with the data about subject drop: the different percentage informs us that we are dealing with different phenomena of argument omission. Our findings confirm the insight behind the claim of Hyams and Wexler (1993, pp.428) who explain that 'the option to drop a specific argument is available only for

subjects'. However in languages where object can be topicalised as Portuguese[25] or V2 as Dutch , objects may be dropped from the initial position. This fits with the empirical data (Hyams & Wexler, 1993; Hyams, 2012). Italian does not pattern with these languages, object drop is limited to few circumstances and in a longitudinal perspective it is also linked to the acquisition of object clitics.

If we try to make a comparison with the subjects of Unaccusatives which share structural properties with direct object, at first sight we can conclude that we are dealing with different phenomena: null subjects with Unaccusatives are around 63,3% (tab.4) while null objects are around 33% (tab.7). Also at stage I where children produce more null objects (47%), the data is not comparable with null subjects with Unaccusative: in MLUW stage I they are higher than in later stages (around 75%). In Italian the asymmetry in the distribution of null arguments between similar structural position within the VPs, such as Unaccusative subjects and direct objects, is linked to the difference in the licensing head and in the recovering mechanism of the null element: the Unaccusative null subjects are structurally licensed and recovered through the agreement with AgrS, while the null direct object by V head or in a Clitic phrase ClP as in the proposal of Sportiche (1996).[26]

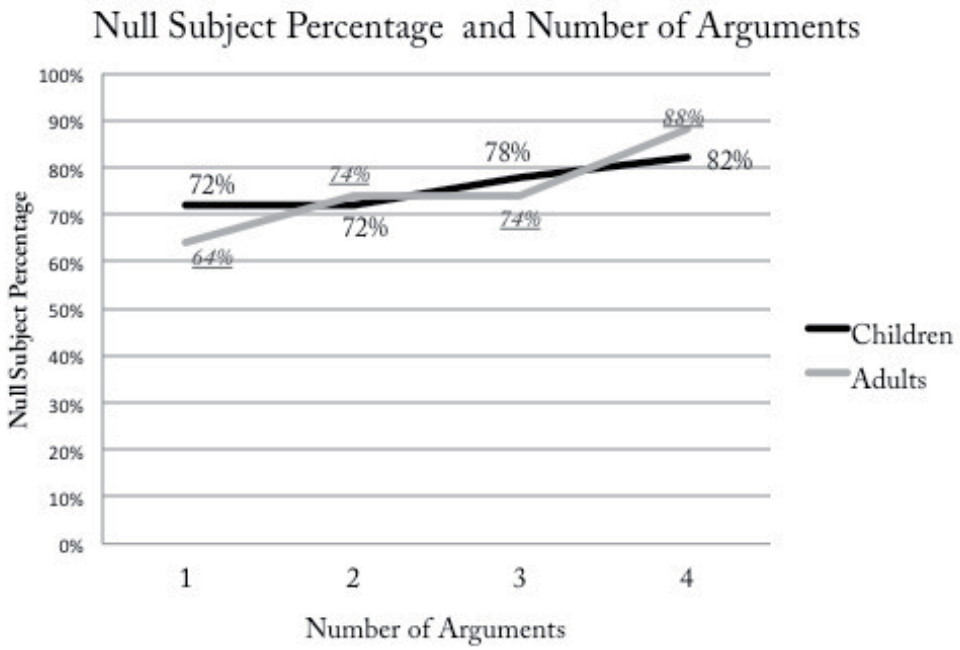
2.3.6 Number of Arguments.

Grammar external accounts emphasize that VP length influences the 'heaviness' of the subjects: the longer VPs present a higher percentage of null subjets. We performed an analysis in which the VP length is calculated on the number of arguments occurring in an utterance. We checked the percentage of distribution of null subjects depending on the number of arguments (DPs, PPs, Aps) projected in each sentence. The difference is not always linked to the MLU of the sentence since the number of arguments does not always coincide with the MLU. We preferred to use arguments instead of the mere MLU in order to check the eventual effect of the presence of syntactic nodes. We found, in line with Hyams and Wexler (1993), that at least in adults' productions a correlation is observed between the number of

[25] See for example the discussion in Raposo (1986) and (Rizzi 1986).
[26] Clitic phrases are In Sportiche's (1996) analysis base-generated as heads of their own functional projection. Clitics select as their specifier an empty DP compatible with the phi-feature specification of the clitic. This selection must be satisfied at LF by moving the designated DP to the specifier position of the clitic projection. Italian that is a no clitic doubling language allows a *pro* in specifier ClP, while clitic doubling language like Spanish a full DP. We will back on clitic doubling language in next chapter.

arguments and the null subjects: as number of arguments grows also the percentage of null subjects get higher as shown in fig. 4.

Fig.4 Chart of the distribution of percentages of overt subjects across different stages.



Children show the same percentage (72%) of null subjects for sentences with one or two arguments (not verbs since also a monoargumental Unaccusative could be catalogued as biargumental for the presence of another argument). Adults, as in Hyams and Wexler, show a dependency on the VP length resulting from the number of arguments: they pass from 64% of monoargumental verbs to 72% of biargumental and so on.

The difference between adults and children is linked to the general tendency found in the null subjects with *monoargumental* and *biargumental* verbs: while adults show a slight difference linked to the number of arguments, children do not. Such a difference is compatible with the data we have been observing above (see tab.4): while adults produce more overt subject with both class of 'standard'[27] monoargumental verbs (Unergative 39,77% and

[27] We use the word 'standard' to refer to the direct arguments projected properly in the VP layer and not to the adjuncts and to oblique or indirect arguments.

Unaccusative 41,38%) than with 'standard' biargumentals (Transitives 20%), children produce significantly more overt subjects with Unaccusatives (36,65%) than with Unergatives (25,56) and Transitives (23,59).

We have to note down that the 74% of sentences was with one or two arguments, so we need more data to confirm the trend in matching null subjects and number of arguments in a sentence, at least in sentences with more than two arguments. Nevertheless we believe, following also other studies like the one of Hyams and Wexler, that there is a correlation between number of argument projected in a sentence and the likelihood of dropping subjects.

In our respect, if we stay within the data of monoargumental and biargumental verbs, we can conclude that while adults produce more null subjects with biargumentals than with monoargumentals, children do not have the same clear pattern since they produce more null subjects with (monoargumental) Unergatives.

2.3.7 Discussion

The general percentage of omission we found in the entire corpus is around the 73% for both children and adults. Similar percentages have been found also for other *pro-drop* languages. Bel (2003) found for Spanish and Catalan the data in tab 9.

Tab.9 Null subjects in Catalan and Spanish (Bel 2003).

	Null subjects in Catalan and Spanish (Bel 2003)	
Children	Null subjects	Overt subjects
Catalan	67,7%(1168)	32,3%(556)
Spanish	67,3% (1630)	32,7%(770)

Catalan adults show few differences with children since they produce following Casanovas (1999) 62% of null subjects. Similar results for Catalan were found for children and adults' corpus also in Cabré Sans & Gavarró (2006).

The main result of our corpus' analysis is that children use subjects in different ways depending on the verb classes. They produce more overt subjects with Unaccusative verbs: that is, they show an ergative pattern in subject omission. Infants treat differently Unaccusative subjects from Unergative ones. This early ergative pattern is typical of child

Italian. Adults, in fact, show a different pattern: they produce more overt subjects with both intransitive classes than with Transitives.

The main syntactic difference is that while Unergative and Transitive verbs project their subject in a position external to the VP, Unaccusative verbs project their subject in a position internal to the VP. Anyway, as we have shown, the comparison with direct objects in terms of rate of omission does not subsist: Unaccusative subjects must have an agreement relation with the overt verbal morphology and, although they can be checked in situ, they can also be moved (and omitted like subjects with Unergatives and Transitives) to the spec of an Inflectional functional projections.[28]

In sum, children show a difference with adults in the percentage of overt subjects with Unergatives: they produce significantly fewer overt subjects than adults. While adults seem to have a production pattern influenced by the informational structure with Unergatives, children may have a pattern partially linked to the locus of generation of the subject. Why is there a similar difference only with Unergatives? Why is pragmatic interface working differently just with Unergatives? Our proposals is that the syntactic derivations implying higher functional heads at the syntax-discourse interface (IP and CP layer) are not adult-like in early stages, as proposed by grammar internal account in non pro-drop languages: considerations on the overt subject position and the linearization of constituents that will be given in next chapter will help us in finding a possible mechanism.

The claim of the existence of peculiarities typical of child grammar is also confirmed by the other main result of our corpus' analysis: when MLUW is lower than 2,5, children produce significantly fewer overt subjects than in later stages. Serratrice (2005) also found that with MLUW <2 children can not use subject in a pragmatic-appropriate way. This result resembles the characteristics of early null subject period for non *pro-drop* languages; that is, although Italian is a *pro-drop* language, there is an early period in which subjects are omitted more than in later period. Such an early difference can be accounted for in different ways: a grammar external explanations could stress on the role of performance limitations, while Informational Structure can not account for this early stage since, as also Serratrice claims, when MLUW is lower than 2 subject distribution can not be accounted for in terms of 'informativeness'.

Our proposal is that also in the very early stages subject omission can be explained in terns of grammar internal factors; that is, verb classes, argument projections, and early syntax may

[28] We will go into details on the word order of verbs and subjects in next chapter.

determine the derivations and the appearance of subjects. Nevertheless, the data we have exposed can not alone support this general claim: we have seen that in the very early stage when overt subjects are fewer in general, also Unaccusatives are produced with a lower rate of overt subjects than in later stage. The locus of generation of subjects alone cannot account for the entire distributional data but it interacts at the interface with other modules of grammar such as the scope-discourse semantic one and the spell-out to phonology. Data about the position of the subject in the sentence will allow us to identify the other mechanisms at work in first verbs: the phonological constraints on the order of constituents, and the discourse constraints that causes movement to Focus/Topic phrases.

2.4 L-synatctic distribution of overt subjects

We have been referring to three big groups of explanations for null subject analysis in non *pro-drop* languages: grammar external accounts, informational structure accounts and grammar internal accounts. We will try to apply the considerations made about non pro-drop languages to Italian data.

Following the statements of the grammar external accounts (*á la* Bloom or Valian), null subjects are produced in terms of performance limitation and they are not grammatically licensed, but the correlation between 'heaviness' of subject and the VP length determines the overall null element distribution: since processing load is higher at the beginning of the sentence, initial position subjects are more likely to be omitted when sentences are longer. In Italian data we found a tendency in omitting more subjects depending on the number of arguments (fig.4), but general data shows that children tend to omit more with Unergatives than with Unaccusatives (both generally monoargumental). The higher percentage of omission with Unergatives seems to be a grammar internal factor that contradicts the predictions of the grammar external account. Nevertheless, in the very early stage (stage I= MLUW<2,5) we have seen (fig.3 , tab.6) that there is no variance between Unergatives and Unaccusatives: grammar external accounts still seem to be suitable to account for the higher overall percentage of null subjects at this stage: null subjects are higher with all verb classes, and no effects of informational structure are recovered in sentences with MLU<2 (Serratrice 2005). These considerations, anyway, needs to be proved on the basis of the presence of sentence-non initial overt subjects (postverbal) that are licit and productive in Italian: in next chapter we will address this clarification.

Informational Structure accounts, as the one of Serratrice, seem to be adequate in explaining children distribution of null subjects as we have been repeating across this chapter (section 2.2): the informativeness of subjects determines its likelihood to be dropped (disambiguation, previous activation into the discourse and the person of the subject) and account for adults' data. The informativeness cannot account for the productions of the first stage in our analysis. For later stages, anyway, the IS accounts seem to be adequate to explain the data, but they can not predict anything about the higher percentage of omission with Unergatives within children's population and in comparison with adults: unquestionably, the subjects with Unergatives are preferentially recovered by the discourse but why should they omit more than adults with this verb class till the age of 3? Considerations on verb class and clausal derivation need to be invoked. Nevertheless IS is at work in languages and is a very powerful tool to analyze argument omission but it works only within the grammar boundaries, (as the data about object omission confirm).

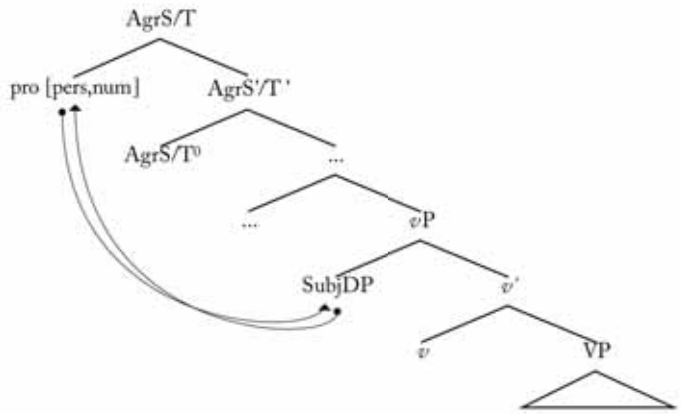
The grammar internal accounts that assume clausal truncation *á la* Rizzi (1993/1994) also could fit with Italian data of the first stage. Children's grammar may involve truncated structure in the sense that missing higher projections in the root of the sentences can occur for cognitive limitation and therefore determine a higher rate of omission of subjects. However, talking about truncated structure just on the basis of the very general data we showed seems to be quite hazardous and merely speculative, nevertheless the maturational insight of the grammar internal account seems to be relevant in our respect: that is, early cognitive limitations may be translated in grammatical options (under some parametric restrictions) and give rise to grammatical detectable effects. We have seen than in later stages the syntax of verb classes seems to influence the computations that lead to overt/null subjects' distribution. At the very early stage these computations may interact with other syntactic mechanism not totally developed or simply not influencing the output at spell-out.

The mechanism of derivation of clausal subjects from different l-syntactic configurations is determined by the operation of φ feature checking in a T or AgrS projection[29] that could be determined both by a movement to the agreement projection or by a probe. Unergatives and Transitives project their arguments in an external position; that is, in the agent position in the

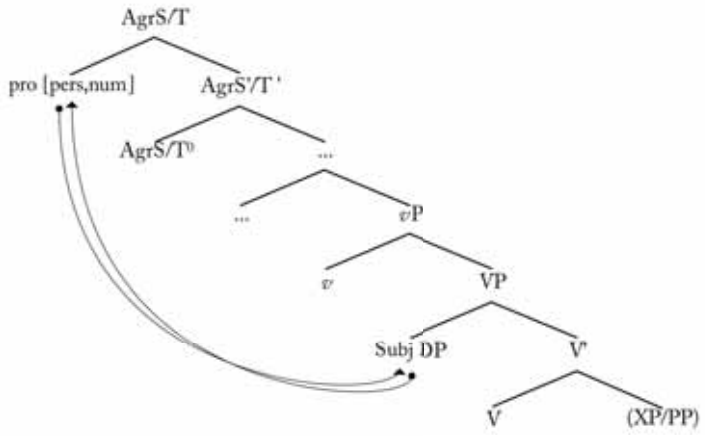
[29] For expositional reasons we will not go into details of the different projections responsible of the feature checking in the TP layer, for simplicity we will be using here a generic T/AgrS projection.

spec of *v*P shell[30] (8), while Unaccusatives do not have any spec in the *v*P and project their argument in the object position within the VP (9).

(8) Subject's feature checking for Transitive and Unergative



(9) Subject's feature checking for Unaccusatives[31]



Null subjects are possible only after the feature checking in an AgrS projection: Unergative and Transitive subjects (8) need to move to AgrSP to check the *φ* features and to receive Case.

[30] The lexical syntactic structure we are adopting here is a simplified version of the Hale & Keyser'sone: the main relation we need to represent here is the different locus of generation of subjects in an optic of Larsonian VP shells in which the higher verbal projection has the properties of the light verbs *v*P as in Hale & Keyser (1993), Chomsky (1995).

[31] We use here a representation *á la* Hale & Keyser, in which the internal argument is in the spc position of the lower VP shell.

Unaccusatives also need to check their *φ* features at AgrsP but they can also receive case or being licensed as direct objects in a functional projection lower than the TP (Belletti, 1988, 2001) or *in situ* within the VP.

The fact that also Unaccusatives show in the very early stage a higher percentage of null subjects than in later stages could be linked to the same phenomenon we observed about object drop. In stage I, when MLU is <2,5 children omit more subjects with Unaccusatives than in later stages but they also omit more direct objects than in later stage. In the very early stage we can imagine more null Unaccusative subjects and more null direct objects due to the missing overt clitic;[32] as we sketched in section 2.3.5 we can imagine that a Clitic Phrase, with no overt phonetic element (see footnote 26) can license a null *pro* in object position. So part of the data about the very early stage could also be linked to grammatical factors strictly dependent on the loci of generation of the subject plus some effects linked to the difference of parametric options for licensing a *pro* in object position.

Although children omit subjects with Unergatives on the basis of 'informativeness' (Serratrice 2005) as adults, they still produce more null subjects with Unergatives than their parents: child grammar probably licenses null subjects in syntactic environments where adults do not or, still for computational limitation, children may have some reduced derivation (not) involving the projections responsible of the informative prominence in the sentence (viz., TopicPs or FocusPs).

At this point of our general reasoning, we miss one big piece of the puzzle: the fact that Italian allows free inversion of arguments. Since in Italian new information is generally presented at the end of the sentence while old information on the left, the position in which overt subjects are expressed can help us in enlightening the interaction between the lexicon-syntax interface and the scope discourse-semantic interface. Furthermore, the linearization of constituents involves other interface relations: the syntax-phonology interface.

Next chapter is devoted to the analysis of the position of overt subjects in order to clarify the picture of the features of child grammar at work in early verbal productions in which different interface effects overlap themselves.

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[32] This is a mere speculation. We are referring here to the *ne*-clitization available for Unaccusative subjects: the *ne* omission with Unaccusative should be analyzed in comparison with the wider phenomenon of accusative clitics. The suggestion is linked to the presence of some functional projections that parametrically could license a null *pro* in the very early stage for internal argument. Further investigations and considerations need to be performed on this respect in order to achieve any result.

Chapter 3. Linearization and Overt Subject Position

3.0 Introduction

We have been defining the meaning encoded in the structural configuration of the VP layer as the *structural verb meaning*: it interacts with properties of the scope-discourse semantic positions assigned in the CP layer as interrogatives, topics, focus, relatives etc. When children start to project arguments at the lexicon-syntax interface, they need to associate each argument to the proper scope-discourse semantic interpretation: to move it to a criterial position where scope-discourse semantic features are checked (Chomsky, 2001; Rizzi 1997, 2006a).[1] The chains between criterial and thematic positions have to include an intermediate position in the inflectional layer where case and agreement are checked.

Children show a different pattern of distribution of overt subjects depending on the age and on the verb class. The loci of generation of the subject alone can not account for the rate of omission, but some considerations about the scope-discourse semantic features of subjects need to be added. Preverbal subjects usually involve an interpretation of topic/old information, while postverbal subjects focus/new information. After children project arguments within the VP layer, they move them to a criterial position that can be post or pre verbal in overt syntax.

We propose a longitudinal analysis of the corpus of spontaneous speech in which we check the overt subject position across verb classes: the main purpose is to find any pattern on the distribution of A (A′)-chain between the theta and criterial position in child grammar. The preferential derivation to some criterial position will allow us to account for null subjects in terms of grammar internal account: for example, we will contrast the higher rate of null subjects with Unergatives in the early stages with the preferential preverbal position of subjects found with this verb class (or the unfamiliarity with postverbal subjects).

The overt subject position has implications not only at the scope-discourse semantic interface but also at syntax-phonology interface. Chomsky (2000, 2001) suggests that the mapping between syntax and phonology (Spell-out) takes place at various points in the course of

[1] Even though we have been often using a feature checking descriptive analysis, the use of criterion is also compatible to our view (Rizzi, 1991, 1997; Haegeman, 1994) since we are dealing with a macro-syntactic phenomenon of acquisition that does not force us to take a theoretical position on that respect. It is indifferent to us to say that a movement satisfies a Topic-Criterion or to check Topic features. It is important in our respect to be able to describe when and if children can create a an A/A' chain involving an NP projected in the θ grid.

the derivation rather than at a single point, as in traditional models. Although spell-out may establish relations among syntactic units such as the determination of phonological phrasing, it mainly sets the word order linearization. We suggest that the differences in the domain chosen by children for the spell-out at the different stages of acquisition determine the divergences found in the distribution of overt subjects in the corpus. Our grammatical account is based on the hypothesis that the projections at lexicon-syntax are spelt out before the scope-discourse features are fully checked: spell out domain may be lower than CP in early stages for production limitation at syntax-phonology interface (very similarly to of truncation hypothesis).

The findings about the distribution of overt preverbal subjects with Unaccusatives will also allow us to reject the A-Chain Deficit Hypothesis (ACDH) (Borer and Wexler, 1987) reformulated in the minimalist terms of the Universal Phase Requirement (UPC) analysis of Wexler (2004), for which children are unable to produce A-chain with Unaccusatives or in minimalist terms, since the Unaccusative *v*Ps are phase (spell-out domain) in child grammar they do not check the subject features at TP/AgrS.

Our reasoning will lead us to claim that the structural meaning of verbs, as it is read off from the VP syntactic structure, seems to be properly acquired by children from the very early stage. The differences with adults are determined by the interaction with other interfaces and by an early production limitation. In section 3.1 we provide a review of the analysis of subject position, in section 3.2 we introduce the data about overt subjects and verb classes in the corpus. In section 3.3 a review of cross-linguistic and cross-population data on linearization is depicted. In the last three sections we will recap the data on the postverbal subjects (section 3.4), the preverbal subjects (including few notes on the acquisition of A-chain in section 3.5), and a longitudinal overview of subject distribution (section 3.6).

3.1 Subject position and Scope-Discourse Semantics

Null Subjects languages like Italian, Spanish, Catalan or Peninsular Portuguese can have silent pronouns such as *pro*. The existence of *pro* is traditionally linked to the fact that in these languages it is also possible to have free inversion of overt subjects: that is, preverbal (SV) or postverbal (VS) subjects.[2] We will try to sketch few considerations on the structural position of overt SV and VS subjects.

[2] We are assuming the existence of *pro* as [-anaphoric, +pronominal] in the general terms of Rizzi (1986). Nevertheless there are modern approaches (Holmberg, 2005; Barbosa, 2009) that claim that in a theory that states the existence of interpretable and uninterpretable features such as Chomsky's (1995), the

The position of *pro* is generally assumed to be preverbal: different diagnostics have been used to strengthen this prediction. Burzio (1986) used existential constructions (1), where only postverbal subjects (1b) are allowed, to show that null subjects are not allowed in these constructions as overt preverbal subjects.

(1) **a.** ***Io** ci sono alla festa.
b. Ci sono **io** alla festa.
c.*Ci sono *pro* alla festa.
I there am I at-the party

Rizzi (1986) adds that while postverbal subjects cannot license floated quantifier (2b) *pro*, like preverbal subjects, can do it (2a-c).

(2) a. **I soldati** sono tutti andati via
The soldiers are (all) gone away
b. * sono tutti andati via **i soldati**
Are all gone away the soldiers
c. Sono tutti andati via.
(pro) are all gone away
'All the soldiers have gone away'

Cardinaletti (1997,2004) proposes that *pro* works like 'weak' pronouns in the sense of Cardinaletti & Starke, (1994): *pro* patterns with the Italian weak pronouns *egli/ella* (=he/she) and not with the strong ones *lei/lui* or the full DPs. Like *pro, egli* doesn't allow coordination (3) or modification (4), it can not be used in postverbal context as in (5).[3]

existence of *pro* is redundant since the set of ϕ features in T (Agr) is interpretable in Null-Subject Languages: Agr is a referential, definite pronoun, albeit a pronoun phonologically expressed as an affix. As such, Agr is also assigned a subject theta-role, possibly by virtue of heading a chain whose foot is in vP, receiving the relevant theta-role. For a review see, Roberts & Holmberg (2010).

[3] To confirm the preverbal position of *pro* Cardinaletti (1997) also compares the distribution of *pro* with other weak pronouns such as *il* in French. She also analyzes agreement phenomena in Central Italian dialects in which postverbal subjects do not agree with the verbal morphology in number, while *pro* needs always to agree with verbs.

(3) a.*Anche **egli** ha dichiarato la sua disponibilità.
Also he has declared the his availability
b. Anche **lui** ha dichiarato la sua disponibilità.
Also he has declared the his availability
'He also declared his availability'

(4) a. ***Egli** e suo fratello hanno dichiarato la propria disponibilità
He (weak) and his brother have declared the their availability
b. **Lui** e suo fratello hanno dichiarato la propria disponibiità
He (strong) and his brother have declared the their availability
'He and his brother declared their availability'.

(5) a. *Ha aderito egli
has adered he $_{weak}$.
b. Ha aderito lui.
has adered he $_{strong}$.
'He has adered'.
(adapted from Cardinaletti 1997)

Since *pro* is a weak pronouns (like *egli* and *il*) and no element proves that *pro* occurs in the thematic position, Cardinaletti concludes that it must move to a Case-checking specifier position before *spell-out* : that is, to an AGrS projection.

Preverbal overt subjects in null subject language are then proposed to be a sort of adjunct occurring in a sentence-peripheral A' position: some authors claims that such a position is an adjoined to AgrSP (Moro, 1993; Barbosa, 1995), while others take it to be a higher Topic position (Benincà & Cinque 1985). This implies that preverbal overt subject co-occurs with a resumptive *pro:* a null subject is present in every sentence. The logic that these authors use is that overt preverbal subjects are more similar to dislocated element than to postverbal subjects. Nevertheless, the left dislocation hypothesis seems to fail to account for many evidences.[4] The most clear is linked to the distribution of weak pronouns that can not occur in a left-disclocated

[4] Cardinaletti cites contrasts in Aux to Comp construction (Rizzi 1982) and complementizer deletion constructions (Poletto 2001) which disallow left-dislocations but admit full subjects, as well as weak pronominal subjects.

position as proposed by Cardinaletti's in the contrast between (6) and (7): while weak pronouns can not precede another dislocated element (6) strong pronouns can precede it (7).[5]

(6) *Egli a Gianni [*pro* non gli ha parlato ancora].
He to Gianni [he] not to-him has spoken yet
'He has not yet spoken to Gianni'

(7) Piero a Gianni [*pro* non gli ha parlato ancora].
Piero to Gianni [he] not to-him has spoken yet
'Piero has not yet spoken to Gianni'

Cardinaletti (2004) proposes two subject positions for preverbal subjects in the left periphery of the Infectional domain: the higher one is the specifier of what she calls SubjP that hosts the subject of predications, the lower one is the specifier of the AgrSP that hosts the grammatical subjects. While in AgrSP ϕ features and nominative case are checked, in SubjP the subject-of-predicate feature is checked. The latter feature is a discourse-oriented feature: when it is not checked in a sentence, the subject of predication is taken to be identical to the one of the previous clause:[6] the preverbal dative experiencer with Unaccusatives checks in SubjP.[7]

---

[5] Although strong pronoun/full DP subjects like *Piero* in (7) in the main text can be left-dislocated, they can also be found in a position 'internal' to the sentence as in (1a) and (2a) in this footnote, where the contrast with (1b) and (2b) confirms the internal status (not left –dislocated) of the DP *Piero*.

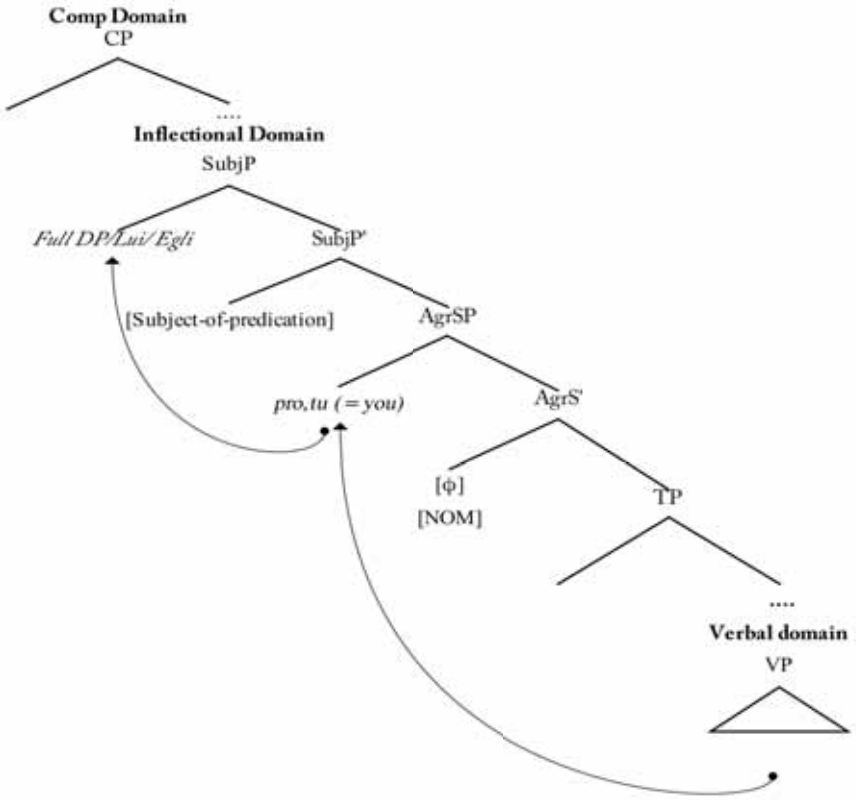
(1) Aux to Comp (Rizzi 1982)
a. Avendo Piero telefonato a Maria …
Having Gianni called Maria
b. *Avendo a Roma vissuto per venti anni, conosce un po' tuttti
Having in Rome (he) lived for twenty years, (he) knows almost everybody
(2) Complementizer-deletion (Poletto 2001)
a. Credevo Piero avesse telefonato a Maria
(I) believed Piero had called Maria
b. ?? Credevo a Roma Piero avesse vissuto per vent'anni
(I) believed in Roma Piero had lived twenty years.

[6] Cardinaletti (2004) provides a semantic analysis which allows to distinguish the subject-of-predication features also from the EPP (Extended Projection Principle (Chomsky1981)) requirements that are not satisfied mainly in SubjP and for which she postulates another dedicated head (EPP Phrase).

[7] Cardinaletti (1997/2004) implements Belletti & Rizzi (1988)'s proposal that the dative experience occupies the preverbal subject position. In spec AgrSP there is a *pro*, dative preverbal moves to SubjP.

(3) [subjP A Gianni$_k$ [AgrSP *pro*$_j$ [VP piace la musica$_j$ t$_k$]]]
To Gianni pleases the music
'Gianni likes Music'

(8) [$_{SubjP}$ Piero, lui, egli , [$_{AgrSP}$ *pro*, tu(=you[8])$_{weak}$[TP…]]]



Preverbal overt subjects share properties with topics but they are not in a proper criterial position in the C layer. The subject-of-predication feature is responsible to their topic-like reading in Cardinaletti's terms.

Rizzi (2005b) is more precise about this intermediate status of overt preverbal subjects: 'A subject shares with a topic the prominence related to the fact that the described event is presented as being about that argument ("aboutness"); it differs from a topic […] in that it does not require the discourse-related property ...'(Rizzi. 2005b: pp.213). So while in TopicP aboutness and d-linking are checked, in SubjP just aboutness is checked (9).

(9) Topic: [+aboutness] [+D-linking]
Subject: [+aboutness]

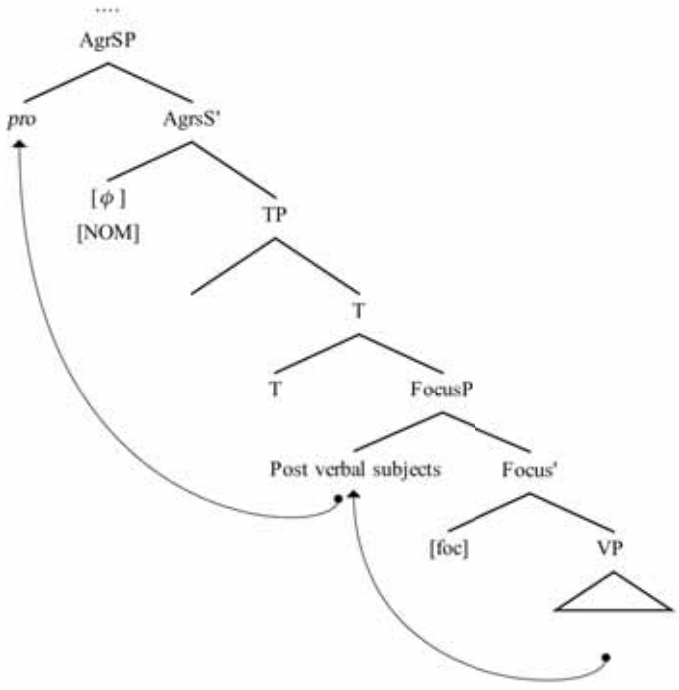
[8] Cardinaletti refers here to the embedded clause with conjunctive verbal items, the second singular person pronouns use is forced by the limited variation in the conjunctive singular persons derivational morphology in Italian. In this sense *you* works like an expletive.

In our respect, preverbal overt subjects in child language determines a movement to an higher position than the sentences with null subjects, since the criterial feature of [aboutness/subject-of-predication] triggers the movement (as last resort, for crirerial interface requirements in terms of Rizzi 2005c, 2006b) to SubjP.

Postverbal subjects, due to their position within the Sentence, are interpreted as new information. A Focus projection is then identified in the lower part of the IP or in the higher part of VP where scope-discourse focus features can be checked. A FocusP occurs directly over the VP layer (Belletti, 1998, 2001, 2004; Belletti & Shlonsky,1995; Bianchi & Belletti, 2014) where post-verbal subjects can check their [+foc] feature (10).

Belletti's account is more complex than the simplified representation we give in (10), she proposes two position where scope –discourse [foc] features can be checked depending on the characteristics of the type of DP (locus of generation and definiteness) that moves from VP to FocusP.[9]

(10)



[9] We will provide a detailed analysis in section 3.4. Belletti's analysis of postverbal subject with Unaccusatives will be one the central theoretical point of our analysis of overt subject distribution.

In our perspective, it is relevant to notice that both preverbal and postverbal subjects need to check scope-discourse semantic features, even though they are not checked in the CP domain. Derivational movements and consequent overt syntactic realization are 'last resort' in the sense that they are not optional and they have to be triggered by interface effects: checking agreement or scope-discourse features.

In Chapter 2 we found that children omit more subjects with Unergatives than with Unaccusatives. To account for this general difference we propose in next section an analysis on the overt subject position in children's spontaneous speech: we want to check how the lexicon-interface features interact with the scope-discourse semantics in determining overt subject position in child language.

3.2 Overt subject position in the corpus

Within the corpus[10] of Calambrone of spontaneous speech we checked the linearization of overt subjects and verbs: that is, the distribution of preverbal and postverbal subjects across verb classes and across the stages of acquisition.

3.2.1 General data

In this section we propose the overall data about the percentage of preverbal and postverbal subjects across verb classes. In tab.1 we can see that the general tendency is producing preverbal subjects SV with Unergatives and Transitives and postverbal subjects with Unaccusatives (tab.1).

[10] Check section 2.3 for information about the corpus of sentences and the methodologies of coding we used for our analysis.

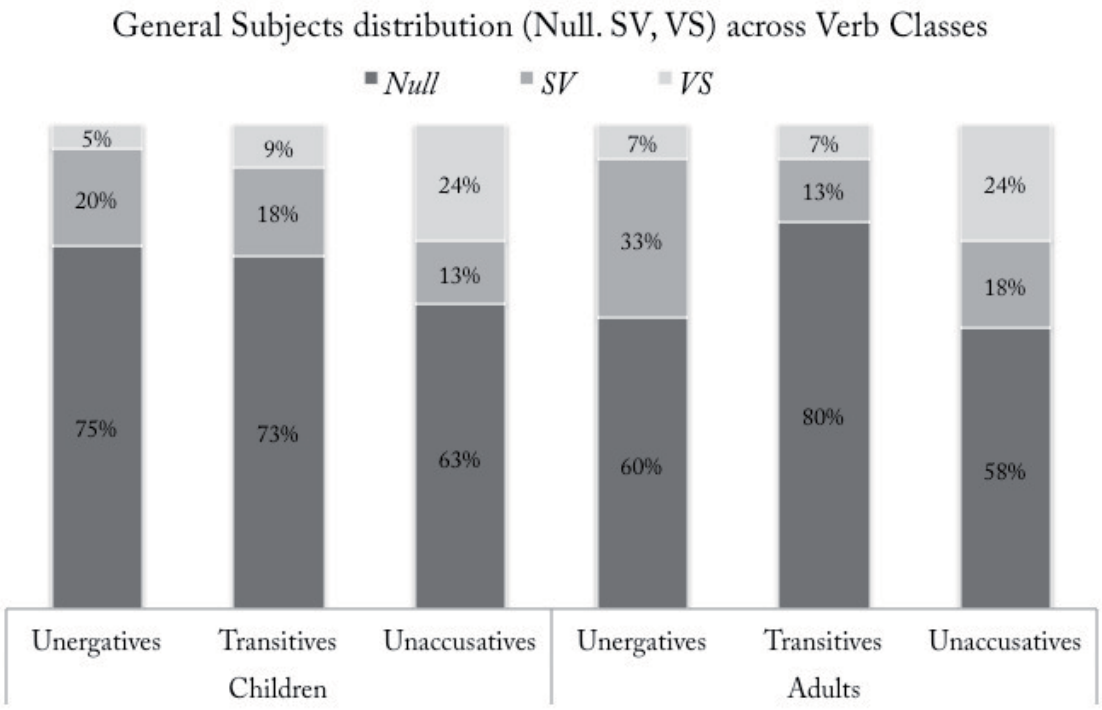
Tab.1 General data about the distribution of postverbal and preverbal subjects across verb classes in children and adults' productions (absolute numbers and percentage).

	Overt Subject Position across Verb Classes					
	Unergatives		Transitives		Unaccusatives	
	SV	VS	SV	VS	SV	VS
Diana	7 (58,3%)	5 (41,7%)	113 (57,4%)	84 (42,6%)	12 (26,7%)	33 (73,3%)
Martina	19(79,2%)	5 (20,8%)	84 (73 %)	31 (27%)	16 (36,4%)	28 (63,6%)
Raffaello	21 (95,5%)	1(4,5%)	45 (64,3%)	25 (35,7%)	20 (37%)	34 (63%)
Rosa	8 (72,7%)	3 (27,3%)	77 (70,6%)	32 (29,4%)	21 (37,5%)	35 (62,5%)
Children	*55 (79,7%)*	*14 (20,3%)*	*319 (65%)*	*117 (35%)*	*69 (34,7%)*	*130 (65,3%)*
Adults	*29 (76,7%)*	*6 (20,3%)*	*81 (71,3%)*	*48 (28,7%)*	*36 (34,7%)*	*48 (65,3%)*

The general data is quite clear: all children and adults show a pattern of preferential SV order with Unergatives and VS for Unaccusatives. Furthermore the percentages are very similar: both children and adults use in around the 70% of cases preverbal subjects for external arguments, while in the 65% of cases postverbal subjects for internal arguments. This distribution is statistically significant for Children for $p<0,05$ (χ^2= 41,80107122 *df=1* for P-Value = 0.00001) and Adults (χ^2= 15,948 *df=1* for P-Value = 0,000065). Furthermore each child show a statistically significant preference ($p< 0,05$) for preverbals with Unergatives and postverbals with Unaccusatives: Diana (χ^2= 4,275 *df=1* for P-Value =0,038677), Martina (χ^2= 11,39 *df=1* for P-Value =0.000738), Raffaello (χ^2= 9,446538893 *df=1* for P-Value = 0.002116) and Rosa (χ^2= 4,6476 *df=1* for P-Value =0,031097).

We present in fig.1 the data about overt subject position partnered with the data about omission presented in last chapter. In children's data, when subjects are expressed preferentially in a postverbal position, there are fewer null subjects. In adults, overt subjects are related to verb class: no relation between position and omission (Unergatives present almost the same number of null subjects with Unaccusatives but different prevalent position).

Fig.1 Chart of the percentage of distribution of null / overt subjects identified for they clausal position .



We can acknowledge that both children and adults show a tendency in producing systematic different overt subject position depending on the loci of generation of the subject within the VP layers, we will introduce the longitudinal variables in next section.

3.2.2 Longitudinal data

The same pattern of subject position across verb classes is found in all stages of the longitudinal analysis. At every stage in stage I (MLUW <2,5) II (MLUW 2,5; 3,1) or III (MLUW> 3,2), children produce preferential preverbal subjects with Unergatives and Transitives, and postverbal with Unaccusatives. Longitudinal data are presented in tab.2

Tab.2 Longitudinal data about the distribution of postverbal and preverbal subjects across verb classes in children and adults' productions (absolute numbers and percentage).

Overt Subject Position across Verb Classes Longitudinal							
		Stages					
		I		II		III	
Child	Verb Class	SV	VS	SV	VS	SV	VS
Diana	Unergatives	1 (50%)	1 (50%)	0 (0%)	0 (0%)	6 (60%)	4 (40%)
	Transitives	2 (40%)	3 (60%)	4 (26,7%)	11 (73,3%)	78 (83,9%)	15 (16,1%)
	Unaccusatives	0 (0%)	2 (100%)	0 (100%)	3 (100%)	12 (30%)	28 (70%)
Martina	Unergatives	15 (79%)	4 (21%)	4 (80%)	1 (20%)	__	__
	Transitives	34 (71%)	14 (29%)	50 (74,6%)	17 (25,4%)	__	__
	Unaccusatives	1 (6,7%)	14 (93,3%)	15 (51,7%)	14 (48,3%)	__	__
Raffaell	Unergatives	11 (100%)	0 (0%)	10 (91%)	1 (9%)	0 (0%)	0 (0%)
o	Transitives	7 (35%)	13 (65%)	26 (76,5%)	8 (23,5%)	12 (75%)	4 (25%)
	Unaccusatives	6 (40%)	9 (60%)	9 (32,1%)	19 (67,9%)	5 (45,4%)	6 (54,6%)
Rosa	Unergatives	2 (66,7%)	1 (33,3%)	6 (75%)	2 (25%)	0 (0%)	0 (0%)
	Transitives	24 (92,3%)	2 (7,7%)	47 (66,2%)	24 (33,8%)	6 (50%)	6 (50%)
	Unaccusatives	3 (27,3%)	8 (72,7%)	14 (37,8%)	23 (62,2%)	4 (50%)	4 (50%)
Total	Unergatives	29 (82,9%)	6 (17,1%)	20 (87%)	3 (13%)	6 (60%)	4 (40%)
	Transitives	67 (67,7%)	32 (32,3%)	127 (68%)	60 (32%)	96 (79%)	25 (21%)
	Unaccusatives	10 (23,3%)	33 (76,7%)	38 (39%)	59 (61%)	21 (35,6%)	38 (64,4%)

At all stages in the general data the pattern is confirmed: SV order with Unergatives and Transitives and VS order with Unaccusatives is statistically significant ($p<0,05$) at Stage I /MLUW-1 (χ^2= 27,416 *df=1* for P-Value = 0.002116) and Stage II (χ^2= 17.309 *df=1* for P-Value =0,000032). At stage III the differences found are not statistically significant (χ^2= 2.1384*df=1* for P-Value = 0.143652).[11] Anyway, few observations about the longitudinal data are needed especially about the 3rd stage:

- In the 3rd stages Martina is not in the corpus since her MLUW never reaches a value higher than 2,68 so her data is never included in the stage III.
- Raffaello & Rosa do not produce at all overt subjects with Unergatives (see also tab.6 chapter.2) in the 3rd stage. Nevertheless, the number of Unergatives is very low in general. The

[11] It is significant only at a $p<0,10$

missing overt subjects seem to be linked to the general low average of distribution of Unergatives in the entire corpus and not to a proper grammatical factor.[12]

- Diana, displays few overt subjects with both Unergatives and Unaccusatives in the earliest stages: she doesn't show overt subjects with Unergatives in stage II. Nevertheless, her preferential position pattern is even stronger since she produces at stage I and II just postverbal subjects with Unaccusatives. Anyway, her small data in the earliest stage is not in contradiction with the general patterns: the difference with other children is mainly linked to the fact that she produces utterances with a higher MLUW (from 2,3 to 5,5).[13]

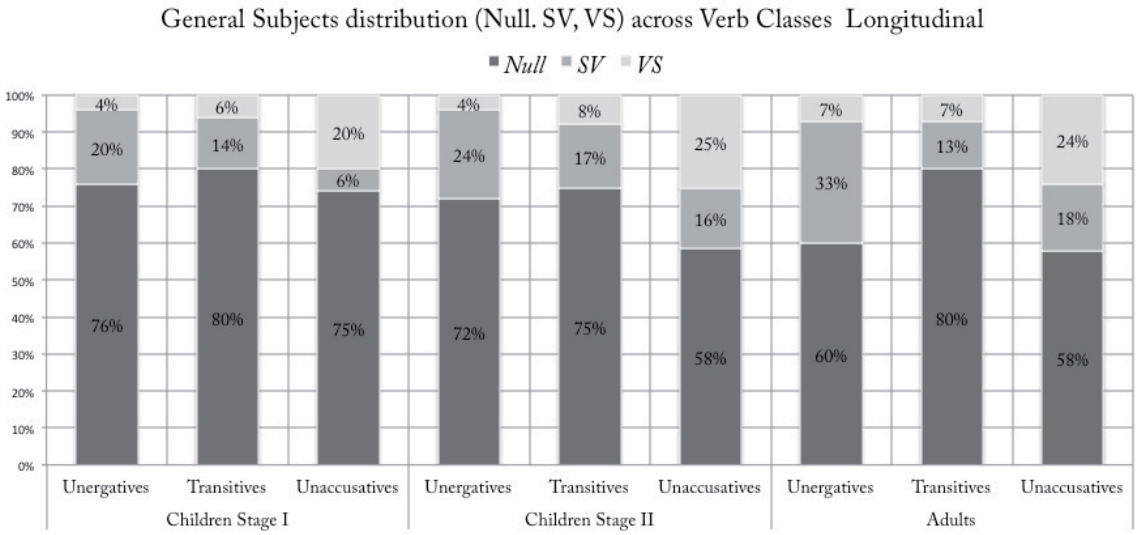
In the longitudinal data about the distribution of overt/null subjects in (Chapter 2) we have noticed that there are fewer overt subjects with Unergatives in children than in adults, now we can adjoin that Unergative overt subjects are preferentially produced with a SV preferential word order. In last chapter we also noticed that in the first stage there was a general lower percentage of overt subjects with all verb classes in comparison with later stages and with adults. We have seen in tab. 2 that there is a strong pattern in expressing overt subject position depending on the verb classes. We sketch the differences between the first two stages[14] and adults in the chart in fig.2.

[12] See Tab. 5 in Chapter 4 for the data about the verb classes distribution in the spontaneous speech

[13] The other children shows different range of MLUW: we saw that Martina show the lowest (from 1,2 to 2,7), then Raffaello (from 1,2 to 3,7) and Rosa (from1,2 to 3,3) show am homogenous pattern accross the three stages.

[14] Since half of children's productions are without overt subject with Unergatives and the data about Unaccuatives and Transitives are very similar to the previous stage, we have omitted stage III to make easier the "readability" of information within the chart in fig.2.

Fig.2 Chart of the longitudinal percentage of distribution of null / overt subjects with overt subjects identified for they clausal position.



Through this representation we can notice that between stage I and stage II there are some remarkable differences in the trend of percentages:

- In stage I children produce more null subjects with Unaccusatives: about 17% more than stage II and adults. At stage I they produce only a 6% of preverbal subjects, while in later stages this percentage get to 16% and 18% in adults. Also postverbal subjects are produced in a higher percentage after stage I but the difference is not as big as preverbal subjects (around 5%).
- As we have been repeating form last chapter on, child Unergatives in all stages present a lower percentage of overt subjects than adults: the differences do not seem to be linked to a particular trend in subject position since the majority are preverbal subjects with no particular differences between stages.

The striking fact is that the pattern of preverbal subjects with Unergatives and postverbal with Unaccusatives is never contradicted in all stages.

3.2.3 Discussion

The first main result is that the structural relations within the VP domain are at work from the very early stage. The data was not clear enough in the overt/null subject distribution, but by the strong distinctive pattern in overt subject position we can argue that the projection at l-syntax influences the derivation at s-syntax. In both children and adults' productions, subjects projected

in an external argument position are more likely to have a topic-like reading and to be expressed in a preverbal position (and to be omitted), while subjects projected as internal argument object are more likely (not necessarily) to have a new information focus-like reading (and to show less null subjects in both children and adults).

Our grammatical account of early null-subject is enriched by the findings about the overt subject position. Verb classes (and their l-syntax) influence the position of subjects at spell out and consequently the operation in which scope-discourse semantics intervenes. In the first chapter we have been seeing differences across approaches on the structural representations of verb meaning. We will briefly repeat their analyses here.

External argument in Levin & Rappaport Hovav (1991,1995) is derived through the immediate cause-linking rule: the argument of a verb that denotes the immediate cause of the eventuality denoted by that verb is its external argument. On the other side while Borer claims that it occupies a spec position in a dedicate Eventive Projection (EP) that determines the non-stative reading of a verb, Hale & Keyser (1993,2002) argue that the subjects of Unergatives and Transitives is not an argument of the verb at all, it originates in the sentential part of the syntax (or s-syntax) in the specifier of *v*P projection: the agent position. All approaches coincide in the fact that the external argument has an agentive reading or causative (initiator/source)[15] reading at lexicon syntax interface. The agent/causer reading is more likely to be inferred by the discourse and then omitted.[16] In scope-discourse semantic terms, an argument that moves to a topic-like position, like SubjP *á la* Cardinaletti is more likely to be omitted. The preferential preverbal position is then linked to two interfaces: the lexicon-syntax for the agent reading and the scope-discourse semantic -syntax for the likelihood of a topic-ike reading.

Symmetrically, the internal arguments in Levin & Rappaport Hovav's terms are ruled by the *direct change linking rule* that states that an entity undergoing a directed change denoted by the verb is its internal argument. Both Borer and van Hout argue that direct object is checked in respectively an ASPQ or in an AgrOP projection where telicity is assigned to the event within the VP: direct object is then the *subject of a quantifiable change.* Hale & Keyser claim that direct

[15] An external argument is agent in InitPhrase in Ramchand's (2008) terms or a Source relation in Mateu's (2002) terms.

[16] The Preferred Argument Structure (Du Bois, 1987, 2003) claims that the likelihood of an argument realization is linked to ergativity pattern as a preference in discourse for a certain grammatical configuration of argument realizations. In Du Bois' reasoning agents are more likely to be omitted than patient/ergative: on one side for the pragmatic chance the agent is recoverable by environment or discourse-pragmatic, on the other side typological different languages are organized so that ergativity can play a role in argument realization.

objects are specifiers in the (lower) VP projections: that is, the object that undergoes the change predicated by the verb. Thus, independently from the account, Unaccusative subjects are theme/undergoer of the event denoted by the verb and are more likely to represent new information in the sentence: the preferential postverbal position confirms the relation between lexicon-syntax interface and scope-discourse requirements because focus positions are mainly postverbal.[17] Furthermore Unaccusatives have two focus positions available while Unergatives do not (Belletti, 1998,2001,2004, section 3.4.2 this chapter): this is one of the reason for which subjects with Unaccusatives omitted in a lower rate.

Now while the pattern of preverbal and postverbal distribution seems to be quite stable across stages and verb classes, we have to debate about two peculiarities of the data: the higher percentage of omission in the earliest stage and the differences between children and adults with Unergatives.

The lowest initial number of null subject involves both Unaccusatives and Unergatives: the main idea is that children may not use in the derivation the higher functional projections in the IP/CP layer responsible for the scope-discourse semantic features of focus and topic. This intial stage goes roughly till the 27/38 months of age (the youngest Diana, 25 months, the oldest Rosa 29 months) when MLUW is lower than 2,5. From the second stage on, when they produce less overt subjects just with Unergatives, children may start to use the scope-discourse semantic projections responsible for postverbal overt subjects with Unaccusatives in an adult-like manner but they still do not use as many preverbal overt subjects with Unergatives as adults.

We imagine that adults produce more overt subjects with Unergatives than with Transitives not just for a VP lenght effect, but because the biargumental status of Transitive may allow an easier operation of recovering of the clausal subject. While Unergatives, on the other side, can be more ambiguous in the discourse than Transitives, by this reason the [+aboutness] or the [+subject-of-predicate] feature is more likely to be checked overtly in SubjP.

Children may produce less overt subjects with Unergatives for two reasons: first, because Unergatives are rare in the discourse (see tab.5 Chapter 4) and children may associate them to Transitives on the basis of the projection of the external argument. The second reason is that derivations to higher functional projection in the left periphery of the IP layer maybe problematic. We will investigate the implication of the latter suggestion, which looks like a truncation analysis. The rationale is that higher projections involved in the scope-discourse

[17] We are not referring here to preverbal contrastive Focus position that needs to be marked phonologically.

semantic interface may not be at use in an adult-like way in the first stage of acquisition of Italian: that is, children may stop the derivation (or they may spell-out) in a maximal projection lower than the one employed by adults. The resulting syntactic utterances are not ungrammatical (as apparently are null subjects in non pro-drop languages) since the use of the *pro* option is also available in adults' production: the overuse of null subjects is however linked to derivational/interface effects.

Additionally, the fact that children use overt subjects preverbally with Unaccusatives and postverbally with Unergatives confirms that derivation involving projections higher than VP are present, but for production limitation they could often use a lower spell-out domain in which some word orders are not given. The identification of spell-out domain may vary across stages: in the early stages, due to a lower spell-out domain, children show differences in the overt subject production with both Unergatives and Unaccusatives; with Transitives they do not show variances since also adults use few overt subjects with this verb class (probably for Informational reasons).

The next sections are devoted to analyze the reliability of this grammatical proposal on early null subjects in Italian. We will start by exploring the implication of the spell out domain on the linearization of constituents: we will provide an analysis of linearization based on the comparison between our data and the ones available in the literature from other languages and from aphasic productions. We will then provide a discussion on the derivation of postverbal subjects with Unaccusatives: the second focus position available only for Unaccusatives is strictly linked to the definiteness features of the subjects (Bianchi & Belletti, 2014) and is found to be at work in children's experimental data (Guasti & Vernice, 2014). The following section is devoted to the analysis of preverbal subject with Unergatives and with Unaccusatives and the data about first A-chain will allow us to take a position on the debate about the A chain deficit hypothesis as it follows from the statements of the Universal Phase Requirement (Wexler 2004).

The general picture is that Italian children master from the very early stage: the association of structural verb meaning at lexicon-syntax interface, the movement of lexical DPs at A position, and the scope discourse-semantic driven movements in the distribution of overt arguments. Their grammar may differ from adults' one for the spell-out domain: children may overtly produce a spell-out in lower functional projection, since no overt element triggers the spell-out in higher domain (as *wh-* element for interrogatives).

Although we do not need to postulate null elements such as null constants (*nc*) for Italian for the presence of *pro* (or *Agr* in Holmberg's (2005) terms), differences in the spell-out domains in child grammar have implications similar to the ones of the truncation hypothesis: the difference is that while truncation involves parametric variations on the functional projection that is taken as the root of the sentence, the syntactic domain chosen for the spell-out is indifferent to the root of the sentence and to the higher functional projections that can be at work in other constructions in child grammar.

3.3 A Comparative view of Spell Out domain and linearization

In this section we will compare data about linearization of word order across different languages and population. Below we draw few assumptions at the base of the comparison of data. As we have been arguing so far, spell-out represents the interface between syntax and phonology. In the terms of minimalist program (Chomsky; 1995, 1998, 2001) spell-out is an instruction to switch to Phonetic Form (PF): all movements before Spell Out refer to overt syntax. Word order is determined from when spell-out applies. In Italian, for example, the basic word order is SVO (Rizzi, 1982) and verb raises to IP (Belletti, 1990),[18] a spell-out point could be IP where SVO order is given. [19]

Since languages differ in word order, they may differ as to the point in the derivation where Spell-Out applies. Fox & Pesetsky (2005), in their analysis of the cyclic linearization of syntactic structures, highlight the assumption of Chomsky (2000, 2001) that the mapping between syntax and phonology takes place at various points in the course of the derivation rather than at a single point. A spell-out domain is each maximal projection that is mapped from syntax to phonology.

'…The list of Spell-out domains includes at least CP, VP and DP. Each time the derivation constructs a Spell-out domain D, Spell-out applies, linearizing D. The first time this happens, Spell-out takes D as input and yields straightforwardly a linearization of D. Each time a new Spell-out domain D' is constructed, Spell-out linearizes the new material in D' and adds information about its linearization to the information cumulatively produced by previous applications of Spell-out …' (Fox & Pesetsky 2005:pp.5) .

[18] Belletti (1990) uses a Split IP analysis. We are not going into detail about verb movement, at the moment we refer to a general Inflectional head where the verbal head moves.
[19] If we follow Chomsky 2001 IP is only one of the point at which in the course of derivation spell-out applies.

The key element of their proposal is the information about linearization, once established at the end of a given Spell-out domain, is never deleted in the course of derivation. The sole function of Spell-out is to add information. They call it the property of *Spell-out Order Preservation*.

In our terms, although children master derivation to higher functional projections, they may spell out just once, or having as a spell out domain the VP, and not IP/CP. This proposal was originally formalized by Friedman & Costa (2009/2011) who implement Chomsky's cyclic Spell-out on data from acquisition.

These authors used data coming from different languages allowing both SV and VS orders. They found differences in distribution of word order: they account for these disparities in terms of the variation of the domain that children may choose for the First Spell-out Domain. The cross-linguistic and cross-stage distinctions are linked to the presence of a syntactic element that triggers a Spell-out in a higher domain.

We check in details Friedman & Costa's proposal and their data coming from European-Portuguese and Spanish (together with Hebrew and Palestinian-Arabic) that link differences in linearization at spell-out to the parameter of clitic doubling. We will then propose another domain of application where spell-out analysis seems to fit: the data collected by Garraffa (2007,2008) on the productions of an aphasic speaker.

3.3.1 Cross Linguistic evidence

Our main data about linearization of constituents is that children use preverbal subjects in the 79,7% of Unergative utterances and postverbal subjects in the 65,3% of Unaccusative ones. Similar data are also found in a tipologically similar language as Catalan. Cabré Sans & Gavarró (2006) found that Catalan children use the preverbal subjects in the 66% of Unergative sentences and postverbal in the 64% of Unacusative ones. Both in Catalan and in Italian the data confirm a systematic difference on linearization depending on verb classes.

In another romance pro-drop language like Spanish the pattern is not that clear. Friedman & Costa analyzed a corpus of one child child, Magín, between the ages of 1;07–2;0 (from CHILDES, Aguirre database, MacWhinney & al. 1990) and they found that Unergative overt subjects are expresed in SV order in the 35% of the utterances while in VS in the 65%. Unaccusatives show in the 38% of cases a SV order, while in 62% a VS order: both Unergatives and Unaccusastives show a preferential postverbal pattern.

Portuguese patterns with Italian and Catalan for linearization: Adragão (2001) and Adragão & Costa (2004) perform an analysis of the spontaneous speech of one Portuguese child, between the ages of 2;07 and 3;07, where they found a strong preference for SV order for Unergatives and VS for Unaccusatives.[20]

Friedman & Costa performed few repetition tasks that also confirmed this pattern. They also found that while Hebrew patterns with Portuguese, Palestinian Arabic patterns with Spanish. We resume the different typologies of languages that allow both SV and VS order but that show a clear preferential pattern in early stages in tab. 3.

Tab.3. Summary of the Results for the SV/VS pattern found in differnt languages by Friedman & Costa 2009/2011 Adapted from Friedman & Costa (2011).

	Unergative (Transitive)	Unergative (Transitive)	Unaccusative	Unaccusative
	SV(O)	VS(O)	SV	VS
Spanish	X	✓	X	✓
European Portuguese	✓	X	✓	X
Palestinian Arabic	X	✓	X	✓
Hebrew	✓	X	✓	X

Friedman & Costa claim that the differences between the two families of languages are linked to a difference in the first spell-out domain: Spanish and Palestinian children who produces a preferential VS with both verb classes may have as first spell-out domain the IP, while Portuguese and Hebrew may have the VP.

In the acquisition literature it is quite agreed on that the V-to-I verb movement is acquired early,[21] but subject movement outside the VP, although possible, it is not as widespread as in the

[20] They divided the context of the spontaneous speech splitting in two parts: on the one side the contexts in which both VS and SV order were allowed, on the other side the contexts in which only VS order was allowed. In the first group they found that in the 115 Unaccusative contexts both SV and VS orders were used, while in the 242 Unergative contexts, there was an overwhelming preference for SV. The difference in the rate of production of VS in the two verb types was significant, 25:67 , χ^2=1 p < 0,001. In the second group of sentences where the adult preferential order would have been a VS, children produced in the 90% of cases SV order with Unergatives, and no SV order with Unaccusatives.

[21] As Friedman & Costa remind: early V-to-I movement is supported by the mastery of VP-ellipsis in verbal answers in European Portuguese (Santos 2006), and by verb placement relative to adverbs and negation by the age of two in English and French (Pierce, 1989, 1992; Déprez & Pierce, 1993; Friedemann, 1993/1994, 2000).

adults' grammars. [22] The interaction between V-to-I movements, the likelihood of having more NPs *in situ* within the VP, and the extent of the first spell-out domain determine the differences in the pattern of linearization. So in Spanish and Palestinian Arabian we have a V-to-I movement, the subject NPs stays *in situ,* and the IP is taken as first spell-out domain: that's why all arguments tend to occur in a postverbal position.

Anyway, in European Portuguese and in Hebrew the verb may remain in V (or *v*, depending on the account we assume for the generation of the external argument) and not move to IP[23] because the spell out domain is the VP/*v*P. VS order is more problematic for the external arguments since the movement of the verb to I would imply a linearization order different from the one in the first spell out domain.

The reasoning is linked to Fox and Pesetsky' *Spell-Out order preservation* which states that once the linearization is established at one spell-out domain, it is never deleted in the course of derivation. Since in child European Portuguese and Hebrew the subjects of Unergatives and Transitives are preverbal in VP, infants avoid VS linearization where the verb moves to I. For the same reason SV order with Unaccusatives is rarely found, for spell-out order preservation of the VS order in VP. Children start to produce consistently SV order with Unaccusatives when they widen their spell-out domain to IP[24] and then they have not to preserve the VS order spelt out at VP.

On the other side in Spanish and in Palestinian, where the first spell out domain is IP, V moves to IP and NP subjects stay in situ within the VP: they have a configuration with both types of NP subjects in postverbal position. They do not significantly produce SV order for both types of verbs just because they have a preference for leaving NPs in situ. They do not have problems with the Spell-Out order preservation, since the first spell-out domain available is the IP in which both order are available.

The preferential use of VP or IP as first spell out domain is linked to a parametric options. The parameter is not the mere choice of the spell-out domain but, in Friedman & Costa's proposal, the presence of the Clitic Doubling Costructions or not in Child grammar. Spanish allows clitic doubling and IP as the first spell-out domain, while Child Portuguese, Italian and Catalan do not.

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[22] Friedman & Costa refer to observation that children leave subjects in the VP-internal base-generated position in several languages (Déprez & Pierce, 1993; Friedemann 1993/1994, 2000).

[23] Portguese Children seem to be able to move verbs to I only when the effects of the VP as first spell-out domain are canceled; that is in the case of the VP ellipsis (Santos 2006).

[24] For Hebrew children since verb moves to CP there are other intermediate stages before getting to the adult-like word order distribuition.

3.3.2 Clitic Doubling parameter

Languages may differ for the parametric options of allowing double cliting constructions or not. The crucial difference between the two sets of languages is the availability of clitic doubling only in Spanish (11) and its unavailability in Portuguese and Italian (12).

(11) Spanish
Lo vi a Juan ayer.
him saw-1-sg to Juan yesterday

(12) a Portuguese
Vi(*-o) ao João ontem.
saw-1-sg him to João yesterday

b. Italian
*Lo vidi ieri Gianni [25]
him saw-1-sg yesterday Gianni.

According to the proposals in literature (e.g., Torrego 1998), in clitic doubling languages clitics and their doubles are generated as single constituents, but the clitic must undergo movement to the IP domain, since it is licensed there. In contrast, in languages without clitic doubling, DPs are the arguments bearing Case and theta-role and there is no part of the internal argument waiting for licensing at the IP-level. For this reason, in languages without clitic doubling, argument licensing is solved at the VP domain, whereas in clitic doubling languages theta-role assignment is completed only at the IP-level where clitics are licensed.

So, in Spanish only IP counts as a phase/spell-out domain because it is the first level at which the theta roles are assigned. Therefore, children acquiring clitic-doubling languages have evidence to assume IP as the first domain for linearization, whereas children acquiring non-clitic-doubling languages start out with the VP as the Spell-out domain, since this is the

[25] We have not to confund clitic doubling with CLLD –type sentences like (4) that are possible in Italian
(4) Gianni,, lo vidi ieri.
Gianni, him- saw-1 pers yesterday

domain at which thematic roles are fully assigned. Spanish children, in fact, seem to use clitic doubling from the age of 1;07 in an adult-like way as in Torrens & Wexler (1996).

Italian patterns with Portuguese: no clitic doubling is allowed and children show a preferential SV pattern with Unergatives and VS with Unaccusatives. In stage I of our corpus, in fact, the SV order with Unaccusatives is limited to 10 occurences (23,3%) while in later stages this percentage grows. We can assume also that the higher percentage of null subjects with Unergatives is due to a spell-out domain that does not include the SubjP at the edge of the IP layer. Although investigating the scope-discourse semantic features of the SubjP is beyond the scope of the present work, intuitively its Comp like features can be seen as not directly included within the IP spell-out domain.

Anyway the variation of spell out domain across languages implies differences in the instruction sent to PF about the linearization within a local domain. In next section we will see how the linearization, seen as a local effects, can account for aphasic data.

3.3.3 Aphasic data

Garraffa (2007,2008) performed a language examination of an Italian aphasic speaker (M.R.) with a non-fluent speech caused by a focal lesion in the left hemisphere. She collected spontaneous speech for a period of three months composing a corpus of 136 narrative sentences.

Garraffa checked the distribution of overt null subjects and the overt subject position across verb classes in her corpus. The main result was that the aphasic speaker omitted subjects only with Transitive verbs and she didn't show any omission with Unergatives and Unaccusatives. Unergatives were produced only with preverbal subjects, while 20% postverbal subjects were found with Transitives and 50% postverbal subjects with Unaccusatives.

Tab.4. Percentage of overt subject distribution in aphasic spontaneous speech (Garraffa, 2007, 2008).

Subject Distribution in Aphasic speaker (Garraffa 2007)			
	Unergatives	Transitives	Unaccusatives
Null Subjetcs	0%	58%	0%
Overt Subjects	100%	42%	100%

Tab.5. Percentage of overt subject Position in aphasic spontaneous speech (Garraffa, 2007, 2008).

Overt Subjtect Position in Aphasic speaker (Garraffa 2007)			
	Unergatives	Transitives	Unaccusatives
SV	100%	80%	50%
VS	0%	20%	50%

The striking fact is that contrary to children and adults' data the aphasic speaker does not show null subjects with both Unergatives and Unaccusatives, and also with Transitives the number of null subjects is strongly lower than in adults or children's productions.

The literature on agreement errors in aphasic grammar (see Garraffa, 2007, 2008; Garraffa & Grillo, 2008; Grillo, 2008; for a review and a grammatical proposal) adopts effects linked to the locality of the agreement relation: long distance or postverbal agreements are more problematic.

In the terms of the present discussion, the data from Garraffa can also confirm locality effects linked to a spell out domain lower than IP. The fact that there are very few null subjects can be linked to the fact that in the aphasic's spell out domain agreement features are checked mainly in a spec head configuration with an inflectional head, and thus projections allowing null elements are not included in the spell out domain. That is, aphasic speaker may use as spell-out domain the local projections where agreement features are checked.

The absolute predominance of preverbal overt subjects in M.R.'s Unergative and Transitive productions could be determined by the fact that spell-out domain is not higher than VP/*v*P (or is not as higher as IP). The aphasic as the Portuguese and Italian children may elude VS configurations for Unergatives and Transitives since for the *Spell-out order preservation* a VS configuration would be undesirable.

In general terms the data from aphasia confirm that verb classes are at work in underspecified grammar (both developmental or pathological): effects of the projection of arguments within the VP also influences the aphasic data. Once more, the distribution of overt null subjects has a central role in our analysis: on the one hand it endorses the relevance of the structural verb meaning in syntactic derivations, on the other hand it confirms that postverbal subjects have a key role in the analysis of the spell/out domain and in determining the local configuration of early/aphasic grammar.

3.4 Postverbal subjects

This section is devoted to the analysis of the position of postverbal subjects that involves apparently anti-local syntactic operation and a long distance agreement with the FocusP. Unaccusative verbs show a preferential VS pattern and project their subjects in a postverbal configuration in the *v*P: postverbal subjects do not contradict the *Spell-out order preservation* if *v*P is the first spell-out domain.

Conversely, Unergatives are preferentially used in a preverbal fashion and VS order is hardly found: the focus-reading is not given in most of Unergatives since the agent of an action is more likely to be the given information in a discourse perspective. Nevertheless, Unergatives can be expressed with focal postverbal subjects. In a *Spell-out order preservation* account VS order with Unergatives would be problematic for the preservation of the SV order if *v*P is the first spell-out domain.

We will address the analysis of the structural position of postverbal subject to complete our reasoning about the distribution of subjects across verb classes. We will start with Unergatives. Then we will present two different postverbal positions that are available only for Unaccusative subjects, and we will provide evidence in acquisition about their existence.

3.4.1 Postverbal subjects with Unergatives

Postverbal subjects are commonly interpreted as new information (Antinucci & Cinque,1977; Belletti & Shlonsky, 1995; Zubizarreta, 1998; Belletti, 1998, 2001, 2004) due to oddness of preverbal subjects in contexts like the typical sentences utilized in answering phone calls in (13).

(13) a. (Pronto, chi parla?)
(hello, who speaks)
b. Parla Gianni
speaks Gianni
c *Gianni parla
Gianni speaks
(adapted from Belletti, 2001)

Belletti (2001,2004) and Bianchi & Belletti (2014) propose that the FocusP is located in the low IP area[26] between TP and VP as in (14): the external argument of Unergatives moves to the specifier of FocusP and the Verb raises higher up producing the order VS (13,b). This Focus position has an interpretation of *narrow* focus (Zubizarreta 1998) when the focalized element is just the moved constituent and not the entire clause (*broad* focus).[27] The argument moves to the specifier of the FocusP. The argument in FocusP is then accessible to the AgrS probe. A

[26] The insight of Belletti (2004) is that the low IP area resembles in many respect the left periphery structure, in this position also a postverbal Topic can be found.

[27] In case of a *broad* focus interpretation (Zubizarreta 1998) like the one in ((5) this footnote) in out of the blue context in which the entire sentences is the focalized constituent the subject is also expressed postverbally. The derivation is similar to the one in (14 in the main text). The entire *v*P is moved to specifier of FocusP, then V moves to I and the nominal argument is accessible to AgrSP probe.

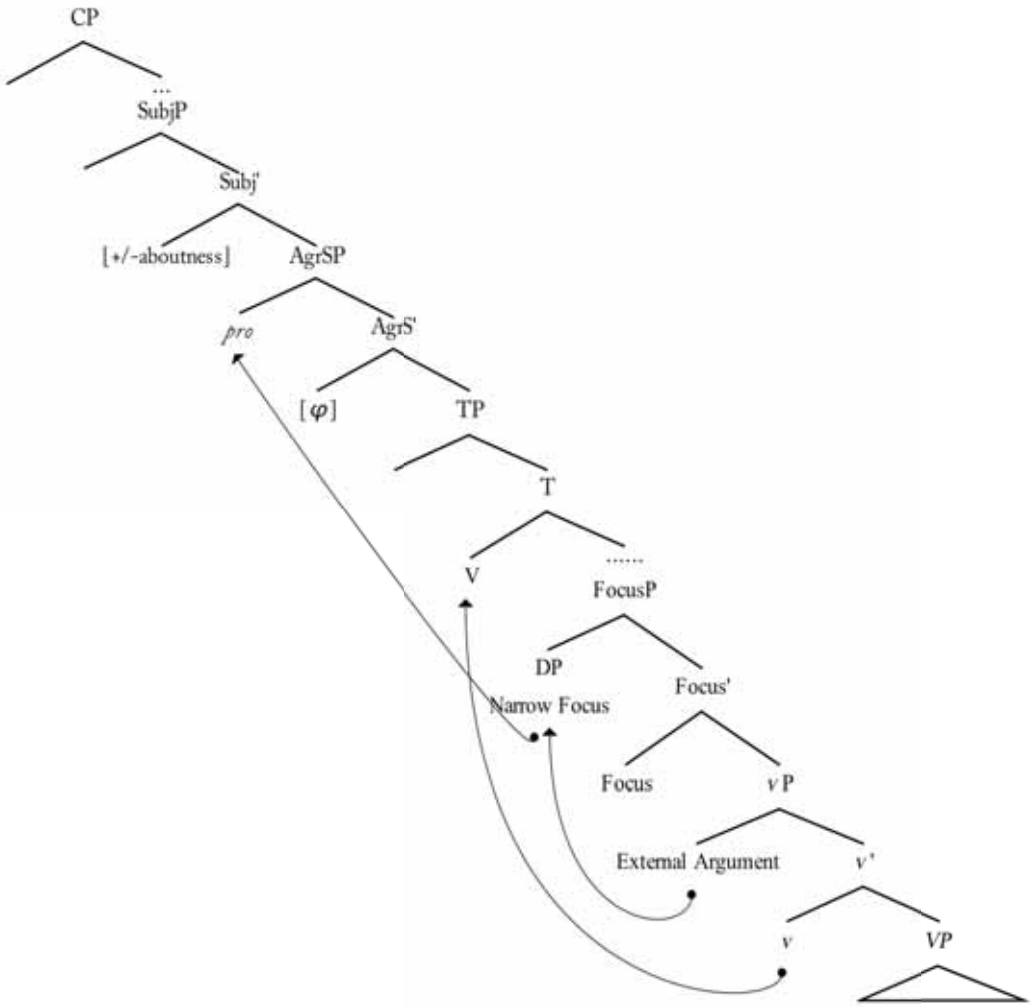
(5) a.Cosa è successo?
What is happened?

b.Ha parlato Gianni
Has spoken Gianni

c.# Gianni ha parlato
Gianni has spoken

doubling *pro* moves to the spec of AgrSP and the ϕ features of [person] and [number] are checked.

(14) Postverbal subjects with Unergatives



Unergative postverbal subjects are few in adults' productions: due to the lexicon-syntactic interface properties, the external arguments are identified as the event initiators and not like the participants or some properties of the event (as Unaccusative subjects). With the exception of marked context like the one in (13) Unergative subjects are given as old information in preverbal position and are more likely to be omitted and retrieved in the discourse.

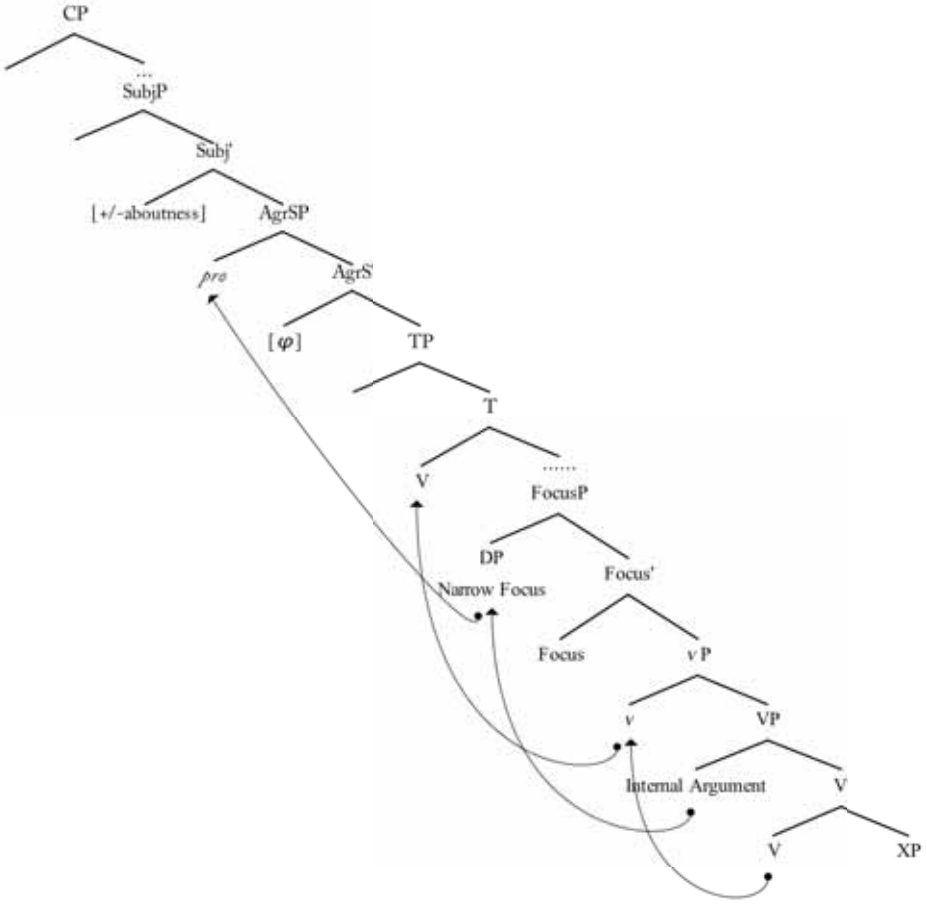
Children produce a lower percentage of overt subjects with Unergatives. In stage I and II they produce very few postverbal subjects (see fig.2): the average is half the percentage of adults' VSs. In stage I infants use as first spell out the *v*P, the movement of the verb to I and of DP to Spec of FocusP derive a word order VS that is in conflict with the first SV linearization at *v*P. This explains the lower percentage of postverbal realization and partially accounts for the general average of higher null subjects with Unergatives in children's productions.

3.4.2 Postverbal subjects with Unaccusatives

Analogously Unaccusative postverbal subjects are derived through a movement of the DP to the specifier of the FocusP and the Verb to T as in (15).

The φ features and nominative case are assigned through the AgrSP probe. Adults produce more overt subjects with Unaccusatives since the thematic role of the internal argument is inherently linked to the event denoted by the verb and represent new information. For the same reason also children produce more overt subjects with Unaccusatives. The movement of the DP to FocusP and of V to I is not in conflict with the preservation of the order at *v*P spell-out domain.

(15) Postverbal subjects with Unaccusatives[28]



In postverbal subjects with Unaccusatives there is one more possibility: since their syntactic subject share properties with the direct object, the position where objects are licensed (an AgrOP position) is also available. The case assigned in this position is not a proper *nominative*, but in terms of Belletti (1988) it is a *partitive:* the verb selects an indefinite meaning for the argument in internal argument position. The contrast for the *ne- partitive clitic* extraction in (16) shows that while Unergatives in (16a) and (16b) are marginally accepted, Unaccusatives in (16c) and (16d) are perfect. Belletti (2001) suggests that the contrast is due to the fact that (*ne*) extraction is possible from the VP internal (subject) position but it does not work equally well from the VP external Focus position.

[28] The internal argument is presented once more as the specifier of the lower VP shell as in the general syntactic representation á la Hale & Keyser.

(16) a. (?) Ha telefonato uno studente al giornale
has phoned a student to the newspaper

b. ??Ne ha telefonato uno al giornale
of-them+has telephoned one at the newspaper

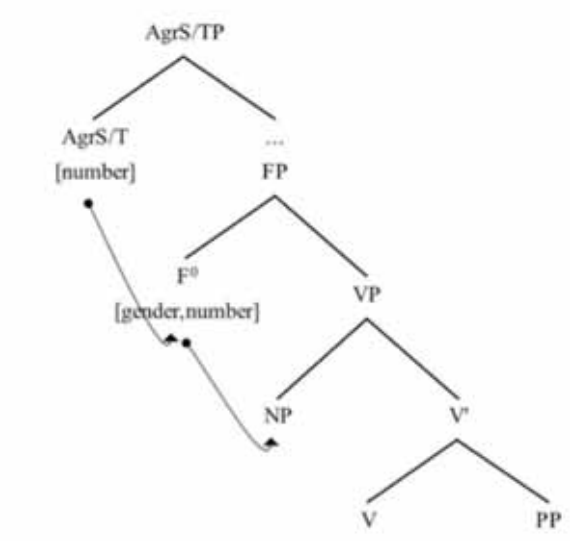
c. E' arrivato uno studente al giornale
has arrived a student at the newspaper

d. Ne è arrivato uno al giornale
of-them+has arrived one at the newspaper

(Belletti 2001)

The internal argument position is not directly available for being licensed by the AgrSP probe. In more recent proposals (Belletti 2001,2004, Bianchi & Belletti 2014) Belletti suggests that the postverbal subjects with Unaccusatives are licensed *in situ* through a Functional projection F that carries [gender] and [number] probe. The mechanism is similar to the licensing of *pro* in a V governed subject position of a small clause through number and person in Rizzi (1986) (see chapter 2, footnote 22). This functional projection FP is a probe for the object and in Unaccusatives it is in the VP peripheral position, instead of the *v*P projections that in Unaccusatives does not project external arguments as in (17). F agrees (probes) in gender and number with the internal object and then is probed by the number agreement of the finite verb Agrs/T.

(17) Postverbal subject agreement *in situ*.



Due to characteristics of the agree mechanism of this postverbal position, nominative case is not assigned since the VP barrier blocks it. The feature checking in the FP assigns only an indefinite (18) reading because these postverbal subjects represent a property of the event denoted by the Unaccusative verb and not a mere participant.

(18) All'improvviso è entrato un uomo /*l'uomo/*ogni uomo dalla finestra.
Suddenly is entered a man/ *the man/ *every man from the window

(Bianchi & Belletti, 2014)

We have then checked this hypothesis about the indefiniteness of postverbal Unaccusative subjects in our corpus and we have found out that children produce indefinite postverbal subjects only with Unaccusatives in about the 18% of the cases, while with Transitives and Unergatives they do not produce any indefinite postverbal subject, see results in tab.6.

Tab.6. Absolute numbers and percentage of indefinite postverbal subjects acrross verb classes.

Distribution of Definite Subjects in SV or VS order accross Verb Classes				
	Preverbal Subjects		Postverbal Subjects	
	Indefinite	Definite	Indefinite	Definite
Unergative	2 (4%)	55 (96%)	0 (0%)	14 (100%)
Unaccusatives	3 (4%)	70 (96%)	23 (18%)	130 (82%)
Transitives	3 (1%)	290 (99%)	0 (0%)	117 (100 %)

In tab.6, we can see that while in preverbal position children tendentially use a similar percentage of indefinites across verb classes (around 3%) in postverbal position they produce indefinites just with Unaccusatives. We then checked the distribution of indefinite direct objects in Transitives and we find a similar percentage: 15 % of definite objects (tab.7). Once more this data confirms that postverbal unaccusative subjects crucially share some properties with direct objects.[29]

Tab.7. Distribution of indefinite direct objects.

Distribution of Indefinite Objects in Transitive Productions		
	Definite Objects	Indefinite Objects
Null subjects	699 (86%)	117 (14%)
Preverbal Subjects	168 (82%)	37 (18%)
Postverbal Subjects	55 (98%)	1 (2%)
Total	**922 (85%)**	**155 (15%)**

More supporting data come from the experimental study performed by Vernice & Guasti (2014). These authors tested in a first experiment 25 Italian monolinguals 4;2 to 5;11 with a repetition task. Children were presented with a picture and then a voice pronounced a grammatical sentence involving Unergatives or Unacusatives verbs in both SV or VS order: the

[29] We can see in tab.7 that there are fewer indefinite objects when the subjects of transitives are postverbal: in the majority of these frames, objects are left dislocated and show the presence of a clitic and are not indefinite. We will not analyze in details these data, since we are analyzing just the similarities between direct objects and postverbal Unaccusative subjects, nevertheless it is interesting to point down that indefiniteness is crucially linked to an internal VP position.

subject was indefinite. Children were then asked to repeat the sentences. Children repeated the SV order when they were presented with SV Unergatives in the 90% of cases, but the VS order when they were presented with a VS Unergative only in the 25% of the cases: they showed a preference for SV repetition. Complementary, with Unaccusatives in SV context they repeated it in the 69% of cases (contrary to the 98% with Unergatives) and in VS context in the 52% of cases (vs. the 28% with Unergatives). Children once more indicated a preference for SV order with Unergatives and VS order with Unaccussatives showing that they clearly distinguish verb classes.

The most interesting result was found when the authors replicated the experiment with a definite NP subject. With Unaccusatives the presence of definiteness in the stimulus increased the SV repetition percentage in SV context from the 67% to the 84%, while, in the VS repetition context the overall percentage of VS repetition decreased from 52% to 39. With Unergatives the fact that the subject was definite or indefinite did not determine any significant difference in children's' responses: SV in SV context was 87% with indefinites and 90% with definites, while VS in VS was 23% with indefinites and 25% with definites.

Vernice & Guasti's experiment shows not only that children are sensitive to verb classes, but also that indefinite NPs are preferentially expressed as postverbal subjets with Unaccusatives, similar effects were not found with Unergatives.

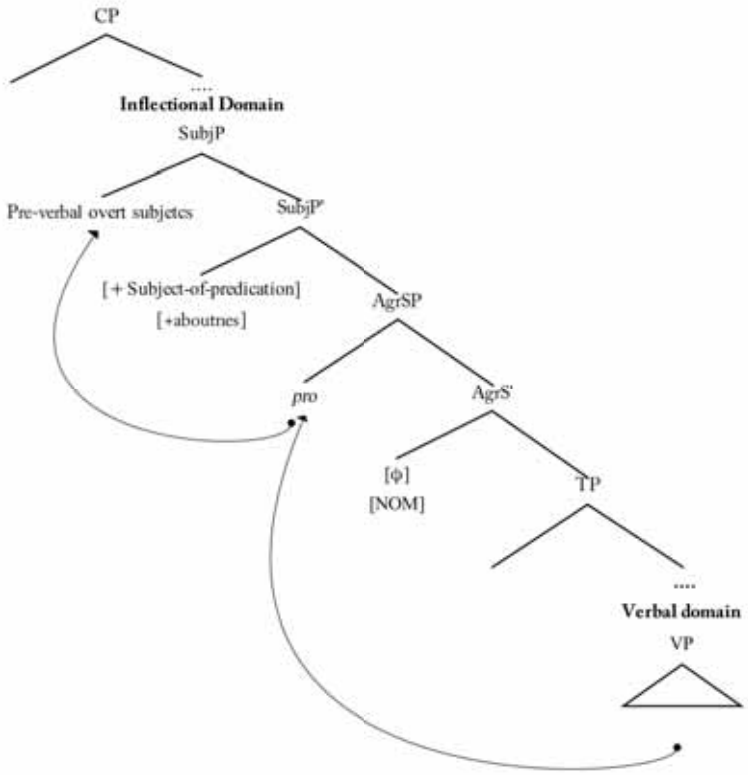
At this point our general picture is that children and adults produce more overt subjects with Unaccusatives in a preferential postverbal order since they have two postverbal positions available: a postverbal FocusP and a periferal FP in the VP. In our corpus there is an early stage in which children produce less overt subjects also with Unaccustaives: in stage I they probably still do not use a first spell-out domain higher than VP, they preferentially use an agreement strategy *in situ* for postverbal subjects with Unaccusatives. On the other side, Unergative subjects are not likely to be produced postverbally by children: for the agent/initiator interpretation of the subjects that determines a SV preferential overt distribution and for the structural constraint deriving from the SV order at *v*P spell out domain that does not favor the overt VS order.

Anyway, the fact that the VS order is not likely to be produced by children with Unergatives can not explain alone the higher percentage of null subjects with Unergatives at all stages, moreover also in adults Unergatives are expressed in a very similar preferential preverbal order: children are omitting also (or mainly) preverbal subjects. Next paragraph is devoted to analyze the characteristics of preverbal subjects with both verb classes.

3.5 Preverbal subjects

Following Cardinaletti (1997/2004) we have been arguing that subjects' feature checking takes place in the higher part of the IP domain, simplifying: in AgrSP φ features are checked and nominative case is assigned, in SubjP[30] the subject of the predicate is displayed. The arguments in SubjP are recoverable by the environment of the linguistic representation (and by agreement) but they are not necessarily d-linked to elements already presented in the discourse (as the Topics). The fact that a preverbal subject is expressed overtly is determined by the scope-discourse semantic requirements of SubjP: [+aboutness] is a feature that is checked to identify one argument from the linguistic context as the subject of the eventive structure of the sentence. We repeat the derivation of preverbal subjects in (19) below.

(19) Subject Phrase



[30] For simplicity reason we are not referring here to the third functional projection in the subject layer of the inflectional domain provided in Cardinaletti's analysis: the projection responsible for the checking of the EPP feature that is in an intermediate position between SubjP and AgrsP.

One option is that children do not always check the aboutness feature and this may cause the production of less overt subjects with Unergatives. With Transitives we do not see any effect due to the low percentage of overt subjects also in adults' stimuli.

Children may fail to complete the derivation due to a reduced structure in which a proper SubjP is not fully operative: in stage I they may have a higher number of omission due to the fact that they preferentially do not use the IP as spell out domain.

In later stages they do not check features in SubjP as often as adults since scope-discourse semantics is operative mainly at CP level: the idea is that while children already use IP as a spell out domain in stage II, they still do not use CP for declarative context, where no open element (such as wh-element in interrogative) triggers the use of CP as a spell out domain. Since SubjP is a functional projection whit mixed properties, half inflectional and half criterial, children who still do not have CP as spell out domain may fail in some occasions to check the criterial-like features in the SubjP. Friedman & Costa (2011) show that the CP as spell-out is reached by Hebrew children only in a later stage, since in Hebrew verbs moves to C: they observe that I-to-C in Hebrew is acquired later than V-to-I and VS in European Portuguese (Soares 2002, 2003) and at an age later than when SV is acquired in Spanish and Palestinian Arabic (Friedmann & Lavi, 2006; Friedmann, 2007).

We tested our conjecture looking the characteristics of the overt preverbal subjects across verb classes in children and adults: we found especially with Unergatives an apparent over-use of demonstrative preverbal subject such as *questo* (this) or *quello* (that) pronouns in children's utterances in comparison with adults. We collect the results in tab. 8, where 'Others' mean personal pronouns and full DPs.

Tab.8. Distribution of demonstrative pronouns in preverbal subject position

Distribution of Demonstrative as Preverbal Subjects Accross Verb Classes						
	Unergatives		Unaccusatives		Transitives	
	Demonstr.	Others	Demonstr.	Others	Demonstr.	Others
Adults	5 (17%)	24 (83%)	3 (8%)	33 (92%)	9 (11%)	72 (89%)
Children	22 (40%)	33 (60%)	14 (20%)	55 (80%)	23 (8%)	267 (92%)

First of all, children produce more demonstrative pronouns than adults with Unergatives and Unaccusative. If we focus on Unergatives, which show a preferential SV order, we notice that: children use few full DPs and personal pronouns in preverbal position with Unergatives.

Demonstrative can be used as expletives or as pointing indexes and are checked in a lower AgrSP (where expletives are checked following Cardinaletti 2004), while full DPs and personal pronouns check [subject-of-predicate] or [aboutness] feature in the higher position of SubjP. The same effect is not visible with Transitives: although null subjects have a similar proportion, demonstrative as preverbal subject are used in a lower percentage than with Unergatives.

Anyway, this is a mere conjecture, the only element that could support us in our claim would be an analysis of the context of production of the sentences that in our corpus was not immediately retrievable. Nevertheless, a tendency on scope-discourse semantic effects with Unergative subjects seems to be plausible in the limits of an analysis that is based on the relation between the locus of generation of subjects and overt syntactic realization: in children's productions, external arguments (both Unergatives and Transitives) are more likely to be omitted and when expressed in overt syntax they are preferentially presented as old information. Adults, as children, produce external arguments as old information at the beginning of the sentence, but they produce more overt (preverbal) subjects with Unergatives probably for informational/emphatic reasons: the originator/agent of Unergatives is more difficult to retrieve from the linguistic context than the agent of Transitives, since Transitive eventive structures present more contextual information for the presence of an overt object.

Another factors of the early drop of preverbal Unergative subjects, in fact, can be linked to the type of interaction that adults have with children. Adults may use overtly more overt subjects with Unergatives with the intention of avoiding ambiguities in the discourse: since there are no explicit participants or additional properties in the events denoted by Unergatives, they may stress the role of the agent of the event checking more often the aboutness feature in SubjP.

3.5.1 Preverbal subjects with Unaccusatives

Preverbal subjects with Unaccusatives share a derivation like the one of Unergatives. Nevertheless they are not as frequent as postverbal subjects in children's productions for two reasons: on the one side the SV order contradicts the linearization at VP (in the very early

stages), on the other side also in adult Italian there is a preference in expressing internal arguments in a postverbal position due to the focus-like reading available for objects.

However, in many circumstances children are able to produce preverbal subjects with Unaccusatives. The fact that children have VP as first preferential spell-out domain does not imply that children can not start to produce sentences spelt out directly in IP from the very early stage: for example the parameter of V to I is set very early (see footnote 21). Children have also tendencies in leaving the NPs in situ, but it does not mean that they do not start to use preverbals for satisfying the 'quasi-criterial' feature of SubjP.

In our corpus, in fact, we found that from the early stage children do produce preverbal subjects with Unaccusatives. In tab.9 we present the data of first preverbal subject in the corpus.

Tab.9. Age of first preverbal subjects with Unaccusatives in the corpus

Age of Fist Pre-verbal Overt Subject with Unaccusatives. (yy;mm,,dd)	
Diana	01,11,07
Martina	02,03.01
Raffaello	01,10,20
Rosa	02,02,11

These preverbal subjects are properly used since children use to remark a subject already presented in the discourse. For example in (20), Martina was told to her mother to go close to her and she answer that she goes. In a similar context (21) Raffaello when he was told to get closer he answers that he would have gone outside.

(20) MOT: vieni .
Come! (imperative)
Martina: io vengo
I come

(21) FAT: senti vieni qua .
Listen, come here!
Raffaello: no .
No
FAT: senti si fa ora .
Listen, we do it now.

Raffaello: io andae fori[31].
I go (infinitive) *outside.*

These preverbal subjects with Unaccusatives are not problematic on our account since the VP spell out domain represents a tendency that is readily overcome already in the second stage, when children use consistently preverbal subjects with Unaccusatives. Furthermore, since Unaccusative verbs may have a defective *v*P, that is not a phase, the choise of IP as spell-out domain may be triggered earlier for Unaccusatives.

Nevertheless Unaccusative preverbal subjects are problematic for the account of the A chain deficit hypothesis (ACDH) that claims that children are unable to produce A-chain and consequently they have problems with Unaccusatives. Next paragraph is devoted to few remarks about this account.

3.5.2 A challenge to the Unique Phase Requirement

Unaccusatives are often analyzed together with passives since they share a crucial syntactic property: the internal argument rises to TP. The DP (an A element) moves from a VP internal position to a functional projection responsible for the agreement and case checking, an A-chain is produced.

Passives are problematic constructions for children (Maratsos et al., 1983), they are not produced till late stages in acquisition. Borer and Wexler (1987) argue that children have problems with passives because they are unable to produce and comprehend constructions in which an A-chain is involved: the A-Chain Deficit Hypothesis (ACDH).

[31] Curiously this example is one of the 60 cases over the 2538 sentences in which children do not produce the verbal morphology and produce the verb as an infinitive.

Unaccusatives should involve similar problems. [32] However, children produce and comprehend Unaccusatives from an early period (Déprez & Pierce, 1993; Snyder & Stromswold, 1997). Our data confirms that children are able to differentiate between Unaccusatives and Unergatives/Transitives and that they also produce pre-verbal subjects with Unaccusatives in early stages as the table of the occurrence of first preverbal subjects with Unaccusatives confirms (tab.9 above).

Babyonyshev et al. (2001) and Borer and Wexler (1992), in their revision of the ACDH, state that children correctly analyze the syntactic argument structure of the Unaccusatives. They assume that kids treat Unaccusatives and Unergatives differently: kids know the UTAH and then they know the mapping of the argument of Unaccusatives to object position and of Unergatives/Transitives to subject position. Following their account, since ACDH holds, kids can't raise the subject to TP projections and thus the derivation crashes for the presence of EPP which means that they can not produce a sentence without an explicit subject. So, in order to express an Unaccusative verb, children violate UTAH generating the subject as it was Unergative, or they violate the ACDH and they move the subject to TP. The systematic pattern of distribution of subjects we found in the corpus once more confirms that children do not violate UTAH since they show an adult-like overt distribution of the subjects. The ACDH seems not to hold: although they are few, children produce preverbal subjects with Unaccusatives. The distribution of the postverbal preferential subject is not due to a deficit but it is consistent with adult distribution of overt subjects and to criterial realization of the target language.

Wexler (2004), reformulated the insight of the ACDH in minimalist terms using as a starting point the Phase Impenetrability Condition formulated by Chomsky (1998) roughly synthesized in (22).

(22) Phase Impenetrability Condition (PIC)

When working at a phase, only the edge (the head and spec(s)) of the next lower phase is available for analysis, and nothing lower than the edge. In particular, the complement is not available

[32] They states that only non-trivial A-chains (those which involve two theta positions: passives and unaccusatives) are problematic for children. Subject movement according to the VP-Internal Hypothesis is a trivial A-chain, since only spec VP is a theta position, and thus they are unproblematic for children.

CP and the *v*P of Transitives and Unergatives are proper phases, while Unaccusatives and passive constructions are defective phases since the internal argument has to move to TP for agreement and case. Wexler (2004) proposes that in child grammar this difference between types of phases does not hold till a late stage (5 years of age). He states the Universal Phase Requirement (23).

(23) Universal Phase Requirement (Wexler 2004:164)
(holds of pre-mature children, until around age 5)
v defines a phase, whether *v* is defective or not

So children, when they produce passives and Unaccusatives, analyze such *v*Ps as non-defective phases. This explains the problem they have with the A chains implied in both passives and Unaccusatives. They do not raise the internal complement to TP in order not to violate the PIC. Since in our data the majority of Unaccusative subjects is postverbal, this apparently fits with the PIC, but two problems arise: the possibility of checking the indefinite NPs directly in situ is compatible with PIC but the ones that raise to postverbal FocusP are not contempled by PIC. Then, the second problem is associated to the preverbal subjects found from the very early stage.

Wexler (personal communication, 2005) answers at this respect that the movements to A' position such as postverbal FocusP or preverbal SubjP with Unaccusatives are possible, since A' chain position does not represent any UPR violation.

'…Optional operations can apply only if they have a (semantic) effect on outcome; in the present case [wh movement or A' movement], *v* (no defective) may be assigned an EPP-feature to permit successive cyclic A' movement…'(Chomsky 1998:60).

Although in FocusP and SubjP scope-discourse semantic features are checked, they are within the Inflectional layer and are A positions.[33]

As we have seen in the first section (Cardinaletti, 2004) Italian preverbal subjects are not left dislocated. Anyway if we admit that children raise Unaccusative subjects to a TopicP a logical problem holds: if children use A' position for subjects, how can they start to move to an A position instead of an A' positions in later stages?

[33] See the analysis in Rizzi (2005b/2006a).

Children, for adults' input, may start with a superset grammar in which preverbal subjects are Topic, the problem would be in finding evidence to pass to a subset grammar in which the preverbal subjects are moved to SubjP where no d-linking applies. The process would be also problematic due to the differentiation with other verb classes that allow, contrary to Unaccusatives, an A position from the very early stages.

Contrary to what Wexler proposes, children may simply prefer to leave in lower position argument till some criterial requirements apply for the movement to higher projections, but this does not mean that children cannot create an A-chain. Furthermore, as we have been arguing at the beginning of this Chapter also *pro* is in a preverbal position and in the case of the null subjects found with Unaccusatives it implies an A chain with AgrSP.

Friedman & Costa (2011) showed that in many languages (Hebrew, Spanish, Potuguese) the acquisition follows bottom-up pattern and not a top-down fashion, the movement of V to C is delayed after children start to produce a V-to I movement. The fact that a criterial feature is checked before than an inflectional one seems to be counterintuitive.

Given these considerations we can at least claim that children do recognize the difference between Unergatives and Unaccusatives and are able to move constituents outside the VP consistently and much earlier than the 5 years of age. Children do not show a high number of NP derivations to higher functional projection because they have in the early stages a spell-out domain lower than in later stages.

3.6 Verbs at interface in acquisition

The data we have provided have led our reasoning to account for the distribution of overt subjects in terms of interface relations. On the one hand there is the lexicon-syntax interface: the projection of structural meaning of the verb influences the reading of the semantic role (such as initiator, patient) and the typical distribution within the sentence (new information for theme, patient and old information for agent/ initiatior). On the other hand there is the scope-discourse semantic interface: the criterial requirements trigger derivation of nominal elements outside the VP and determine their distribution pattern in interaction with lexicon-syntax interface, only after the inflectional features are checked in the IP layer.

The main results in the acquisition process of subject distribution are that children systematically distinguish between verbs assigning to each verb class a pattern of distribution of overt/null subject similar to adults: preverbal subject with a topic-like configuration for

Unergatives and Transitives, while postverbal subjects with a focus-like configuration for Unaccusatives. Child Subjects are not adult-like in all the respects. Children produce more overt subjects when the subjects is generate in the direct object position, while adults produce more overt subjects with monoargumental verbs than with Transitives. Logically adults produce more overt subjects with Unergatives than with Transitives not just for a VP lenght effect, but because Transitive event structures are more informative: the 2 arguments may allow an easier operation of recovering the clausal subject in comparison with Unergatives.

Another difference with adult productions is that in the very early stage children produce more overt null subjects than in later stage or than adults. We have been proposing an evolutional grammar internal account linked to differences of the first spell-out domain during the phases of acquisition that influences the overall distribution. We sketch below the three stages we identify through our data.

First Stage (MLUW <2,5. Age= till 27months): children produce systematically SV order for Unergatives and Transitives and VS order for Unaccusatives but they use less overt subjects than in later stages. The higher number of null subjects is distributed equally between Unaccusatives and Unergatives. Children use as first spell out domain VP in which the linearization order is SV for Unergatives and VS for Unaccusatives. For the *spell-out domain preservatio*n children tend to avoid linearization that contradicts the word order given at VP. For the same reason, children may realize the criterial requirements in situ: that is, they do not move overt preverbal subjects to SubjP and postverbal subject to the low IP FocusP. Nevertheless, children start to produce spell-out at IP that allow them to produce first adult-like sentences.

Second stage (MLUW= between 2,5 and 5,5. Age= after 2 years and half)children still show SV/VS order depending on the verb class. With Unaccusatives they reach an adult-like distribution: more preverbal subjects and a higher number of overt subjects than in previous stage. With Unergatives results are similar to the previous stage. Children use IP as first spell-out domain. Children produce Unaccusative postverbal subjects in the FocusP. With Unergatives they start to produce postverbal subjects in FocusP but they still do not use in an adult-like way the SubjP for overt preverbal subjects. Children at this stage either do not master the criterial requirements implied by the SubjP (since they have not reached to use CP as spell-out domain), or they simply do not differentiate between Unergatives and Transitives for their

informational status: they simply distinguish subjects on the basis of the loci of generation (internal/external).

Third stage. (No data in the corpus about MLUW and Age) We have not observed it directly in our corpus but at this stage children's productions become similar to adults' ones. Infants should use Transitives as the class with more subject omission. Children should start to use CP as spell-out domain and the criterial features should be at work. Unergatives should have an adultlike distribution: either children properly use the scope-disocurse requirements on the SubjP, or they start to distribute overt subjects depending on the informational status of Unergative and Transitive predicates; monoargumental Unergatives are more likely to be used with an overt subject than biargumental Transitives.

The road map we have sketched needs further modification and data, but the relation between scope-discourse semantic and lexicon-syntax interface in acquisition is essential for an account for the overt/null subject distribution in an apparently free inversion grammar as Italian. The operation of mapping between the two interface levels implies that the IP is the 'battlefield' where relation and conflict are found during the phase of acquisition. Since our main aim is to retrieve the effects of verb classes in acquisition, we have seen that structural meaning is at work form the very early stage as one of the key players in early subject drop.

Another phenomenon related to the structural meaning is the production and comprehension of auxiliaries: depending on how the event is read off from the structural configuration within the vP, different aspectual values will be assigned to the event and will influence the interaction with the aspect encoded in the auxiliary morphology. Next chapter is devoted to the analysis of the role of direct objects and the attribution of aspectual reading to *v*Ps.

Chapter 4. Few remarks on Auxiliaries and Structural Meaning

4.0 Introduction

Children show a clear pattern of distribution in overt syntax of internal and external arguments. Infants do not omit internal arguments as they do with external arguments: structural verb meaning seems to be at work from the very early stage. The arguments projected within the VP interact on the one side with functional projections responsible for the assignment of scope-discourse semantic features (determining the null/overt distribution of arguments) and on the other side with the spell-out domain (that determines the overt word order). Structural verb meaning also entails aspectual features. Aspect is encoded in Italian both structurally and morphologically: on the one side the aspectual properties of the verb can be read off from the structure of the event within the VP layers, on the other side they can be marked through the overt tense morphology such as auxiliaries.

The general purpose of the present chapter is to show how structural meaning of verbs is at work in child language also in determining the compositional aspect of verbs. L-syntactic features influence the general aspectual readings that are at work in the production and comprehension of compound tenses marked for aspect. We will be performing an analysis on the compound tense of *passato prossimo*.

The *passato prossimo* in Italian is the most common compound tense found in the corpus. It is a past tense that is used to obtain a reading of finished action to an event that happened in the past. Its counterpart in English in morphologic formation and meaning is the "present perfect". It is created by the present inflected form of the auxiliary and the past participle derived from the lexical root of the verb (1).

(1) Formation of the "Passato Prossimo"
AUXILIARY (present tense) + PAST PARTICIPLE of the verb

In Italian two auxiliaries are selected in the compounds depending on the verb class. We will provide a brief analysis of the characteristics of the first compound tense form in the corpus of spontaneous speech we have been referring to in last chapters. The auxiliary selection once

more implies an early knowledge of structural relation bearing at l-syntatic level, as in the syntactic traditional account of auxiliary selection (Burzio, 1986), [1] but it also implies aspectual semantic values as in more recent proposals (Sorace, 2000). We will try to reason once more on whether structural relations determine peculiar behaviors in Child Italian or not.

While in the previous chapter we have been dealing with the criterial position within the IP layer, in the present chapter we will check how aspect is encoded within the VP and IP layers and how it interacts with structural verb meaning in acquisition: in section 4.1 we will present a review on what grammatical and lexical aspect are and how they are encoded in Italian. We will emphasize the role of the telicity and its relation with the finished/terminated reading linked to the production of perfective auxiliary forms. Then, in section 4.2 we will focus on the compositional lexical aspect and its relation to the auxiliary selection. The projection of arguments in internal object position will be the nucleus of the discussion about be-auxiliary selection and telicity: we will overview the distribution of auxiliaries in the corpus of spontaneous speech. Section 4.3 and 4.4 will be devoted to present two experimental studies in which the projection of direct object is investigated on its capacity to trigger the aspectual reading of auxiliaries. The results will allow us to argue that structural relations within the VP, at least in some stage of acquisition, strongly influence the aspectual reading of the auxiliary morphology, contrary to what happens with adults: structural meaning is at work in child Italian in determining the aspectual properties of verb at each stage of development. In section 4.5 we will be matching the effects of the structural verb meaning with the idiosyncratic meaning in the process of acquisition of Italian: the big picture will confirm that both coexist in guiding language development. Structural verb meaning seems to overcome encyclopedic semantic effects at least in some stage of the comprehension or production of the aspectual entailments. In section 4.6 we present some remarks on the general features of verbs in acquisition: the structure of VP is acquired from the very early stage, the derivation of arguments in higher functional layers and their mastering is acquired later and when no conflict arises with the relations established and projected at 'First spell out domain' (or 'First Phase Syntax' in Ramnchand's (2008) terms).

[1] In syntactic approaches such as Van Hout (1998), the structural properties of the projection of arguments determine aspectual features such as telicity and are overtly marked through the auxiliary in languages like Dutch.

4.1. The Appearance of Aspect

When we talk about aspect we have to distinguish between two basic notions of aspect: *lexical aspect* and *grammatical aspect*. *Lexical aspect* (or Aktionsart, situation aspect) deals with the temporal contour of a situation that is independent of time; it describes whether an eventuality is stative or dynamic, punctual or durative.[2] These aspectual properties encode, for example, whether the event denoted by the verb has a natural terminus or not, that is, if it is telic or atelic. The atemporality of a given lexical aspect is determined by the fact that '…the timeframe is irrelevant to the natural unfolding of the event' (Rosen 1999:3). This is a property of verb and it is derived in languages like Italian by two elements at work in the VP:[3]

- The semantic properties resulting from the structural configuration of the VP and of the morpho-syntactic elements in the VP.
- The features attributed to each lexical root that enter into the syntactic derivation, independently from the structural configurations.

On the other hand *Grammatical aspect* (or viewpoint aspect) operates on top of lexical aspect. The use of grammatical aspect implies that a speaker chooses a certain perspective to report on an event. This aspect '…focuses on the temporal perspective of the event' (Rosen 1999:3) and it is usually determined by tense morphology. Tense inflections locate the described eventuality at a time that can be before, overlapping or after speech time (Arosio 2011).[4] According to Kratzer (1998), (grammatical) aspectual distinctions are conveyed by means of

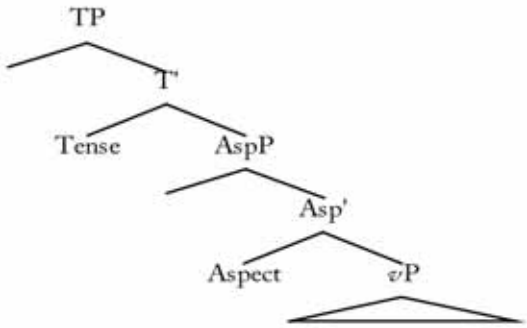
[2] As Borik (2002) extensively shows, in what we refer here as lexical aspect we merge two more detailed notions of aspect, in Borik's terms: the *lexical aspect* that focuses on a lexical type of verbs determined by the inherent temporal properties (Ramchand, 2001), viz. the verbal root, and the *telicity aspect* (or *predicational* or *inner* aspect) that refers to the aspectual type of a predicate, which can be telic (terminative in Verkuyl (1972,1993) or quantized in Krifka (1998)) or atelic. In our respect, as in Rosen (1999), it is interesting to distinguish the aspectual information encoded in the VP and inherent to the predications, (independently from whether the inner aspect is given directly in the lexical class of the verbal root or compositionally) from the viewpoint aspectual implications derived by the interaction with the tense (morphological or anchoring time). Nevertheless, we will be using mainly telicity (derived compositionally or by verbal root) as the principal features of the lexical aspect.

[3] We are stating as two epiphenomena of the same definition of aspect what Borik (2002) identifies as two types of aspects (see footnote 2).

[4] Arosio's (2011) in his review of Romance tense system defines aspect as concerning a temporal relation between the time at which the eventuality described by the VP holds and the time introduced by tense (Klein 1994).

aspectual operators that map properties of events denoted by the VP into properties of time: tenses provide the time that saturates the temporal property obtained. Kratzer (among others) proposes for Romance languages a derivation where grammatical aspects result from the combination of Tense and Aspect as the one in (2) where the tenses (past, present or future) in T selects different aspectual values. Kratzer contends that the two major aspect operators responsible for the aspectual distinctions in AspP are the *Imperfective* and the *Perfective* operators.

(2)



For example, the *Passato prossimo* in Italian encodes a perfective aspectual feature selected by a present tense.[5] The perfective feature in AspP then interacts with the lexical feature and gives a reading of finished action for both types of predicates: telic or atelic. We will not enter into a discussion about Kratzer's model. In our respect we will roughly be referring to grammatical aspect as the aspect conveyed by tense morphology in language like Italian and that applies on the top of lexical aspect.[6] Our main interest is to show how children acquire to relate the

[5] The *passato prossimo* is a past tense even though the auxiliary is presented with the morphology of the present tense, and T head is present. Its interpretation as a past tense results from the incorporation of the perfective aspectual features. In opposition to *passato prossimo* in Italian there is the *passato remoto* (simple past) that is a past tense that is perfective and is selected by a past T head. For a discussion on Italian tense system see Arosio (2011) Bianchi & Bertinetto (2003) and Giorgi & Pianesi (2007).

[6] Kratzer's suggestion is that verb forms are the spell-out of a complex head resulting from the combination of tense and aspect. This tense/aspect combinations is challenged by Arosio (2011) who proposes a complex T phrase in which two lexical entries appear: a tense selecting for temporally homogeneous predicates and a tense selecting for temporally nonhomogeneous predicates. Arosio defines (un)homogeneous predicates on the basis of the temporal modifiers: *for* -adverbials make the temporal predicate they modify non homogeneous, *sinceD* -adverbials make them homogeneous.

grammatical aspect encoded in tense morphology to the lexical aspect as it results by the eventive structural meaning within the VP layers.

So the viewpoint aspect is applied to an event described through a predication. A predicate has telic interpretation when the event that it denotes reaches its point of culmination; in other words, when it entails the completion of an event as in *build the house, write a letter*. A telic predicate has a natural endpoint, while a predicate is atelic when the event that it denotes does not reach its culmination or does not encode any natural endpoint. Telicity is encoded in different ways on the verb. Languages differ in this respect: some languages encode the (a)telicity in the verb phrase through the presence of a definite or indefinite object, others use overt verbal morphology

Dutch, English and Italian encode telicity in the syntax-semantics of the direct objects. Transitive verbs with a semantically countable direct object may yield telicity, while Transitive verbs with an uncountable / mass object may yield atelicity. This can be shown using one of Dowty's (1979) tests for telicity: the contrast between durative versus time-frame adverbial phrases. Durative phrases (e.g. "for hours") select for an atelic predicate, while time-frame adverbials (e.g. "in an hour") select for telic ones. Compare the possible modifications in the Dutch examples in (3) reported by Van Hout (1998) and their translation in Italian in (4).

(3) a. Het paard heeft urenlang /* in een uur brood gegeten. (uncountable/mass)
The horse has hours-long/ in an hour bread eaten
The horse ate bread for hours/*in an hour.'

b. Het paard heeft *urenlang / in een uur een appel gegeten. (countable)
The horse has hours-long/ in an hour an apple eaten
'The horse ate an apple *for hours/in an hour.'

(4) a. Il cavallo ha mangiato pane per ore/#in un'ora. (uncountable/mass)
The horse has eaten bread for hours/#in an hour
'The horse has eaten bread for hours/#in an hour'

b. Il cavallo ha mangiato la mela #per ore/ in un'ora. (countable)
The horse has eaten the apple #for hours/in an hour
' The horse ate the fodder #for hours/in an hour'

When the same type of verb occurs as intransitive, since it does not express the object, the telic reading is not available. See the Dutch example in (5).

(5) Het paard heeft urenlang /* in een uur gedronken.
The horse has hours-long/ in an hour drunk
'The horse drank for hours/*in an hour.'
(Van Hout 1998)

Furthermore since Unaccusatives project their argument in the internal object position and Unergatives as external argument, in general terms Unergatives have atelic reading (6) while Unaccusatives determine a telic reading (7).

(6) The horse has drunken for hours/*in an hour
(7) The horse has arrived *for hours/ in an hour.

So in languages like Dutch, English and Italian the presence of a direct (countable) object triggers a telic reading of the event. Nevertheless, in Slavic languages the countability of the direct object is not overtly encoded, as there are no articles. Instead, there is morphological aspect on the verb that is associated with telicity. In Kratzer's terms, the Tense phrase encodes in Slavic languages a more complex combination than in Dutch, English and Italian: tense (past/present), grammatical aspect (perfective/imperfective) and lexical aspect (telic/atelic). Telicity requires a morphologically perfective verb. The Czech examples in (8) and (9) illustrate it. Grammatical aspect is marked on the verb (Imperfective in 8a/9a and Perfective in 8b/9b) and depending on the verbal morphology the direct object is identified as definite or indefinite. Thus the perfective (8b and 9b) establishes a telic interpretation and a definite reading of the direct object while the imperfective (8a and 9a) an atelic interpretation and an indefinite reading of the object.

(8) a. Ota pil vino
Ota drink (Imperfective) wine / ?the wine
'Ota drank wine / ?the wine'

b. Ota vypil vino
Ota (Perfective suffix)drink *wine / the wine
'Ota drank *wine / the wine'

(9) a. Jedi hrušky.
(He) eat (Imperfective) pears/ ? the pears
'He ate pears/ ? the pears'

b. Snědi hrušky.
(He) eat (Perfective)*pears/ the pears .
'He ate *pears/ the pears

(Van Hout 1998)

This is a crucial difference with languages that mark telicity directly on the quantification of the object: Slavic languages mark the quantification directly on the specification +/- perfective of the verb.

Since languages systematically differ in the representation of the telicity, children must pay attention to different elements depending on the aspectual features of the target language. Czech children must learn the semantics of perfective-imperfective marking on the verb and figure out its double semantic function: establishing a telic/atelic reading and giving information about the definiteness of the object. Dutch, English and Italian children must learn the aspectual information through the definiteness of the object (and also the locus of generation of the subject in order to distinguish between intransitives) in composition with the verb. There is no specific locus for encoding telicity in the clause, unlike what happens with tense that seems to always get marked on the verb. It seems that UG will direct and restrict the search space of where to look for telicity clues across verb and object. Still, the child has to figure out which exact clues his language employs.

Van Hout (1996, 1998) claims that one may expect that learning the role of direct objects for telicity arises later than the role of perfective marking on the verb because it is easier to retrieve. Dutch, English and Italian children initially will not realize that the count term versus mass term distinction, marked through the presence/absence of an article, co-determines telicity: such information is not presented directly on the verb but is retrieved by the composition of verb and direct object. She puts forward the hypothesis that when the lexical aspect of a verb is marked directly in its morphology it is easier to retrieve than when it is marked in the co-occurring elements. Her hypothesis is confirmed by the experiments in Van Hout (1996, 1998). She found out that Dutch and English children up to the age of 5 do not conform to the aspectual information related to object position in an adult-like way. On the other hand, Polish and Russian children as 2 and 3 year olds are able to compute their aspectual entailments right. Italian patterns with English and Dutch. Next section is devoted to a closer look to the combination of grammatical and lexical aspect in Italian and the consequent implications for its acquisition.

4.1.1. Few Notes on Aspectual Tense Interpretation in Italian

Since telicity can be derived compositionally in languages like Italian, the quantificational status of the object or its mere presence in intransitive constructions determines telicity. Thus, the aspectual semantics of the VP is compositionally determined (Verkuyl 1972, 1993; Krifka, 1986, 1992) depending on the features of the projected internal argument. Nevertheless, lexical aspect can also be determined directly by the lexical root of the verb. Each verbal root may include its own lexical features like [±stative], [±durative], [±telic]. For example in (10) and (11) we have two Unergative verbs that are compositionally atelic, since no direct object is involved in the event they denote. Nevertheless while *dormire* 'sleep' in (10) is non stative, durative and atelic, a verb such as *partorire* 'give birth to' (11) is non stative and non durative but telic. This is brought out in (10) and (11) by the different temporal modifiers with which they can combine; *per ore* 'for hours' modifies atelic predicates and *in un'ora* 'in one hour' telic ones.

(10) Maria ha dormito per ore/*in un'ora
Maria has slept for hours/ *in one hour
'Maria has slept for hours/ *in one hour.'

(11) Maria ha partorito *per ore/in un'ora
Maria has given birth*for hours / in one hour.
'Maria has given birth (to a baby) *for hours/ in one hour.'

Both examples do not have an explicit endpoint in object position that determines telicity. The contrast is given by the fact that *partorire* in (11) is telic because of the presence in its lexical root of the world *parto* that means *birth* in Italian and is a *bounded* root in the terms of Harley (2005).[7] In sum, both lexical specification on the lexical root of the verb and an overt definite overt object may determine telicity in Italian.

The attribution of grammatical aspect through tense morphology works on predicates with marked lexical-aspectual values (such as telicity/atelicity). Since *passato prossimo* is the most common compound tense form also found in our corpus of spontaneous speech and it is a past tense, we will focus our attention on how *past tense* morphology interacts with lexical aspect in a representation *à la* Kratzer, when T phrase selects different aspectual values in AspP. Thus, the *passato prossimo* on one hand gives an entailment of completion for telic predicates such that the event has progressed to its natural culmination moment and, on the other hand, it establishes termination for atelic predicates (there is no natural culmination moment for atelic predicates; the final moment is an arbitrary moment). The *imperfetto*, for its imperfective feature, suggests ongoingness with the force of a conversational implicature and it applies in the same way to both telic and atelic verbs. All these interactions are summarized throughout table 1.[8]

[7] Harley (2005) distinguishes between two types of roots. The first one is the *bounded* root that denotes things that are delimited and determines telic reading: for example verbs of births such as *foal*, *calve* are derived by the incorporation of NPs like *foal* and *calf* that measure-out the event of birth due to their finite spatial extent. The second type of roots is the *unbounded root* that denotes things that are not delimited and determine atelic reading. Incorporating an *unbounded* root produces an activity due to the inherently infinite extent of the event or thing named by the root: for example *dance*, *drool* and *sleep* refer to NPs that are not delimited. For a discussion about boundedness vs unboundedness in nouns, verbs and events see Harley (2005).

[8] For a complete discussion on the Italian aspectual tenses, see Giorgi & Pianesi (1997), Bianchi & Bertinetto (2003), Arosio (2011).

Tab.1 Interaction between (a) telicity and the aspectual tenses (adapted from van Hout & Hollebrandse (2001)).

		Grammatical Aspect	
		IMPERFETTO	PASSATO PROSSIMO
Lexical Aspect	TELIC	*Ongoing*	*Completed*
	ATELIC	*Ongoing*	*Terminated*

The *imperfetto* is morphologically derived by adding the morpheme *–v* and the person and number morphemes to the verbal root. A past T head selects the imperfective aspectual features and it applies on the top of lexical aspect giving as a result an ongoing reading in the past. A verb such *mangiare* 'to *eat*' will derive the Imperfetto through the adjunction of the morpheme *v* and the agreement morphology of number to the morphological verbal root *mangia-*. The *imperfetto* gives the ongoing reading as it is visible in (12) and (13) allowing adjunction of a phrase with a present continuous (*sta ancora mangiando*= (he) is still eating) which confirms the ongoing reading in both telic (12) and atelic (13) situations.[9]

(12) TELIC & IMPERFETTO -> ONGOING

Questa mattina alle 8 il cavallo mangiava la mela, e la sta ancora mangiando

This morning at 8 the horse eat -pr3s *imperf* the apple, and it (obj.clitic) is still eating

'At 8 this morning the horse was eating the apple, and it is still eating it.'

(13) ATELIC & IMPERFETTO -> ONGOING

Questa mattina alle 8 il cavallo mangiava pane, e lo sta ancora mangiando

This morning at 8 the horse eat -pr3s *imperf* bread, and it (obj.clitic)is still eating.

'At 8 this morning the horse was eating bread and it is still eating it'.

[9] Kazanina & Phillips, (2007) and Real, Van Hout, Ezeizabarrena (2013), refer to the phenomenon of interaction between imperfective and lexical aspect of verbs in the terms of the traditional Imperfective Paradox (Dowty,1979): perfective (PF) and imperfective (IPF) aspect morphemes with telic predicates differ in that PF entails completion while IPF does not (Kazanina & Phillips, 2007). Therefore, telic PF predicates can be related only to complete versions of events, while IPF telic predicates can refer to complete and incomplete events. However, when these forms are used to convey new information, IPF can be pragmatically enriched generating the Scalar Implicature that completion has not been reached. For a discussion and experiments on the Imperfective paradox see Real, Van Hout & Ezeizabarrena (2013) or Van Hout & Hollebrandse (2001).

The *passato prossimo* is an analytical perfect which takes an auxiliary (either avere 'have' or essere 'be') plus a past participle: a perfective aspect Phrase selected by a present T. The resulting T+AspP combination, if applied to event that do not have a natural endpoint or a culmination, determines a terminated reading for an event that in its natural unfolding does not encode a termination as in (14), while if Passato Prossimo is applied to telic events it determines that the natural endpoint encoded in the eventive structure has been completed as in (15).

(14) ATELIC & PASSATO PROSSIMO -> TERMINATED

a. Maria ha pianto per un'ora/*in un'ora
Maria has cried for one hour/*in one hour

b. Maria ha mangiato mele per due ore /*in due ore
Maria has eaten apples for two hours/*in two hours

(15) TELIC & PASSATO PROSSIMO -> COMPLETED

a. Maria è arrivata *per un'ora /in un'ora
Maria has arrived *for une hour/in one hour

b. Maria ha mangiato la mela *per un'ora/ in un'ora
Maria has eaten the apple *for one hour/in one hour

As Kratzer (1998), different authors (including Borer, 1996,2004) agree in the assumption that the derivation of perfective morphology is given by the interpretation of the feature of *perfect* which is given by a temporal/aspectual functional category in an Asp projection below Tense.[10] Many approaches (Van Hout, 2004; Ritter & Rosen, 1998) agree in using an AgroP functional projection instead of the AspP. That means that the projection responsible for the accusative case checking and where the features of direct objects are checked is also relevant to determine the grammatical aspect. So the verb has to be marked for the presence of a quantified object or its absence. The insight of this claim is that the presence of a subject (object) of a quantifiable change (the terminus of the event) is compatible with the perfective meaning that is based on the completion of the event. The fact that overt direct objects are

[10] Borer (2005) defines it as an AspQ phrase that is a quantity node where the specifier is the subject of a quantifiable change, see Chapter 1.

checked in an Agro,P where also perfective aspect is given, is confirmed by the past participle agreement in gender and number when objects are moved to projection higher than AgrOP.[11]

Nonetheless, in Italian (as in Dutch, French, and several other languages) there are two auxiliaries that can be used in the formation of compound tenses that express perfectivity: the auxiliaries *essere* (=be) and *avere* (=have). The selection of the auxiliaries seems to be linked not only to aspectual features but also to structural relations between the objects and the clausal subject. Next section is devoted the analysis of the auxiliaries: their distribution in children's spontaneous speech seems to be somehow linked to the presence of an overt object.

4.2. Auxiliary Selection and Structural Meaning

Few syntactic phenomena are relevant to as many areas of linguistic theory as auxiliary selection – the alternation between auxiliaries in compound tenses. Standing at the intersection between syntax, lexical and clausal semantics, and morphology, auxiliary selection has been the subject of intense research since the late 1970s. In her review, Legendre (2006) gets to the claim that '…auxiliary selection in the present perfect of monadic verbs reflects a pattern grounded in lexico-aspectual properties of individual verbs though mediated through their syntax' (Legendre, 2006: pp.1538): that is, the lexicon-syntax interface and the projection of arguments within the VP are crucially involved. In our perspective, since our main aim is to understand the characteristics of the structural meaning encoded in the acquisition of verbs, the features of auxiliaries (and their selection) will help us in understanding the first verbal structures produced in child Italian and how the lexicon-syntax interface enters in the determination of the aspectual properties.

Languages vary on the basis on the auxiliary that verbs select in the formation of compound tenses. There are languages that do not show a split in the selection of auxiliaries. Some languages like English, Spanish, some varieties of Catalan, Swedish and a number of

[11] We refer to object clitic construction with past participle agreement such as (1) and to Unaccusative constructions in (2) with *be* auxiliary. We will back on the auxiliary selection in the next section.

(1) L'ha comprata Mario
It (clitic) has bought (feminine singular Past Participle) Mario
Mario has bought it.

(2) Sono arrivate le rondini
Are arrived (feminine plural Past Participle) the swallows (fm, plural)
The swallows have arrived.

Italo-Romance dialects[12] select just *have* while others select just *be* as Scottish Gaelic (Adger, 1996), Welsh (Roberts, 2005), modern Terracinese (an Italo-Romance dialect discussed by Tuttle 1986), several Slavic languages (e.g. see Pancheva, 2003 on Bulgarian) and Shetland English (Melchers 1992).[13]

Other languages differ on the type of properties that determine the split in auxiliaries: on the one hand there are clause-level properties, on the other hand there are predicate-level properties. In the clause-level set there are the languages that split their auxiliaries on the basis of the person and number of the subjects, or on tense and mood such as many Italian and Germanic dialects (Manzini & Savoia, 2005; McFaldden & Alexiadou, 2006).[14] In the predicate-level set there are the languages that have formed the basis for much of the discussion about auxiliary selection in the literature, namely Dutch, French, German, Italian and several other Romance and Germanic varieties. The factors involved are related: on the one hand to the argument structural status of the main predicate, and, on the other hand to the aspectual structure or Aktionsart of the denoted eventuality. Thus, these factors are determined by the main lexical verb in combination with various VP (or *v*P) arguments and modifiers. Since Italian belongs to the last set of languages we will not address the issue about a general theory on auxiliary selection as in Kayne (1993),[15] but we will pay attention to the argument structure and the lexical aspect that in different theories have been invoked to be responsible for the auxiliary selection in languages that present a predicate level Auxiliary split: our aim is to understand the characteristics of the first computational operation involved by

[12] Legendre (2006) proposes that in these languages the argument of any monadic verb is realized as an External Argument in the present perfect. Her main assumption is that the present perfect morphology allows changes in the feature of argument projected in the event. For a review of this hypothesis see Legendre (2006) and Legendre, Miyata & Smolensky (1991).

[13] Interestingly enough, many of the languages in this group do not actually have a lexical verb corresponding to *have*. Possession is expressed by *be* combined with oblique marking on the possessor. For a discussion of this typology f languages see Macfaden et al.(2006).

[14]Kayne (1993), for example, attempts to handle both splits based on argument structure and those based on person and number. Recall that, for him, the difference between HAVE and BE reduces to whether or not a preposition incorporates into BE. One circumstance under which incorporation will fail is if the structure simply lacks the P in the first place. He proposes that this is possible in Unaccusatives, but not in Unergatives or Transitives, hence the familiar auxiliary split based on predicate-level properties. Alternatively, incorporation can be made unnecessary even if the P is present, if the subject can escape the prepositional structure in some other way. Simplifying greatly, this possibility is related to participial agreement with the subject, and thus can be sensitive to the subject's person and number. This leads to the attested person- and number-based splits. Manzini & Savoia (2005), D'alessandro (2012), Arregi and Nevins, (2012) implement and reformulate the proposal of Kayne in explaining the person and number split languages.

[15] See footnote 14.

the auxiliary selection in language acquisition. We will review the insight of the Unaccusative Hypothesis that links verb classes to auxiliaries and how Sorace (2000) includes in the analysis of the auxiliary selection lexical features that accurately account for variable behavior verbs and crosslinguistic differences. We will then present the distribution across verb classes of auxiliary in Children's spontaneous speech.

4.2.1. Syntactic account: the Unaccusative Hypothesis

The central premise of the UH, formulated in Perlmutter (1978), is that intransitive verbs fall into two classes, based on the status and locus of generation of their single argument: Unergatives and Transitives project external argument while Unaccusatives internal argument. The motivation for this idea comes from the behavior of intransitive verbs on a series of syntactic tests which distinguish transitive subjects from objects: for example the *ne* Italian partitive clitic that is possible only with internal arguments. Crucially, in languages like Italian and Dutch, the distribution of auxiliaries across intransitives seems to coincide with the split determined by the syntactic tests like *ne*-cliticization. Perlmutter thus suggested that the syntactic representation distinguishes Unergatives/Transitives from Unaccustaives in terms of the underlying grammatical roles borne by their subjects. Consequently he proposed rules for the auxiliary selection that refer to the underlying grammatical roles.

Burzio (1986) accordingly argues that the selection of the auxiliary in Italian is an Unaccusative diagnostic:[16] Unaccusatives select the auxiliary *essere* 'to be' while Unergatives and Transitives select *avere* 'to have'. If children correctly recognize the verb class, they are supposed to make no mistakes in choosing the right auxiliary for verb class. Burzio shows that *essere* is selected by Unaccusatives and passives and *avere* by Transitives and Unergatives.

On the same line there are more recent approaches that account for auxiliary selection on the basis of lexical-semantic features that overlap the Unaccusativity Hypothesis: the rationale is that for example Unaccusatives select *be* and are prototypically verbs denoting a telic change in location or state. Telicity is taken to be the lexical feature that generally determines the auxiliary selection and is at the basis of verb class distinction and argument projection (e.g. van Hout, 2004; Levin and Rappaport Hovav, 1995; Zaenen, 1993).

[16] For a discussion on the Unaccusative Diagnostics at work in Italian and in other languages see Burzio (1986), Grimshaw (1987) and Levin & Rappaport Hovav (1995).

Legendre (2006) recognizes the insight of the Unaccusativity Hypothesis and the role of syntax in auxiliary selection but at the same time she criticizes the use of a binary value for a single lexical-semantic feature like telicity: she argues that events are more complex and are built up of subevents that play a role in determining auxiliary split across languages and variable behavior verbs within the same language. The examples in (16) show that the same verb can be found with both auxiliaries and in one case it includes a state subevent and is expressed as an Unaccusative with the *be* auxiliary (16a), while in the other it implies a process and is expressed as an Unergative (16b). The verb *vivere* (to live) in (16) in both cases does not allow the telic reading since no natural endpoint is found in the subevent decomposition of verbs.

(16) a.Gianni è vissuto a Roma *in un anno /per un anno
Gianni be-pr3s lived in Rome one year
'Gianni has lived in Rome one year'

b.Gianni ha vissuto a Roma *in un anno/per un anno,.
Gianni have-pr3s lived in Rome for three years
Gianni has lived in Rome for three years

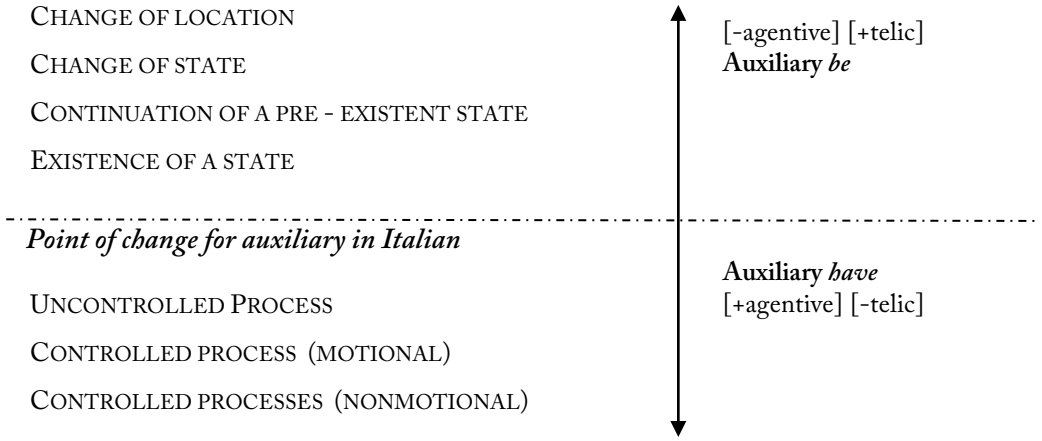
Although Legendre (2006) uses an Optimality Theory approach where the constraints apply on a huge number of lexical semantic features in which the verbs can be decomposed to account for the different type of languages (also including the ones with no auxiliary split in a diachronic perspective).[17] In languages like Italian auxiliary selection can be explained in terms of predicate level split using few lexical semantic features as in the account of Sorace (2000) that we review in next section.

[17] Legendre (2006) describes the transition between old and contemporary Spanish and English: these were split auxiliary languages at some early point in their history (Benzing, 1931; Visser, 1963/1973) and over time eliminated to *be* as a present perfect auxiliary with an operation for which the present perfect selects an external argument by default.

4.2.2. Lexical Features and Aspectual Meaning

Sorace (2000) claims that the selection of the auxiliary depends on the features [±agentivity] and [±telicity]. Verbs are divided depending on the value of these features. Sorace postulates a scale of verb classes identified by the different lexical values. This scale has the values [-agentive] [+telic] on one extreme and [+agentive] [-telic] on the other. The verbs with value [+agentive] are named 'processes' and imply the selection of the auxiliary *have* since they have an external argument that can be considered the *agent (causer)* of the process denoted by the verb. The verbs with value [-telic] are 'activities'. Each verb class is placed in the scale depending on the gradual variation in the attribution of a value to the two relevant features. The scale Sorace formulates is the one presented in (17) termed the *Auxiliary Selection Hypothesis*.

(17) AUXILIARY SELECTION HYPOTHESIS (ASH) (Sorace 2000)



This scale of aspectual features relevant is meant to account for auxiliary selection in all the languages in which it is found. The languages differ on the point of the scale taken as the cut off point for the selection of one auxiliary or the other as represented in figure 1 taken from Legendre (2006).

Fig.1 Split auxiliary selection in French, Dutch, German, Italian in Sorace (2000) from Legendre (2006).

ASH (Sorace, 2000)	Example	French	Dutch	German	Italian
Change of location	John came	E	E	E	E
Change of state	John died	E	E	E	E
	John went up	E	E	E	E
	John disappeared	A	E	E	E
	John lost weight	A	E	E	E
Continuation of state	His worry lasted	A	A	A	E
Existence of state	Dinosaurs existed	A	A	A	E
Uncontrolled processes	John shivered	A	A	A	A
Motional processes	John ran	A	A	E	A
Non-motional processes	John worked	A	A	A	A

Italian cuts at the point indicated in (17). Such a location is given as the point on the scale where it is possible to distinguish between processes (that select *have*) and states and change of states or location (that select *be*). Verbs like *vivere* (to live) in (16) selects different auxiliaries: they can select either *have* or *be*. *Vivere* in (16a) with the auxiliary *be* represents the existence of a state, while in (16b) it selects the auxiliary *have* and it is an uncontrolled process.

Italian children seem to project the argument structure since the very early stages, although they show some differences with adults' grammar linked to derivation of scope-discourse semantic features within the IP (as we have been arguing in the previous chapters), they produce different pattern of subject distribution depending on the verb class. The l-syntax of verbs also determines the selection of the auxiliary, since both *agentivity* and *telicity* in language like Italian are derived by the relations within the VP layers and overlap, in most cases, the Unaccusative/Unergative distinction. The analysis of the features of auxiliaries will help us in understanding how structural meaning interacts with the aspectual projections in the IP layer. In next section we start looking at how auxiliaries are distributed in the spontaneous speech.

4.2.3. Children's Auxiliaries in the Italian Corpus

We looked for the auxiliaries found in the CHILDES Italian corpus (Calamabrone) we have been using so far. The only compounds available in the children's corpus are the forms of *passato prossimo*. All forms with an overt auxiliary are correctly constructed by an auxiliary expressed in the present tense and a past participle. The percentage of occurrence of inflected

forms of the *passato prossimo* along all the productions for each verb class is given in table 2.

Tab.2 Distribution of forms with auxiliaries across verb classes in both Children and adults' spontaneous speech .

Distribution of Forms with Auxiiaries across Verb Classes				
	Children		Adults	
	Forms with Auxiliary	Simple Forms	Forms with Auxiliary	Simple Forms
Unaccusatives	15%	85%	9%	91%
Transitives	14%	86%	20%	80%
Unergatives	2%	98%	7%	93%

Children do not use the same percentage of forms of *passato prossimo* for all verb classes and the same is true for adults. In fact, there is a tendency in children's production to use more compound tensed forms with Unaccusatives and Transitives than with Unergatives. Only 2% of the total of Unergative verbs shows an auxiliary morphology in chidren's productions. We then checked if children select the auxiliaries correctly: table 3[18] shows the percentage of the *essere* and *avere* selected for the *passato prossimo*.

Tab.3 Percentage of Selection of the Auxiliary in the Compound Tensed Form in Children's Productions.

Auxiliary Selection across Verb Classes			
	essere (to be)	***avere*** (to have)	Omission
Unaccusatives	98%	0	2%
Unergatives	0	67%	33%
Transitives	0	75%	25%

Children do not show any problem in assigning the proper auxiliary in the compound-tense form with each verb class. Infants regularly select the right auxiliary *essere* for Unaccusatives

[18] We do not present data from adults, since adults do not present any mistake in the selection of the auxiliary and almost no omission.

and *avere* for Unergatives and Transitives These results are consistent with the ones of Snyder & Stromswold (1997).

After the pattern of distribution of subjects across verb classes, the selection of auxiliary is a second evidence of the fact that children attribute different clausal configuration to each verb class. Furthermore, the *Passato prossimo* in child language is supposed to encode the same terminated/ completed reading to both telic/atelic predicates; but following the general data in tab.3, children seem to not produce a lots of auxiliaries with Unergatives. Then, the age at which first compounds with different verb classes appear was analyzed. The age at which children first produce the forms of *passato prossimo* does not seem to be the same for all verb classes. The results from the four children show that none of them use compounds in the earliest stage. Furthermore, though there are strong individual differences regarding the first compounds with Unaccusatives and Transitives, all of them presented the same temporal pattern for the appearance of the first compound with Unergatives.[19] These are the last compound forms appearing in children's production as table 4 shows.

Tab.4. Age of first appearance of *passato prossimo* (yy,mm,dd).

First Forms of *Passato Prossimo* (yy,mm,dd) across Verb Classes for Each Child.			
	First PP with Unaccusatives	First PP with Unergatives	First PP with Transitives
Diana	01;08,05	02; 06	01; 10, 07
Martina	No forms	02; 04,14	01; 07, 18
Raffaello	02; 03 14	02, 05, 13	01, 11
Rosa	02; 01, 14	03;00, 24	02; 05, 25

The age at which children produce the first forms of *passato prossimo* is relevant in our respect because these forms encode aspectual information that is retrieved directly from the properties of the VP. Although general data about the selection of the auxiliary confirms that children correctly choose it depending on the verb class, the fact that the *passato prossimo* with Unergatives is the last in appearing for all children deserves an explanation. Children use fewer overt subjects than adults with Unergatives and do not produce forms with the selection of auxiliary till a late stage.

[19] Martina does not use auxiliaries with Unaccusatives. The analysis performed on the same corpus in Lorusso (2003) shows that she is, however, able to use the auxiliary with Unaccusatives in interrogative contexts.

The first main reason of the differences found between adults and children in the production of Unergatives could be determined by the low number of utterances in which Unergatives are used: also in adults' stimuli, Unergatives are the verb class with the lowest percentage of occurrences.[20] We resume the data about the distribution of verb classes in the spontaneous speech in table 5.

Tab. 5 distribution of verb classes in Children and Adults production (Absolut number and percentage).

Verb Classes Distribution				
	Unergatives	Transitives	Unaccusatives	Total Verbs
Diana	51 (8,5%)	428 (71,3%)	121 (20,2%)	600 (100%)
Martina	89 (16,1%)	352 (63,9%)	110 (20%)	551 (100%)
Raffaello	88 (14,3%)	384 (62,2%)	145 (23,5%)	617 (100%)
Rosa	42 (5,4%)	561 (72,9%)	167 (21,4%)	770 (100%)
Children	*270 (10,6%)*	*1725 (68%)*	*543 (21,4%)*	*2538 (100%)*
Adults	*88 (9,4%)*	*645 (68,9%)*	*203 (21,7%)*	*936 (100%)*

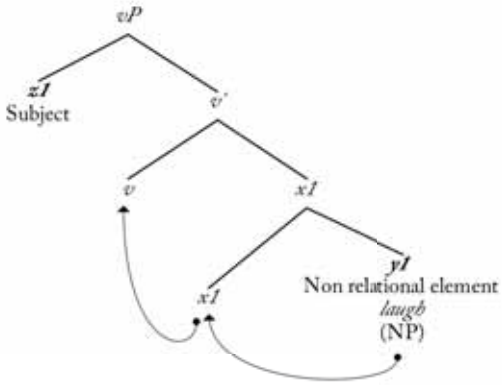
Moreover, one more l-syntactic feature distinguishes Unergatives from Transitives: although both project external argument, Unergatives do not show a direct overt object. Hale & Keyser (1993) first proposed that the Unergatives (beside the external argument in spec *v*P) have a structure similar to the Transitives in the sense that they project an internal argument position: the internal argument is a nominal head, thus capturing the denominal character of most Unergatives. This fact allows many Unergatives (in sentences like *sing a song* or in consumption verbs) to take an overt complement of a restricted semantic class (hyponymous) linked to the verbal root.[21] Mateu (2002) develops this idea in assigning to Unergatives a lexical structure as the one we give in (18) for the verb *laugh*. The subject is generated in the spec of the light verb *v*P while the complement that Unergatives select is a non- relational element: it has a nuclear configuration and it does not have further specifier and/or complement. Such a non-relational complement is incorporated directly in the verb and it

[20] In Chapter 3 we have also been arguing that the differences between adults and children in the production of overt subjects with Unergatives is linked to the fact the this verb class is not present as the other ones in the stimulus, this could influences the anomalies that children may present in the production of Unergatives (see Lorusso 2003).

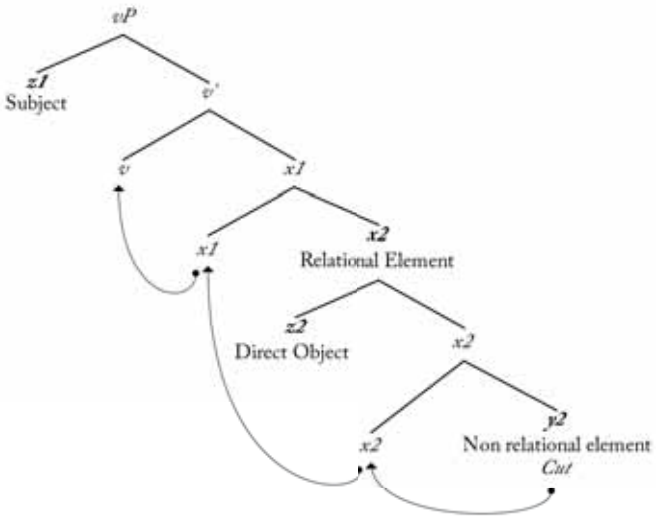
[21] For an analysis and a review of cognate object with Unergatives see Mateu (2002), Mateu & Rigau (2002), Real (2008), and Gallego (2012).

gives the name to the verb *laugh*. If we compare the Unergative *laugh* (18) with the Transitive *cut* in (19), we notice that both verbs present the same generation of the subject but a different complement. Transitives subcategorize for a relational element, which means that the selected item is given with a specifier (the overt direct object) and a non-relational element as a complement.

(18) Unergatives



(19) Transitives



Both verbs are derived through the incorporation of the non-relational element into the verb matrix. Transitives present one more overt element (z2) that does not incorporate into the verb matrix. This type or representation allows us to define the difference between

Unergatives and Transitives in the terms of absence/presence of a specifier of the element in complement position that does not incorporate into the verb and is an internal argument.

In terms of acquisition, we have seen that in the early stages children produce a similar percentage of overt subjects with both Unergatives and Transitives (Chapter 2 and 3), this could suggest that they treat both types of verbs as a single verb class.[22] This is compatible with an account for which Unergatives are Transitives that select a non-relational complement (as the intransitive version of consumption verbs like *eat* or *drink*).

Arguing that children distinguish verb classes only for the locus of generation of subjects would imply that they use the same lexical structure for all the verbs that generate the subject in spec *v*P position. Nevertheless, while this claim can account for the distribution of subjects, it can not account for the differences found between Transitives and Unergatives: the presence of an overt object (that infants do not omitt) with Transitives at spell out and the difference in the lexical /grammatical aspect linked to the AspP /AGROP projection where the features of the direct overt object of Transitives (and not of the non relational complement of Unergatives) are checked.

In this section, we have showed that the *passato prossimo* with Unergatives is produced later than with other verb classes. Since Italian is a language that partially expresses aspect compositionally through the computation of internal objects, we propose that the delay in the appearance of the aspectual perfective morphology of *passato prossimo* with Unergatives is due to the fact that Unergatives are not produced with an overt object and to the low percentage of Unergative occurrences within the spontaneous speech. The key point of the present proposal is linked to the assumption that the features of the objects trigger the appearance of perfective morphology and the absence of such an overt element with Unergatives determines a delay or an under-specification in the derivation of aspectual meanings.

Our proposal is that children clearly distinguish between Transitives and Unergatives but although this is not predictable by the analysis of the distribution of overt subjects, it can be inferred by the analysis of the aspectual effects determined by the presence or the absence of an overt direct object. Next section is devoted to review the theories of the acquisition of

[22] Remember that adults produce more overt subjects with Unergatives than with Transitives. We have been arguing in Chapter 2 that this is due to the presence of an overt direct object with Transitives that allow the recovery of information about null subject more easily than with monoargumental verbs.

grammatical aspect and to report a production experiment in which the use of *passato prossimo* with Transitives and Unergatives is analyzed.

4.3. Developmental Pattern in the Production of Aspectual Auxiliaries

We have seen that all children in the corpus of spontaneous speech produce *passato prossimo* with Unergatives later than with Transitives and Unergatives. This section is devoted to review the theories that have been proposed to account for the acquisition of past aspectual tense morphology.[23] We will focus mainly on perfective and imperfective grammatical aspectual features and on the Italian tenses in which they are realized: respectively the *passato prossimo* and the *imperfetto*. We will present a production task in which the grammatical aspect encoded in past tenses is correlated to the lexical aspect determined within the VPs.

For the acquisition of the aspect in tense morphology we will refer to two traditional approaches: the Lexical Aspect First (LAF) (Antinucci & Miler, 1976) and the Grammatical Aspect First (GAF) hypotheses (Wagner, 2001). Both frameworks coincide in that the initial child grammar mismatches forms and meanings so that child grammar differs crucially from the adult grammars for the use of tenses: inflection is not taken by the child to mark temporal relations. For Lexical Aspect First, tense inflection is taken by the child to encode lexical aspect notions such as telicity, while for Grammatical Aspect First, the tense inflection is used to reproduce grammatical aspect such as perfectivity.

Nevertheless, children seem to not have any problem with the production and comprehension of past tenses. For example Beherens (1993) found in early German productions clear instances of the child's ability to refer to past events before the onset of linguistic tense marking, suggesting that children have a basic temporal orientation of past long before its morphological tense marking. Smith & Weist (1987) in their studies on Polish acquisition found that children are able to refer to the past properly and in earlier stages. Children aged between 1 year and 2 years were able to refer to events happening two weeks before the second experimental session by using past tense forms without referring to particular aspectual notions of the class of verbs.

[23] In the last decades numerous psycholinguistic studies have been concerned with the acquisition of aspect (and tense). The findings of these studies (as well as the general Aspect Hypothesis) are reviewed very thoroughly and in detail in Weist (2002) (see also Shirai 1998, 2003). We will focus on the analysis of the acquisition of language in which the pair perfective/imperfective is present.

In our corpus we found forms of *imperfetto* with Unergatives that precede the appearance of *passato prossimo* with this verb class: see (20). If LAF works, we should expect that children will express telic forms such as Transitives or Unaccusatives only with perfective forms and will show problems with *imperfetto* (in particular they predict that Transitives and Unaccusatives will not appear in the *imperfetto*). But this is not consistent with our corpus: infants use *imperfetto* with both Transitives (21) and with Unaccusatives (22). Children use this tensed past forms independently from their lexical aspect, and perhaps they use them just for referring to the past. So, the predictions of the Aspect First Hypothesis are not fulfilled by our data.

(20) Unergatives

a. no , chivavo io . (Diana,02; 05)
no, write-pr1s *imperf* I
'No, I wrote'

b. otava (=nuotava) (Martina, 01;11,20)
swim –pr3s *imperf*
'(he/she) swam'

c. sparava . (Raffaello,02; 04, 29)
shoot –pr3s *imperf*
'(he/she) shoot'

d. uno fumava . (Rosa, 01;11, 24)
someone smoke –pr3s *imperf*
'someone smoked'

(21) Transitives

a. ettìa 0w ppallone (=metteva il Pallone) (Diana, 01;10,07)
put –pr3s *imperf* the ball
'(he/she) put the ball'

b. 0w bimbo (a)ngiaw 0w banana (Martina, 01;10,29)
the child eat -pr3s *imperf* the banana
'The child ate the banana'

c. lo veva (=muoveva) (Raffaello, 02,00 ,28)
it –obj.clit (he/she) moves –pr3s
'(he/she) moved it'

d. # l' apia #2 (Rosa, 02;05,25)
it -obj.cl. open – pr3s *imperf*
'(he/she) opened it'

(22) Unaccusatives

a. allivava la l' acqua (Diana, 02 ;01, 35)
arrive – pr3s *imperf* the water
'the water arrived'

b. s' # <pioveveh@i> [<] ! (=pioveva) (Martina, 02;03,01)
rain -pr3s *imperf*
'it rained'

c. diventava forte (Raffaello, 02;09,06)
become- pr3s *imperf* strong
'(he/she) got strong'

d. eva, eva, <ere> (=sedeva) (Rosa, 01;09,11)
sit down-pr3s *imperf*
'(he/she) was sitted'

Wagner (2001) proposed a different version of the Aspect First Hypothesis. She formulates the so-called Grammatical Aspect First Hypothesis. Children initially associate past morphology with perfectivity and present morphology with imperfectivity, instead of past and present. She performed an experiment on American English children in which she showed ongoing situations and contrasted these either with completed situations or incomplete

situations in the past. Children had to select a scene when prompted with a present or a past tense (of the auxiliary). The youngest children (2;6 years old) were only able to correctly differentiate past and present when presented with two acted-out scenes showing a completed/ongoing contrast, but not when given an incomplete/ongoing contrast. Wagner argues that children map past tense on completion and present tense on incompletion, so that they cannot do the task when they are given an incomplete-past and an incomplete-ongoing situation. She takes this result as support for the Grammatical Aspect First Hypothesis. Children interpret past and present morphology as bearing the grammatical aspect meaning perfective and imperfective, respectively. She concludes that all past tenses are used in all languages to refer to completed situations and present tense to refer to ongoing situations.

Our data do not confirm these assumptions: children use imperfective with all verb classes. For perfectives, the only class in which children show a delay in producing the *passato prossimo* is the Unergative one. Martina[24] also has problems with Unaccusatives, but not so if interrogative production is taken into account. Unergatives are expressed in *imperfetto* without problems but they are not expressed with *passato prossimo* morphology because children may not be able to assign the perfective reading to this verb class. Wagner's assumptions do not account for the fact that children systematically use few and late forms of *passato prossimo* with Unergatives.

Our claim is that children have no problem in attributing a perfective value to any verb class, except for Unergatives since overt direct objects are not given and the perfective morphology can not be triggered by the features of the internal argument but have to be operative directly at AspP: aspectual features have to be checked through the auxiliary morphology directly in the IP layer and can not be determined from a bottom up compositional derivation. Before presenting our perfective/imperfective production experiment, we will briefly sketch the background studies on Italian.

4.3.1. Acquisition of Aspect

Both LAF and GAF coincide in the assumptions that tense morphology is used in early grammar as a one to one mapping with aspect: for LAF perfective morphology is used to

[24] See the Tab.3 about the appearance of first forms of passato prossimo across verb classes and children.

express telicity while imperfective/present is used for atelicity; for GAF all past tenses stand for perfective while present tenses for imperfective. Against LAF we have seen that at least imperfective morphology is used with all verb classes (as in the data of the spontaneous speech), while against GAF we can argue that in the spontaneous speech both *imperfetto* and *passato prossimo* are used as past tense and there is no overlapping between present tense and imperfective: children differentiate about temporal relations.

Further criticisms to such views come from Van Hout & Hollebrandse (2001). They claim that Italian children do not reliably know the grammatical aspect semantics associated with *passato prossimo* and *imperfetto* so even when they produce it may simply refer to temporal features. Hodgson (2001) has proved that children acquiring Spanish are not sensitive to grammatical aspect when perfective tenses intervene on the top of different lexical classes.[25]

Van Hout & Hollebrandse (2001)[26] tested children's comprehension of telic sentences (all presenting an overt quantified object) in the Imperfetto and *passato prossimo* tenses using a picture selection task. Subjects were presented with short stories and accompanying pictures. The final picture of each story was missing. Children's task was to choose one of two pictures they were shown at the end of the story. They were asked about the picture using a question presented in the *passato prossimo* or in the *imperfetto*. The choice was between a picture of a completed situation and one of an ongoing situation. Half of the questions had an *imperfetto* and the other half had a *passato prossimo*. The story that at the end presented the question with an *imperfetto* implied the choice of the ongoing situation, while the situation with a *passato prossimo* triggered the choice of the completed situation in adults. The 64 children tested in this experiment (aged between 3 and 5 years old) showed a particular pattern of comprehension: in table 6 the correct answers are computed; the choice of the correct picture for the *imperfetto* is the ongoing situation and for the *passato prossimo* the completed situation.

[25] We present just the studies that refer to the lexical aspect resulting from the presence of an object or endpoint in finite VPs. Here, we do not make reference to studies that have investigated the presence of aspect in child grammar in non-finite constructions as Hoekstra & Hyams (1998) and Hyams (2007).
[26] For a cross-linguistically analysis of the interaction between perfectiveity and tense morphology on acquisition see Van Hout (2007).

Tab 6 (Van Hout & Hollebrandse 2001) results of the comprehension task experiment of perfective/imperfective morphology for scenarios involving telic predicates.

Percentage of Correct Answer (Imperfetto-Ongoing / Passato Prossimo-Completed)		
Age	Imperfetto	Passato Prossimo
3	35%	47%
4	71%	57%
5	58%	92%

3-year-old children present the lowest percentage of correct answers. 4 and 5 year olds show a higher percentage of correct answers. In any case, children make a lot of mistakes in performing this task. Children do not seem to recognize the grammatical aspectual information encoded in the tense morphology very well. The important thing to notice here is that there is no possibility of accounting for the experimental performance in terms of aspect. There is no bias at work for which they, certainly at an early age, use perfective/imperfective morphology in order to refer to aspectual notions. Children do not interpret *imperfetto* or *passato prossimo* systematically to refer to the ongoing/completed, they only do it at 4 years for *imperfetto,* at 5 years for *passato prossimo.*

The second study we review is the one of Hodgson (2001), who performed two experiments: a production task and a comprehension task on Spanish children. The production task was made with children aged between 3 and 8 years old. The children were presented with a silent video that described three telic actions (presenting a completed situation) alternated with three atelic verbs (presenting an incomplete situation). Then children had to describe the situation when it was over. In describing the situation, the participant had to select how to convey the information. The subject had two choices; he could express himself by using a perfective morphology or by using imperfective morphology. Hodgson found that the youngest group, the 3/4 year olds used perfective at a rate of 66% for describing completed situations, and imperfective at a rate of 75% rate in expressing incomplete situations. The 5/6 year olds did not show this pattern since they used more imperfective forms with completed situations and more perfective forms for incomplete situations. The 7-8 year-olds' performance was similar to the one of the 3-4 year-olds: they produced 84% perfective tenses in their description of completed situations, while they used

imperfective tenses for incomplete events 75% of the time. These data suggests that young children distribute grammatical morphology according to lexical type in the earliest stage, and in the later stages analyzed. It is only the 5-6 year-olds who do not show the same pattern. Hodgson argues that this is due to the fact that children up to 7-8 years old do not know the entailment of completion/no completion but she does not explain why 3-4 year olds do use tense morphology to refer to lexical aspect of the verbs as adults and 7-8 year-olds.

Hodgson's (2001) comprehension task was performed on children aged between 3 and 8 years old. Children were shown a video presenting actions referred to by telic verbs (with an object and a culmination point) and a story that described the context. At the end a who-question was presented to each child using the perfective morphology of the type *"Who did it?*". Children had to choose between two images, one showing the completed situation and the other showing the uncompleted one. Children produced adult like answers, correctly selecting the completed situation only at 7, while adults know the completion values encoded in the verbal morphology. Children were not aware of the perfective values encoded in the perfective forms and they needed to visualize the completion of the action on the resulting state of the object in the video in order to assign a completed reading to the predicates. The majority, in fact, of children's incorrect answers were found in situations where the object did not show a complete change of state, but the only detail in the video they had to focus on was the fact that the agent had finished performing the action. This confirms the important role of the object[27] in order to measure out the event and allow children to give aspectual interpretations of the verb.

These studies confirm that Aspect First Hypothesis (both Lexical and Grammatical) fails to give sufficient relevance the compositional syntactic or lexical elements that seem to be crucially involved in the determination of aspectual verb classes in child grammar. The grammatical aspect seems to intervene in a second stage, when the lexical configurations have been established.

Our claim is that in languages like Italian, where there is no overt aspectual marker on the verb as in Slavic language, at least in early stages aspect is not assigned directly in functional higher projections as AspP but it relies on the structural meaning as it is read off in

[27] Spanish is very similar to Italian in the determination of aspect compositionally: that is, through an overt object, but few differences are found, see Hodgson (2011) for a review on Spanish compositional lexical aspect.

the VP layers:[28] aspect checked directly through the auxiliary morphology in AspP (as perfective with Unergatives) will appear later than compositional aspect checked through features of the direct objects. Once more, what is given at l-syntax interacts with the general bottom-up pattern of development in child acquisition.[29]

In order to prove such claim we need to check the role of overt objects in accounting for children's aspectual interpretations when the grammatical aspect is the controlled variable: we need to understand whether the presence of an overt (countable) object triggers telicity or not, and when and how the grammatical aspect encoded in the tense morphology starts to work on the top of the compositional lexical aspect (when perfective morphology is used at the same rate with both classes of verbs: the ones with overt objects and the ones without overt objects). Below we provide two experiments that complete our picture of the characteristics of the lexical aspect as it results from the structural meaning in child grammar. We adapted the experiments of Hodgson to Italian: a production task to find the age at which children start to use the *passato prossimo* on the top of lexical information, and a comprehension task designed to understand how children analyze aspectual information encoded in the verbal morphology of *passato prossimo* with different verb classes.

4.3.2. Production Task

This experiment is designed to recognize the pattern of expression of perfective/imperfective forms along ages and verb classes. Children are presented with a video in which both telic Transitives and atelic Unergatives are completed/terminated and then they are asked to describe the video using past tenses. The first goal of the production task is to investigate whether and when children start produce *passato prossimo* with both Unergatives and Transitives at a similar rate[30].

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[28] Van Hout & Hollebrandse (2001), in fact, claim that in Italian children do not comprehend the grammatical aspectual implications of *passato prossimo* till the age of 7.

[29] We refer to the proposal we made about the difference in the spell out domain at different stages in Chapter 3: the domain at which spell out applies varies from VP in the earliest stage to higher domain in a bottom up development.

[30] We modified the experimental task of Hodgson (2011) we described in 4.3.1 since we forced the expression of perfective forms: in the movies we used we presented all the situations implying both telic and atelic verbs as completed/terminated.

Our proposal assumes that children in the early stage may have problems in deriving perfective (passato prossimo) with Unergatives, because they are not able to identify an overt object/endpoint for such a verb class within the VP: children, then, should prefer *passato prossimo* (the perfective form) with telic predicates and imperfetto (the imperfective form) with atelic verbs, according to the hypothesis. Thus, our predictions coincides with the ones of the Lexical Aspect First Hypothesis, since we both assume that children will use perfective forms with Transitives and imperfective forms with Unergatives. Anyway: while LAF assumes that the cause of such behavior is linked to the tense=aspect mapping, our proposal anchors this distribution to the relevance children give to the role of overt object to derive aspectual past tenses.

4.3.2.1. Subjects

Ten native adult Italian speakers and fifty children participated in the study: ten 3 year-olds, ten 4 year-olds, ten 5 year-olds, ten 6 year-olds and ten 7 year-olds. The ten adults were tested at their homes in Conversano (Bari, Italy) and the children were tested at school 1° Circolo didattico "Giovanni Falcone" also in Conversano (Bari, Italy).

4.3.2.2. Stimuli and Procedure

The materials consisted of 8 silent digital videos in which a story was presented: the story involved three telic transitive verbs with an overt quantified object and three atelic verbs without overt objects. (23) illustrates an example of telic transitive and the content of the video showed to children and (24) an example of atelic Unergatives.[31]

(23) Telic transitive with overt objects in the experimental session

a. Marta fa la torta

'Marta makes the cake'

[The girl starts to prepare a cake in the kitchen using pots, spoons and milk and fruit. Then, after a few seconds she shows a cake to the camera.]

[31] The other verbs with the description and the pictures of the video are found in section 1.1 of the appendix.

(24) Atelic Unergative in the experimental session

a. Marta dorme

'Marta sleeps'

[The girl is seen while she sleeps, then she wakes up.]

Atelic events were represented with an endpoint as a specific design of our experiment (contrary to what happens in Hodgson's experiment where atelic verbs are represented in ongoing situations). The endpoints are given in our experiment to force a completed reading and, consequently, the use of *passato prossimo*.

All events (telic and atelic) were presented in the same video in a random order. The actions represented were chosen in order to evoke familiar activities for the children. Infants, before watching the video, were introduced to the character in the story and they were asked to pay attention to what she had done the day before in order to describe it. The video presented the six actions sequentially as in (25).

(25) Sequence of actions in the experimental session

i. Marta sleeps
ii. Marta makes the cake
iii. Marta phones
iv. Marta washes the dishes
v. Marta eats the cake
vi. Marta sings

After watching the video children were presented with six pictures representing the actions they had just seen in the video. Then, they were asked to describe such actions in the past with the request: *Describe what Marta did yesterday*. In case of telic predicates, the pictures represented the object as it resulted from the performance of the action and in the case of atelic predicates, the action was presented in its development.

Before the experiment was carried out, the subjects were presented with a trial test to see if children were ready for the task, and to help the child familiarize her or him with the design of the experiment. The video of the trial test presented two atelic predicates (26) and a telic

one (27) ordered as in (28). Children were introduced to the girl (Marta) and then they were asked to pay attention to what Marta did the day before yesterday.

(26) Atelic Unergatives in the trial session
a. Marta ride
'Marta laughs'
b. Marta dorme
Marta sleeps'

(27) Telic Transitives in the trial session
a. Marta fa l'aeroplanino
'Marta builds the airplane'

(28) Sequence of actions in the trial test
a. Marta makes the aeroplane
b. Marta laughs
c. Marta sleeps

Then, children were asked to describe what Marta did the day before yesterday looking at three pictures representing the events in the video. Once more the telic event was presented in the pictures with the resulting states of the object while the atelic events were presented in their development. If children had problems at the end of the trial session they did not participate in the experimental session. We had problems just with two 3-year-olds who started to cry. We replaced them with two other 3-year olds.

4.3.3. Results

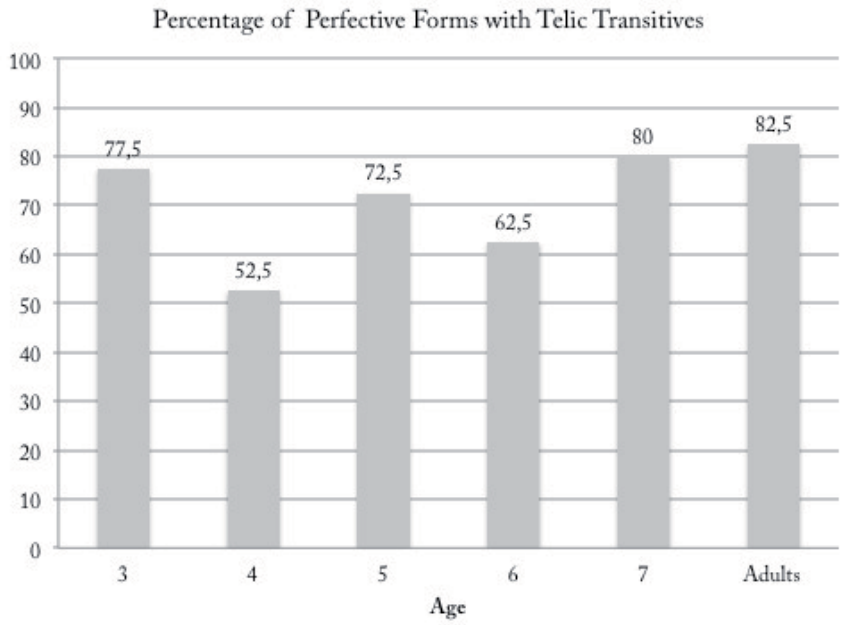
The first general result we present is the attribution of perfective and imperfective morphology to the general verb classes of telic Transitives on one hand and atelic Unergatives on the other. We compute the results of the trial and of the experimental task all together. The absolute

numbers of the responses is summarized in tab. 2 while in figure 1 we give the percentage of *passato prossimo* used with telic Transitives.

Tab. 7 Responses with Telic Transitives (absolute numbers).

Distribution of Perfective/Imperfective Tense Morphology with Telic Transitives				
Telic verbs		Passato Prossimo	Imperfetto	Total
Age	3	31	9	40
	4	21	19	40
	5	29	11	40
	6	25	15	40
	7	32	8	40
	adults	33	7	40
Total		171	69	240

Fig.2 Percentage of perfective forms with Telic Transitives



It seems clear that there is a systematic behavior in attributing *passato prossimo* to telic Transitives. The graph in fig 2 gives us the general percentage of perfective forms produced with telic verbs for all the individuals examined.

At first sight, there are differences in the performance of the group of 4 and 6 year-olds. However the statistical analysis performed does not indicate significant differences among the age groups.[32] There is a tendency for all age groups to produce telic Transitives in sentences with the *passat*o *prossimo*. Still, both children and adults produce imperfective forms with such verbs. That means that there is a tendency to produce such forms with a perfective morphology but all the groups are able to attribute other aspectual marks to such verbs.

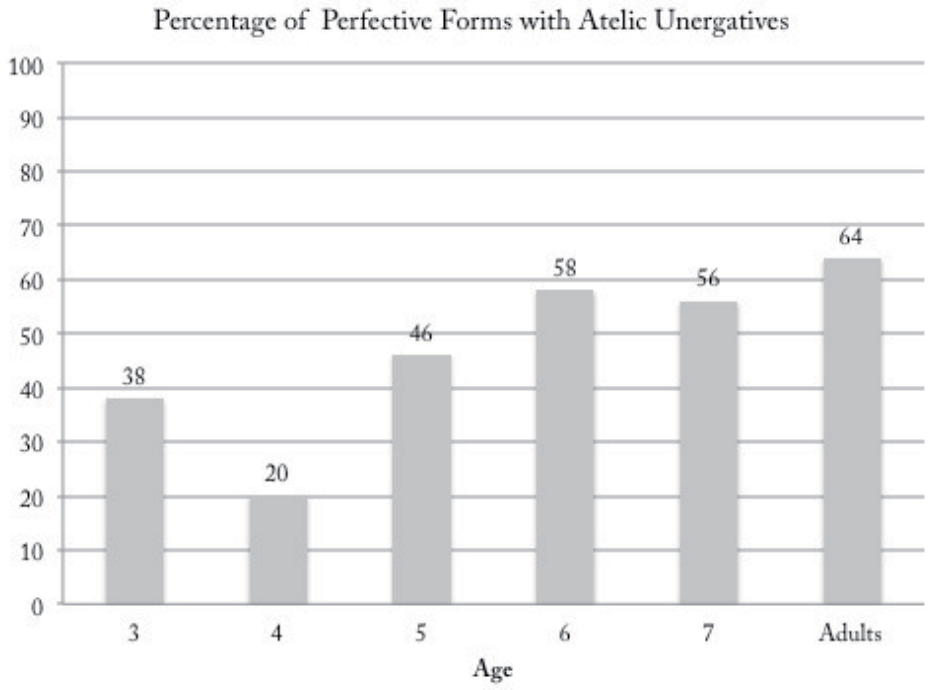
Atelic Unergatives have different distributions of perfective morphology depending on age. In table 8 we give the absolute number of the responses while in figure 3 we present the percentage of perfective forms over the total. The general percentage in figure 3 shows that there is a stronger variation for the production of the *passato prossimo* for atelic Unergatives than we have found with telic Transitives. Children under the age of 5 produce the perfective with such verbs in less than half of the situations. They prefer to use imperfective forms in this context.

Tab. 8 Responses with Atelic Unergatives (absolute numbers).

Distribution of Perfective/Imperfective Tense Morphology with Atelic Unergatives				
Atelic verbs		Passato Prossimo	Imperfetto	Total
Age	3	19	31	50
	4	10	40	50
	5	23	27	50
	6	29	21	50
	7	28	22	50
	adults	34	16	50
Total		143	157	300

[32] The chi-square statistic has been used to test differences among the age groups. However, due to the presence of small frequencies in some cells of the contingency tables, the likelihood ratio statistic has been also used. To compare the two categories of verbs (telic and atelic) the Wilcoxon statistic has been used. All results have been obtained using SPSS v12.0. The significance level was fixed at 5%.

Fig.3 Percentage of perfective forms with Atelic Unergatives.



The likelihood ratio statistic performed on this data was 40.84 (p-value=0.024). That means that there is a significant difference among ages for the type of responses. Adults seem to behave in the same way with both verb classes: they show the tendency in selecting the *passato prossimo* without any differences among the two verb classes. (Statistical analysis is presented in the Appendix 1). Children aged between 5 and 7 years also show the tendency to select *passato prossimo* for both verb classes. So, adults and children aged between 5 and 7 years respond as the experiment requires. 3-year olds show systematic difference in the responses for each verb class. Atelic Unergatives are expressed with a preferential imperfective morphology, while telic Transitives are expressed with a preferential *passato prossimo*. This result is statistically significant by the Wilcoxon test: it is -1.92 (p-value=0.054). The same is true for 4 year olds. (The Wilcoxon statistic in this case is -2.23 (p-value=0.026)). That means that only 3 and 4 year-olds systematically attribute perfective morphology for telic Transitives and imperfective for atelic Unergatives.

All the verbs within the same verb class present similar responses. The pattern we saw for the whole verb class is consistent with the results of each verb individually. There is only one difference between two Unergatives in the attribution of imperfective morphology that seems to be related to the representation of the event given in the video. We presented in the trial and in the experiment the same verb *dormire* 'to sleep': in the trial test the verb was presented with a starting point (the girl goes to sleep), while in the experiment the verb was presented with an endpoint (when the girl woke up). The *dormire* in the trial test is produced as the other Unergatives are: only 3/4 year-olds use a preferential imperfective morphology. Their behaviour is different from older children and adults as table 9 shows. Such differences are significant with a chi-square statistic $\chi_4 = 15.54$ (p-value =0.004).

Tab.9 Results by age for *dormire* (trial test).

Distribution of Perfective/Imperfective Tense Morphology with Dormire (trial test)					
			Imperfective	Perfective	Total
Age	3	Count	7	3	10
		percentage	70,0%	30,0%	100,0%
	4	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	7	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
Total		Count	24	26	50
		percentage	48,0%	52,0%	100,0%

The second *dormire*, which was represented in the video with an endpoint, was preferentially expressed with an imperfective morphology as in table 10. The attribution of imperfective morphology does not vary along ages and this is confirmed statistically.

Tab. 10 Results by age for *dormire* (experiment).

Distribution of Perfective/Imperfective Tense Morphology with Dormire (experimental session)					
			Imperfective	Perfective	Total
Age	3	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	4	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	5	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	6	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	7	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
Total		Count	30	20	50
		Percentage	60,0%	40,0%	100,0%

Dormire of the trial test is produced much as the other atelic Unergatives, although it does not present an overt endpoint. The second *dormire* is produced with a different pattern from the other Unergatives (and the first *dormire*). This difference depends on the design of the experiment. As children build temporal relations between the two experiments, the second *dormire* is expressed preferentially with imperfective because the children older than 5 and the adults have just used, in most of the cases, perfective morphology with the first *dormire*. Since the two verbs are presented consecutively, they create a temporal connection in the discourse.

4.3.4. Discussion

Our results are quite different from Hodgson's (2001). As we described in section 4.3.1 she found a strong correlation between the completeness of a given situation and the tense morphology used in order to describe it. She used telic verbs represented in a completed

situation, and atelic verbs represented in an incomplete situation. This is the main difference with what we did, since we presented all verbs with an explicit endpoint (as completed /terminated).

We found that only at the age of 3 and 4 children had used a systematic correlation between telic and perfective and atelic and imperfective. This means that after this stage they are able to use the perfective morphology of passato prossimo for all verb classes. We can also claim that in the early stage (3, 4 years) children do not pay attention to the fact that the action in the video is presented with an endpoint. Hodgson found different results in the performance of 7/8 year-olds and of adults because they differentiated between imperfective morphology with atelic and perfective morphology with telic. The reason is that in the video she presented the action with an endpoint and without an endpoint, for telic and atelic predicates respectively. She tested the capacity of attributing grammatical aspect depending on the (in)completeness of the action in the video, whereas we were testing compositional (a)telicity since in the video all the actions presented an endpoint: the only information available was the (a)telicity.

These results do not support the Grammatical Aspect First Hypothesis since children do not distribute randomly the past forms for describing completed situations. The results of the experiment confirm the assumptions of the Lexical Aspect First since children use perfective morphology to refer to telic verbs and imperfective morphology to refer to atelic predicates. Our proposal can also be maintained since at least at 3/4 years the absence of an object with Unergatives generally blocks the systematic use of *passato prossimo*. The difference between our account and the Lexical Aspect First Hypothesis is based on the fact that we do not need to postulate knowledge about the lexical aspect of verb classes at the age of 3/4. We propose that the mere presence of an overt object at spell out favors the perfective morphological derivations.

In order to choose between these two competing accounts we need to understand whether all the forms of *passato prossimo* are understood as telic predicates, as Lexical Aspect First Accounts predicts, or whether the information of the l-syntax of the verb classes (the presence of overt objects) determines the available readings as we predict. The comprehension experiment below aims at answering this question.

4.4. Comprehension of Semantic Features in Compounds

The aim of the comprehension task we propose is to understand how the forms of *passato prossimo* are interpreted by children. The variable of the experiment is the complete /incomplete reading children give to the perfective forms of *passato prossimo* with different verb classes. The notion of completion implicit in the *passato prossimo* is not available till late stages according to Van Hout & Hollebrandse (2001). Thus, the first task of our experiment is to confirm that children do not have the same readings of *passato prossimo* available in adult grammar. If that is the case, the second task is to identify, if there are any, the VP features of the verb that trigger the complete/incomplete reading.

4.4.1. Experiment

The experimental task is based once more on the comprehension experiment of Hodgson (2001) that we described in section 4.3.1. The experiment consisted of a story followed by a *who* question in the *passato prossimo*. The answer to the question regarded the knowledge of the perfective features encoded in the *passato prossimo*. Children had to choose between two pictures representing a completed and a non-completed (ongoing) situation. The *passato prossimo* should trigger a reading of completion.

When faced with a *passato prossimo*, the Lexical Aspect First hypothesis predicts that children are supposed to answer always choosing the completed/terminated situations since what they express and comprehend through the *passato prossimo* is the telicity of a verb. In this task children are supposed to have a telic reading, always choosing the situation with a clear culmination point. For Grammatical Aspect First hypothesis children should obviously have a perfective reading, thus in this case the one required by *passato prossimo*. Our hypothesis predicts that children would be sensitive to the structural characteristics of verbs: the presence/absence of an overt object will trigger completed/uncompleted readings respectively. The aspectual information encoded in the tense morphology alone becomes available later.

4.4.1.1. Subjects

The subjects were the same as in the preceding experiment: 10 adults and 60 children aged between 3 and 7 years native speakers of Italian.

4.4.1.2. Stimuli and Procedure

The experiment is a sentence picture-matching task. Eight digital video stories were presented to the subjects. Then a question in the *passato prossimo* was asked. The task was to identify the (completed) event.

Subjects were introduced to the two characters in the story and referred to in the question.[33] Then they were shown the videos. Each of the videos presented the two characters performing the same action, but in each video one of the two girls completed the action (*completed situation*) while the other was still performing it (*ongoing situation*). While subjects were watching the video, the interviewer was describing the video. At the end of the video subjects were shown a picture representing the *ongoing situation* and a picture presenting the *completed situation.* Then they were asked to choose the picture in order to answer the question "Who has *verb*-ed ?". The completed situation was the correct answer in all cases. Materials can be found in section 2 of the appendix. The 8 stories represented telic transitive verbs in 4 cases (29) and in the other 4 cases atelic Unergatives (30).

(29) Telic Transitives
a. Bere il latte
Drink the milk
b. Costruire il trenino
'Build the train'
c. Mangiare il panino
'Eat the sandwich'
d. Rompere i palloni
'Break the balloon'

[33] For the pictures we used in the experiment see Appendix 2.

(30) Atelic Unergatives

a. Camminare

'Walk'

b. Dormire

'Sleep'

c. Ridere

'Laugh'

d. Telefonare

'Phone'

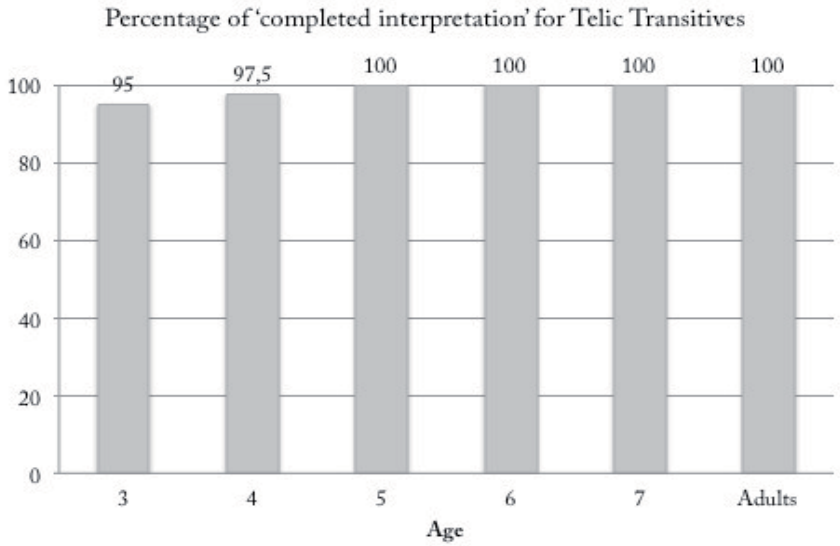
4.4.2. Results

The first general result we present is relative to the interpretation assigned to telic Transitives. In table 11 the absolute number of the responses assigned to this verb class is given. Figure 4 presents the total percentage of complete/terminated situations chosen with telic Transitives. Telic Transitives with an overt object have triggered very similar answers for all age groups. Children of all ages and adults have preferentially chosen the picture that represented the completed situations. We find a systematic completed reading attributed to the situations in which telic Transitives were presented in the *passato prossimo*.

Tab.11 Responses with Telic Transitives (absolute numbers).

Responses with Telic Transitives				
Telic verbs		Completed Situation	Ongoing Situation	Total
Age	3	38	2	40
	4	39	1	40
	5	40	0	40
	6	40	0	40
	7	40	0	40
	adults	40	0	40
Total		237	3	240

Fig.4 Percentage of 'completed interpretation' for Telic Transitives.

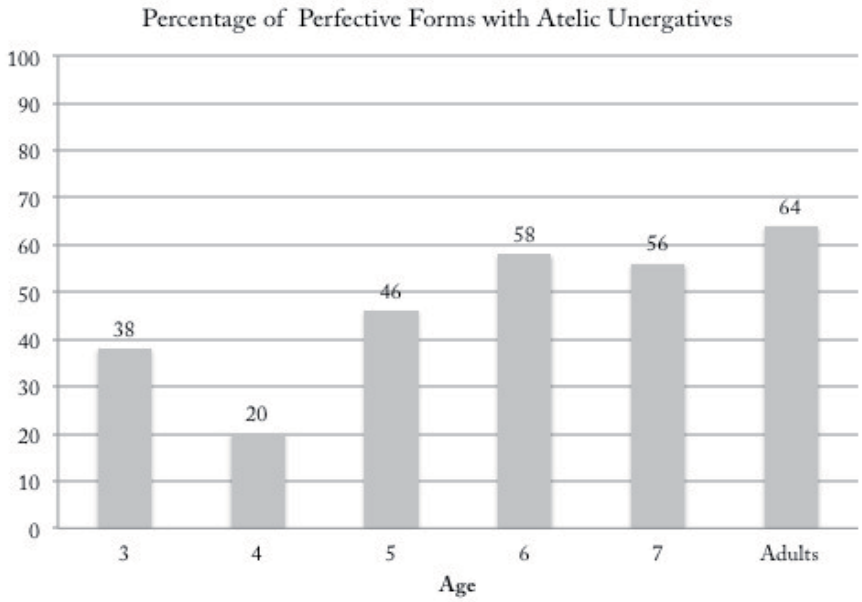


The same cannot be said for the atelic Unergatives. Table 12 presents the absolute numbers of the responses, while figure 5 shows the general distribution of terminated reading with Unergatives in the *passato prossimo*. We can see that there are strong differences related to age: till the age of seven, children show a high proportion of ongoing readings for atelic Unergatives. The completed reading encoded in the *passato prossimo* is not available till 7 years.

Tab.12 Responses with Atelic Unergatives (absolute numbers).

Responses with Atelic Unergatives				
Atelic verbs		Completed Situation	Ongoing Situation	Total
Age	3	17	23	40
	4	19	21	40
	5	24	16	40
	6	17	23	40
	7	35	5	40
	adults	36	4	40
Total		148	92	240

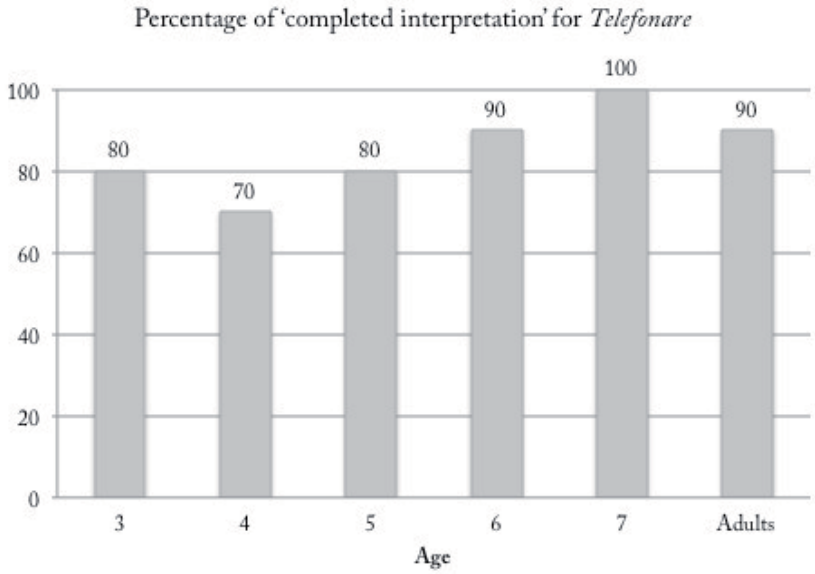
Fig. 5 Percentage of 'terminated interpretation' for Atelic Unergatives.



The likelihood ratio statistic for the difference among ages in attributing terminated readings is 31.88 (p-value = 0.10), which means that there is a systematic differentiation for groups of age. Children attribute more non-terminated readings with Unergatives than with telic transitive situations, in which a completed interpretation is given in almost all cases.

The statistical analysis confirms that while adults and 7 year olds do not show any different behavior in attributing the completed reading to both verb classes, children aged between 3 and 6 systematically attribute an non-terminated reading to the atelic verbs and a completed reading to the telic ones. The p-values of the likelihood statistic are all p <0, 05 for the children aged between 3 and 6 years. They distinguish between the tensed forms of the two verb classes for the different readings they attribute to them systematically. Amongst all the Unergatives there is just one verb that shows a different pattern: the verb *telefonare* 'to phone'. While all the other Unergatives present a preferential non-terminated reading, *telefonare* differs as figure 6 shows: children tend to assign a terminated reading to such verb.

Fig.6 Responses with the verb *Telefonare*.



The verb *telefonare* shows a pattern of responses more similar to telic Transitives than to other atelic Unergatives. There are no statistically significant age effects. This behavior seems to be linked to the lexical semantics of the verbal root. *Telefonare* is a clear denominal verb: the identification of the bounded root[34] *telefono* (=telephone) incorporated in the verbal head triggers the terminated response since the telic lexical (non compositional) aspect is computed in the AspP for assigning the perfective reading. The reasons are not connected with the experimental design as was the case with *dormire* (that incorporates an unbounded root, following Harley (2005)) in the production task, but they are deeply linked to the acquisition of aspect. We propose in the next section a cognitive/linguistic explanation for why this verb is the only Unergative for which children correctly analyze the aspect from the early stages.

4.4.3. Discussion

The first result is that children do not systematically assign the perfective reading to the forms of *passato prossimo* with Unergatives till the age of 7. This leads to two observations. First, children do not interpret the *passato prossimo* in the same way for the two lexical classes used in the experiment: they assign the completed readings preferentially to Transitives. They are not

[34] We refer here to Harley's (2005) definition of boundedness of the NPs incorporated in the V head (see footnote 7 this chapter): the *bounded* roots are the ones that denotes things that are delimited and determines telic reading in opposition to *unbounded* roots that denote things that are not delimited or inherently infinite and determine an atelic reading.

sensitive to the feature of completion encoded in the verbal morphology with Unergatives. Children do not recognize the grammatical aspect encoded in the verbal morphology as was already claimed by Van Hout & Hollebrandse (2001).

The second consideration is linked to the mechanism at work for the interpretation of the forms of *passato prossimo*. The different lexical information that each verb class encodes seems to be at the source of the different readings. Since the *passato prossimo* does not influence the interpretation, the children have direct access to the features of the verbs that determine their interpretation.

The lexical aspect of the verb is at work in children's responses since they attribute readings compatible with telicity: telic verbs are interpreted as completed situations, while atelic verbs are interpreted as describing non-terminated situations. This lexical aspect is not mapped in a one to one fashion to verbal morphology; otherwise children would have systematically chosen the completed reading for all the verb classes, since the stimulus is presented in a perfective tense that would have forced such a reading. The Lexical Aspect First Hypothesis, which claims that verbal tense morphology is used to refer to lexical aspect, is ruled out since children analyze the *passato prossimo* with Unergatives as not giving information about the completeness of the event.

Thus, the perfective features are not analyzed by children and the interpretations are linked to the compositional telicity/atelicity of the verbs. If we go back to the results of the production task, we know that children after the 5 years start to produce the *passato prossimo* with all verb classes (Unergatives included) for describing completed situations, independently from the verb classes. Why do they fail in the same stage to correctly analyze the forms they are able to produce? Our answer is that children after 5 years still do not comprehend the lexical aspect *tout court*. They only use the *compositional* lexical aspect and not the *non-compositional*[35] in comprehension. Furthermore, the fact that Unergatives and *passato prossimo* have not a very high frequency in the spontaneous speech determines a late acquisition of aspect *tout court* with this verb class. Children are able to recognize the lexical aspect of a given class only for the presence/absence of a direct object. They still do not encode the non-configurational semantics of lexical aspect in syntax. We intend for non-configurational semantics the features and the verbal root's information that co-determine the aspectual readings (Mateu 2002). An example of this is Hale & Keyser's (2002) central coincidence

[35] As in the examples in (11) where 'partorire' to gave birth to is analyzed as non-compositional telic.

relation feature encoded in the VP that allows us to differentiate between two verbs: the telic causative *break* which contains a terminal coincidence relation and the atelic agentive *push* which contains a central coincidence relation (Mateu, 2002), in (31) and (32) respectively.[36] Both are transitive verbs with overt objects but while (31) can be interpreted as telic, (32) can only be atelic for semantic (non-configurational) features at work.

(31) John broke the glass in five seconds/*for five seconds

(32) John pushed the door *in an hour/ for hours

Lexical aspect between 3 and 7 years old is not computed in all its appearances. Just the lexical aspect derived compositionally is used by children in the comprehension task, while they fail to analyze the non-configurational lexical aspect in their response.

We propose that the features at work in children's interpretation are linked to the l-syntax of the verb. When an overt object is expressed, children recognize the event predicated by the verb as telic and give completed readings; when the verb is expressed without the overt object children attribute an atelic value and consequently a non-terminated reading.

Another proof of the partial missing non-compositional lexical aspect is constituted by the responses children attributed to the verb *telefonare*. Children attribute a terminated reading to the situation in which this verb is presented contrary to what happens with other Unergatives. Children are probably able to attribute the perfective marking to such a verb because they have correctly assigned the lexical aspect to this verb. The assumption is that when children are able to attribute the lexical aspect, both non-compositional and compositional one, they are able to define the internal event structure of the verb: whether it is agentive, durative etc. The grammatical or viewpoint aspect encoded in the verbal morphology can be correctly interpreted since it is applied to an event for which they know the internal boundaries and that they can use in a temporal conceptual frame related to the tense morphology.

The question still remains why they acquire the non-compositional aspect of *telefonare* earlier. The answer is linked to a cognitive aid carried by this verb. The object referent *telefono*

[36] Mateu (2007) describes : 'Roughly, a terminal coincidence relation (e.g. cf. to, out of, from , etc.) involves a coincidence between one edge or terminus of the theme's path and the place, while a central relation (e.g. cf. with, at, in , etc.) involves a coincidence between the center of the theme and the center of the place' (footnote 8: Mateu 2009). See Hale (1986) for further discussion.

'telephone' is clearly visible in the video (and in the context of use of this verb). Since the name of the referential object *telefono* is incorporated directly on the verb, the reference helps children in the task of deriving the non-compositional feature linked to the object that in this case is a terminal coincidence relation that determines a telic reading. In other words since *telefono* represent the non-relational element in the complement position[37] of the Unergatives and it is incorporated in the verbal root, children may correctly check aspectual features in an AspP position where also the feature of the object are checked: that is, *telefonare* doesn't have an overt object since it is given in the root.

For the other Unergatives since the incorporation is not overt in the verbal root, children do not assign them an aspectual value since they are not able to infer the typology of the non-relational element in their complement position: whether it is a central coincidence relation or a terminal coincidence relation. This distinction will allow them to assign the non-compositional aspectual information to this class of verbs that for obvious structural reasons cannot be assigned telicity compositionally. Once more the fact that Unergatives are the less common verb classes in the stimulus[38] determines a high variability between individuals and on time of appearance of the non-compositional lexical aspect.[39]

The fact that Unergatives are not aspectually marked as soon as they appear in child language can also determine the delay found for the forms of *passato prossimo* in the spontaneous speech. Nevertheless the current proposal is a preliminary attempt to account for acquisition of aspect at lexicon-syntax interface, further analyses are needed to confirm the insight of the proposal: on the one side we need to understand how children differentiate between telic or atelic Unergatives, on the other side we miss a proper analysis of the imperfective grammatical aspect in its interaction with different lexical aspectual features. In the present work our main objective is to describe the structural meaning of verbs in acquisition: the compositional and the non –compositional lexical aspects parallel our initial discussion on the structural meaning and the idiosyncratic meaning of verbs. The considerations about the role of the direct object and of the incorporation of lexical root into

[37] It represents a terminal coincidence relation for paraphrase like 'Marta parla al telefono' (Marta speaks to the phone) where phone is introduced by prepositions like *to*.
[38] See tab.5
[39] As we have seen in tab.11 where children show variability in assigning the terminated reading to atelic Unergatives. Nevertheless, there are half of the responses in which children properly assign the terminated reading.

V head in determining aspectual features can contribute to our general purpose of describing the features of first verbs.

4.5. Encyclopedic Semantic Features vs Compositional Lexical Aspect

At the beginning of the present work we have been distinguishing following Zubizarreta & Oh (2007) between structural and idiosyncratic meaning. The former refers to the "constructional" meaning that is independent of the particular lexical items while the latter refers to the root meaning proper of each lexical item.

The appearance of auxiliaries and their aspectual implications is a case in which both types of verb meaning play a key role. Italian aspectual system, in fact, implies two way of coding the aspectual information within the l-syntax of a verb: through the overt structural meaning and/or through the lexical entry of the verbal root in which lexical primitives (such as the nominal root incorporated) are included.

The structural meaning of a verb has a central role in the acquisition of verbs since the overt arguments in the stimulus are computed by children in order to distinguish between events or verb classes: children relies on the mere structural information in order to assign an aspectual reading till 7 years as Van Hout & Hollebrandse (2001) found cross linguistically. Structural meaning is also relevant in the production of aspect. The presence of an overt argument may ease the attribution of an aspectual value to the entire event, as we have been arguing in the review of the corpus analysis and in the experiment of production: the fact that lexical aspect can be compositional on Italian forces children to look for aspectual information in the structural meaning of verbs.

Nevertheless structural meaning is not the sole responsible for the acquisition of the aspectual system. In other words, we cannot reduce the acquisition of the aspectual system only to an operation of syntactic bootstrapping. The idiosyncratic meaning intervenes at different stages and at different level. First, as Pinker (1989,1994) argues that the compositional lexical aspect or a given syntactic frame represent the *perspective* that one adopts relative to an event: the structural meaning can be used to decide whether to focus on one actor or another, one affected entity or another, the cause or the effect, but it does not inform about the encyclopedic semantic features that distinguish each verb from another within the same syntactic class. Second, encyclopedic meaning linked to some verbal root may determine

different interpretation and syntactic derivation: the case of the verb *telefonare* shows us that the idiosyncratic meaning encoded in the bounded root *telefonare* anchors the structural meaning to the real context and the knowledge of the words more than to abstract relation within the syntactic frames of 'objectless' Unergatives.

The determination of aspectual values, as other relations bearing at lexicon-syntax interface, is a clear example of linguistic information that is in its nature mixed: compositional and encyclopedic. We cannot identify any of them as separated from the other: in Grimshaw (1994) [40] words, '…the semantics to syntax mapping principles provide a predictive mechanism, and the observed structures provide a checking mechanism' (Grimshaw 1994; pp. 423).

At this respect, Biran and Friedmann (2011) through different experimental proofs investigated the lexical-syntactic information (defined as syntactic information stored in the lexicon) and its relation to syntactic and lexical impairments in aphasia. They focused on two types of lexical-syntactic information: predicate argument structure (PAS) of verbs (the number and types of arguments the verb selects) and grammatical gender of nouns. They found that lexical-syntactic information was intact and was represented separately on the one side from syntax even when syntactic operations at the sentence level, such as embedding and movement, were impaired and on the other side from the semantic lexicon even in cases of lexical retrieval deficit (anomia). [41]

The differences we found with adults in the way children analyze and produce aspectual auxiliaries are not linked only to the interaction between compositional and encyclopedic features in the attribution of aspectual meaning but to the syntactic domain at which the aspectual morphology of the auxiliaries is spelt out. Children may not have a problem with lexical aspect (resulting from syntactic operation and/or from the insertion of an encyclopedic verbal root) of the eventive structure in the *v*P layer but with the aspect encoded in the auxiliary morphology that is given in an AspP in the IP layer. Children select the correct

[40] See Chapter 1, section 1.8.

[41] Biran & Friedman (2011) used sentence completion, sentence production, sentence repetition, and grammaticality judgment tasks with 17 aphasic speakers each of them presenting a particular type of impairment; in syntax, in lexicon-semantic information and in lexicon –syntactic information. They show that impaired syntax or impaired lexicon-semantic items did not imply impairment in Lexicon-syntactic computation and viceversa. Furthermore, Shetreet & Friedman (2012) with a fMRI study found also that lexicon-syntactic violations determine different type of activation from lexicon semantic or syntactic violation.

auxiliaries for each verb class but they fail to spell out perfective auxiliary for atelic events (at 3/4 years) and to recover the terminate reading of auxiliary that works on the top of atelic lexical aspect (till the age of 7). The lexical insertion of the auxiliary morphology in the complex TP/AspP may be affected by a lower initial spell out domain at which aspectual features are checked. In this initial spell out domain for aspect (i.e. *v*P), overt structural relations such as the overt objects play a central role; then, since in Italian aspect is encoded in different nodes and some aspectual combinations are rare in the stimuli, it may take time to children to start to analyze the aspectual information *tout court*.

This analysis resembles what we have been proposing in Chapter 3 about the scope discourse semantic interface effects in accounting for the differences between children and adults in the distribution of overt subjects: higher functional projection in the IP layer may not be fully operative in acquisition. In the early stages for computational limitation a truncation or a spell out domain lower than IP (as in Friedman & Costa (2011)) may determine the difference found between Child and Target language.

4.6. Concluding remarks: Interface Effects in Developmental Pattern

The big picture that we have been sketching so far shows an acquisition process in which lexicon-syntax interface is fully operative from the very early stage at least for the generation of subjects and objects: Italian children distinguish verb classes for the loci of generation of subjects and for the presence of an object.

Structural verb meaning influences the pattern of distribution of overt arguments and the lexical aspectual interpretation. Nevertheless, idiosyncratic verb meaning is always at work in interaction with structural verb meaning: even if first verbal roots in child language may not refer to very abstract relation (but depending on the richness of the context of acquisition we believe, as Pinker (1994), that nothing blocks children from acquiring complex concepts), children use always verbs in an appropriate way in our corpus. Furthermore specific encyclopedic meaning linked to some verbal root may intervene in the general pattern of production of verbs.

The differences with target grammar in acquisition are linked not to the interface between lexicon and syntax but how the lexicon-syntactic information interacts with clause level functional projection. The production and computational limitation in children's

grammar is mainly restricted to where in the clausal derivation they spell-out: although a lower first spell out domain may determine interferences in the feature checking mechanism at higher clausal projection, children never produce totally ungrammatical sentences but they use subset of the parametric options available in their target language.

The case of early misinterpretation of aspectual feature with Unergatives is linked to both the low rate of distribution of Unergatives (and of the aspectual forms) and to the structural characteristics of this verb class that does not project overt objects. The structural meaning determines the overall aspectual interpretation for verbs with an overt object. Children are not able to assign perfective reading on the top of Unergative eventive structures: while in Transitives the perfective grammatical aspect overlap the telic lexical aspect, in the case of Unergatives the conflicting features (atelicity vs. terminated) give rise to an interpretation anchored to the structural meaning till the exposition to the target grammar will help children in derive the proper aspectual reading in later stages.

Next chapter is devoted to recapitulate the main findings of the corpus analysis and of the experiments we have been describing and to propose an integrated point of view on the characteristics of the structural verb meaning in the process of acquisition of Italian.

Chapter 5. Conclusion: Acquisition at Interface

5.0 Introduction

In Chapter 1 we have addressed the issue of the appearance of verbs in children's speech. Verbs are lexical items that differ from nouns for their relational meaning: while nouns represent an operation of *word-to-world* mapping, verbs a *sentence-to-world* mapping. Verbs' relational meaning can be decomposed into referential meaning (we have been defining it as the idiosyncratic meaning) and structural meaning that represents the endoskeleton that identifies the participants of an event through the relation denoted by the verb.

We have been dealing with three main classes of verbs categorized for their basic argument structure: Unergatives, Unaccusatives and Transitives. We found that Italian children distinguish verb classes: they identify them on the basis of the loci of generation of the subject (Chapter 2 and 3), whether it is an internal or an external argument. Moreover, infants split the verbs that project subject as an external argument in two verb classes on the basis of the presence of an overt object (Chapter 4). Nevertheless, Child language presents some peculiarities with respect to adult language in the production and comprehension of the verb structural meaning. We have focused mainly on the scope-discourse semantics of subjects through a corpus analysis (Chapter 3) and on the aspectual entailment of overt objects in two experiments (Chapter 4). The differences with adults seem to be linked not to a problem at the lexicon–syntax interface but at higher functional projections in the IP that intervene in the clausal derivation. The process of maturation of the interface relations with scope-discourse semantics and with phonology is responsible of children's performances.

To sum up the present discussion we will focus on four main topics that we have been dealing with:

- The existence of lexical-syntactic verb classes in the acquisition of Italian and the case of Unergatives that in both the corpus analysis and experimental tasks show the higher number of differences with adults' productions.

- The bootstrapping of verb meaning as a bidirectional process from syntax to semantics and vice versa: the features of the lexical-syntactic information *per se* does not allow a distinction between what is semantic and what is syntactic in verb meaning.
- The stages we individuated in the acquisition of verb meaning. We articulate a developmental pattern on the basis of the observed differences with adult language: early higher null subject, Unergative null subjects, late appearance and missing comprehension of the perfective auxiliaries.
- The role of the scope-discourse semantics and of the first spell out domain in the distribution of the arguments in Child Italian.

In the following subsections we will review these four topics. In the conclusive remarks we propose the future developments needed to implement the ideas presented herein.

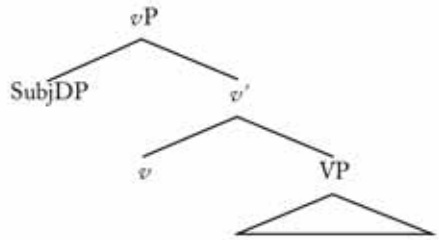
5.1. Lexical – Syntactic Verb Classes

We have been reviewing the definition of verb classes proposed by the constructivist and the lexicalist approaches. Now will define verb classes as they result by the natural data we provided in the present work.

On the basis of the results coming from the analysis of the overt subject distribution and position in the spontaneous speech, we can define two main verb classes at work in acquisition. The first distinctive feature is the loci of generation of the subject within the *vP*:

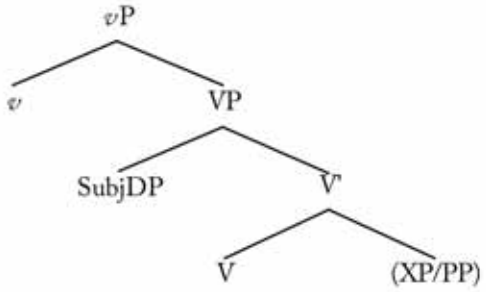
- *Verbs with External Subjects*. These verbs project subjects in spec *v*P (1). Children produce them with a preferential null subject. Overt subjects are spelt out in a preferential preverbal position. External argument subjects are properly analyzed as agents/initiators. Children do not distinguish between Unergatives and Transitives at least with respect to the preferential null/overt distribution. Adults omit more with Transitives than with Unergatives: probably the presence of another overt argument with Transitives favors the higher omission of the subject (that can be easily retrieved by the discourse).

(1)



- *Verbs with Internal Subject*s. These verbs are the Unaccusatives: they project the subject in a VP internal position (2). With these verbs children produce a higher rate of overt subjects than with verbs with external subjects. Subjects are spelt out in a preferential postverbal position. Unaccusative subjects are mainly identified by children as themes, patients or undergoers. Children show a pattern of expression of subject with Unaccusatives similar to adults. They correctly assign *essere* (=be) auxiliary in the perfective forms of *passato prossimo* with no particular delay observed.

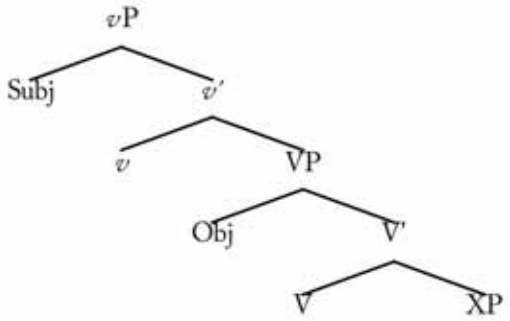
(2)



As can be seen by data about the role of overt object in determining aspectual reading, we can further split the verbs that project an external argument in two verb classes depending on the presence of a structural overt object.

- *Verbs with External Subject and overt Object*. Transitive verbs have an external subject in spec *v*P and an internal argument in the spec position of the lower VP (3).[1] Children use Transitives with overt objects: although they omit objects more than adults. Null subjects have similar percentage between adults and Children. Children properly assign *avere* auxiliary to Transitives. No particular delay is attested in the comprehension and the production of perfective morphology: the overt object allows an overt aspectual checkings.

(3)

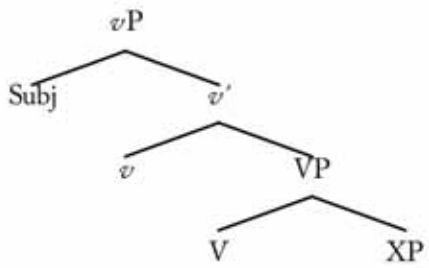


- *Verbs with External Subject and no overt Object*. Unergative verbs have an external argument in spec *v*P and no spec position available for internal argument in the lower spec VP (as in (4)). Children distinguish this verb class from the one of Transitives since they do not produce an overt object. Although they correctly assign the *avere* (=to have) auxiliary to this verb class, they show a delay and a strong individual variation in the production of the first forms with perfective auxiliaries. The fact that with these verbs infants do not produce an overt object but only a non-relational

[1] We are not distinguishing here Causatives and non-Causatives Transitives: we are using an XP in the complement position of the lower VP (instead of a complex PP or an A). See footnote 11 in Chapter 1. We define this verb class as including an overt object, we do not use in the definition the 'internal object' in order to include in child Transitives the transitive variant of the consumption verbs like *eat* that has a structural configuration as the one in (4) and that does not project the overt object in a spec VP but in a VP complement (cognate/hypomimous objects). The verbs in the present analysis are divided on the basis of a presence of a mere overt object since the Transitive variant of consumption verbs pattern with the other Transitives in children's data for the presence of an overt object.

element position (available for cognate object) may determine the delay attested with the perfective morphology: Unergatives have no overt object that triggers the aspectual reading in an AgroP/AspP.

(4)



Children properly use these three structural verb classes. Although we have not provided any qualitative analysis in the present work, we have not identified mistakes in the mapping procedure between thematic role and overt arguments in the spontaneous speech.

Child Unergatives seem to be the verb class with more differences with adults' grammar: distribution of overt subjects, production and comprehension of the perfective auxiliaries with a terminated reading. Different possible explanations have to be mentioned. First of all, Unergatives are rare in adults' spontaneous speech, so children have less positive evidence in the stimulus for defining all the information linked to this verb class. Second, the absence of an overt object may account for the delay in assigning the aspectual reading in a language like Italian where aspect is assigned either lexically or compositionally: while the overt object with Transitives triggers the correct aspectual reading compositionally, the aspectual information of the Unergatives is identified by the idiosyncratic features of the verbal heads that are given in the context of acquisition (where Unergatives are also rare). Third, a production limitation may intervene at the syntax-phonology interface: a spell-out domain lower than IP may affect the operation of features checking in high functional projections in the IP layer responsible, for example, of the scope-discourse semantic interpretation of the preverbal overt subjects.

Nevertheless at lexicon-syntax interface, as already asserted for all verb classes, Unergative subjects seem to be always interpreted properly as the agents of an activity.

Is this mapping learned from the semantic roles assigned by an idiosyncratic verbal root or from the structural representation within the VP? The bootstrapping problem is presented in next section

5.2. Bootstrapping Verb Meaning

We have been describing verb classes mainly on the basis of the characteristics of their structural meaning. Is it licit to talk about syntactic bootstrapping of verb meaning in determining children's performance in the described stages?

The answer is no: syntax alone cannot account for the acquisition of the idiosyncratic meaning and of the lexical non-compositional aspect associated with each verbal root, at least in the stages we have been describing. Children show high variability in the determination of the aspectual idiosyncratic meanings: the acquisition of encyclopedic meaning seems to be influenced mainly by the context of acquisition and not by syntax. Is then semantics that sanction the bootstrapping of verb meaning?

Once more the answer is no. Semantics cannot account alone for the structural way of determining aspectual reading in some stages: when idiosyncratic meaning is not accessible, structural meaning is the only available resource for children.

In the acquisition of verbs the idiosyncratic and structural meanings seem to be so tightly interconnected: it is impossible to determine the predominance of one on the other. Semantic relations may guide structural operations within the VP and, conversely, meaning can be read off directly from the structural positions.

Lexical-syntactic information, as proposed by Biran & Friedmann (2011), is an independent and defined module of the faculty of language: the 'first phase syntax' is like an anchor that connects the linguistic predication to the events in the world and that allows both sequential and parallel processing of the "chaotic" information in the world.

Determining whether syntax comes before semantics or vice versa is out of the scope of the present work: the starting point of children's spontaneous speech analysis is 18 months and at this stage syntax and semantics are crucially melted up. Probably we will never get to a proper answer since what we face here is the question of which comes first, the chicken or the

egg. Nevertheless we can argue that the melted nature of syntax and semantics in the verb meaning provides children with a reliable tool to categorize, organize and represent the 'complexity' of the world: lexicon-syntax information, due to its mixed nature, can successfully symbolize the intricacy of the world allowing the introduction of new information within a structured and meaningful scaffold.

5.3. Mapping the Complexity of the World at Different Stages

The sentence to world mapping appears in the process of acquisition of a language when children start to group words and produce their first verbs. If we put together the data on the distribution of overt arguments and of aspectual information we can recognize three stages in the development of the structural verb meaning. Children start describing the world determining the basic roles in the predication, like the agent and the theme; in the mean time they already can present new/old information in the context of the discourse, although with some discrepancies with adults. Then, they start to produce past tense and perfective morphology adding a viewpoint to the natural unfolding of the events represented within the VPs. In the last stage they get to recognize the aspectual relations implied by the viewpoint aspect on the top of the lexical aspect with all verbs (also with the verbs that encode lexical aspect in their idiosyncratic meaning). We recognize at least three stages in the production of verbs.

- First stage (roughly from 18 to 27/30 months): each verb is projected with a structure involving at least external and internal argument. Children show an ergative pattern of overt subject distribution and sensitivity to the informational structure within the sentence: they tend to produce overtly the subjects that represent new information and/or embody the entities involved in a change of state or of location. The way they convey structural meaning is coherent with adults' stimuli. They differ from adults in using more null subjects in the very early stage and in particular with Unergatives: this can be linked to a first spell out domain lower than IP, preverbal overt subjects, in fact, are merged in a SubjP projection very high in the inflectional layer. Children use few perfective auxiliaries, especially with verbs that do not project an overt object (Unergatives).

- Second stage (roughly from 27/30 months to 5 years): children start to use past tenses and aspectual past auxiliary morphology properly. They select appropriately the auxiliary depending on the verb class. Nevertheless, at this stage children use (produce and comprehend) the perfective morphology of the auxiliary as a mark of the lexical compositional aspect: the presence of an object in the structural meaning of the verb favors a telic/perfective reading while its absence an atelic/imperfective mapping. Although children in the clausal derivation spell out the auxiliary in AspP/TP, they still do not have an adult-like distribution of aspect: they do not use the perfective morphology encoded in the auxiliary as working on the top of lexical aspect but auxiliaries mark the lexical aspectual information derived compositionally in the *v*P.

- Third stage (from 5 to 7 years): children produce the perfective aspectual morphology efficiently across verb classes. They also systematically assign perfective to verbs that have lexical aspect encoded in the verbal root (and not only to verbal items with an overt object). They still fail to recover in comprehension the aspectual complex meaning resulting from the interaction between the perfective morphology of auxiliaries and the lexical aspect. The reason of the miscomprehension of the complex aspectual features are linked to the context of acquisition (it may account for the variability between different verbal roots of the same verb class) and to the conflict in mapping between a clausal oriented notion of aspect (the overt auxiliary morphology) and a lexical oriented one (encoded in the verbal root).

At 7 years children succeed in interpreting the complex aspectual meaning derived from the interaction between the overt auxiliary morphology and the verb meaning (Structural and Idiosyncratic). Children are able to successfully convey the lexical-syntactic information at clausal level. The fact that till the latest stage children may have some difficulties with higher derivation implied by the old/new informational distribution or by the inflectional morphology may derive from an IP structure not fully operative in the very early stages. Interface effects may intervene in acquisition, not at the lexicon-syntax interface, but at the syntax-phonology interface or at the scope-discourse semantic interface.

5.4. Interface Relation Building

Children have no problem with the distribution of old or new information: they are able to use postverbal subjects as new information and to omit subjects when they are recoverable from the context of the discourse. Nevertheless they tend to omit more subjects with Unergatives than adults.

Children do not have a scope-discourse selective problem with Unergatives but they may not conclude all the derivations in the position, high in the IP, where the preverbal overt subjects of Unergatives are checked.[2] Nevertheless they move arguments to higher functional projections to satisfy clausal requirements quite early. Children, in fact, do show overt preverbal subjects, but in some derivations the spell out may intervene before getting to higher functional projections: children in the very early stage seem to have a spell-out domain lower than IP.

This is a general idea and we have not strong evidences for an analysis that links undoubtedly the low rate of overt preverbal subjects with Unergatives to problems in merging preverbal subjects to a high functional projection in the IP layer. Although across languages it seems that movements to functional projections in the IP /CP layer maybe not fully operative in acquisition or in impaired grammar, children clearly identify the scope-discourse semantic requirements that trigger the derivations to high functional projections, for example, with interrogatives.

Only a dynamic model that allows the co-existence of different first spell out domains in the same stage of acquisition can account for the data we found. Although children may omit more subjects in the early stage, since VS order with Unergatives and SV order with Unaccusatives contradict the order established in a *v*P spell-out domain (Friedman & Costa, 2011), children still produce (in a minor rate) preverbal subjects with Unaccusatives and postverbal subject with Unergatives.

Interface requirements are at work and trigger (although in a minor rate) the adult-like derivations. Interface relations not fully mapped may determine in child Italian the apparent

[2] Adults use more overt subjects with Unergatives than children (Chapter 2 and 3). The structural analysis we have been proposing covers only partially the data: it was really difficult to determine by the corpus alone the elements in the discourse that triggered a topic like analysis of the higher number of adults' preverbal subjects. We have also proposed that in interaction with children, adults may emphasize the subject (by pronouncing it) in order to avoid that children may encounter ambiguities in recovering the subject of predicate.

deviances from the target grammar. The different levels of linguistic representation are fully operative; the effects we found in acquisition may be linked simply to the creation *in progress* of a stable mapping procedure between the different interfaces (other than the lexicon-to syntax interface).

5.5. Epilogue

In the present work we presented an analysis of the characteristics of the first verbs in the acquisition of Italian: our main focus has been the semantic and syntactic effect connected to the overt/null distribution of external and internal arguments. Our main finding is that lexical-syntactic information is fully acquired and operative from the appearance of verbs and children's not adult-like performances are linked: on the one side to the limitations of the early cognitive system that intervenes in the derivation involving higher functional projections and on the other side to the context of acquisition where the encyclopedic meanings introduced may strongly vary and where elements underrepresented in the linguistic stimulus may determine a delay in appearing in children's productions.

Further development of the present work are mainly linked to: the analysis of the context of productions and the informational structure of the sentences in order to understand the data about higher null subjects with Unergatives; a qualitative analysis of the verbs used in the spontaneous speech would allow us to refer to the subclasses of the general ones we have been using in the present work (atelic Unergatives or Consumption verbs and other Transitives); experimental studies and corpus analysis about the morphology of the aspectual tenses involving the imperfective, durative and stative aspectual features.

The main aim of the present work was to present the regularities found in the acquisition of a field apparently full of idiosyncrasies like the lexicon-syntax interface that is involved in the acquisition of verbs. The data we have been presenting endorse a view of natural languages in which few syntactic rules are the skeleton of a complex and huge system such as the one resulting from the basic computational operation of the faculty of language.

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Appendix I: Production Task

1.0 Introduction

In the production task experiment children between 3 and 7 years (10 fro each group of age) and 10 adults were shown two videos in which some competed/terminated act involving both telic and atelic verbs were presented. Then children and adults were asked to describe at the past the event that they were presented. In section 1 we collect the actions presented in the video and in section 2 the statistics of the results.

1.1 Experimental stimuli

The stimuli are stored here in the following manner. The sentence implied, a description of the video and the picture children watched when they had to describe the video.

1.1.1 Trial test

We report here the verbs used in the trial session (1)-(3).

(1) Atelic unergatives

a. Marta ride
Marta laughs

[The girl starts to laugh till a given moment when she stops laughing and she looks at the camera.]

b. Marta dorme
Marta sleeps

[The girl gets in bed and she starts to sleep. In this situation, children were not presented with the moment in which the girl wakes up (as happens in the experiment).]

(2) Telic transitives

a. Marta fa l'aeroplanino
Marta builds the airplane (made of paper)

[The girl starts to make a paper aeroplane.]

The action in the trial test video were presented in the order in 3

(3) Sequence of actions in the trial test
   a. Marta makes the aeroplane
   b. Marta laughs
   c. Marta sleeps

1.1.2 Experimental test

(4) Telic transitives within the experimental session

   a. Marta fa la torta
      Marta makes the cake

[The girl starts to prepare a cake in the kitchen using pots, spoons and milk and fruit. Then, after few seconds she shows a cake to the camera.]

b. Marta lava i piatti
Marta washes dishes

[The girl shows some dirty dishes to the camera, then she puts everything in the washbasin. At the end she removes the dishes from the washbasin and she shows the clean dishes to the camera.]

c. Marta mangia la torta
Marta eats the cake

[The girl starts to eat the cake she had prepared, then, she keeps on eating it, till she finishes it up completely and shows the dish containing the cake completely empty.]

(5) Atelic unergatives in the experimental session
a. Marta dorme
Marta sleeps

[The girl is seen while she sleeps, then she wakes up.]

b. Marta telefona
Marta phones

[The girl is seen while she phones, then she stops to phoning and hangs up the telephone.]

c. Marta canta
Marta sings

[The girl is seen while she sings using a microphone, then she stops singing.]

(6) Sequence of actions in experimental test

a. Marta sleeps
b. Marta makes the cake
c. Marta phones
d. Marta wash the dishes
e. Marta eats the cake
f. Marta sings

1.2 Statistic analysis of the results

The subjects are 50 children, 10 for each group of age and 10 adults. The objective is the statistic analysis of the proportions of distribution of *perfective* versus *imperfective* morphology. The analysis was performed by Anna Espinal of the "servei d' estadística de la universitat Autònoma de Barcelona".

1.2.1 Methods and Materials

The responses of the individuals in the experiment are analysed for the variables in (7).

(7) Variables of the statistic analysis
Age
Telic /atelic verbs
Perfective/imperfective morphology

In the analysis, since the variable to verify is the perfective/imperfective morphology the perfective value is 1 and the imperfective valued is 0.
The chi-square statistic has been used to test differences among the age groups. However, due to the presence of small frequencies in some cells of the contingency tables, the likelihood ratio statistic has been also used. To compare the two categories of verbs (telic and atelic) the Wilcoxon statistic has been used. All results have been obtained using SPSS v12.0. The significance level was fixed at 5%.

1.2.2 The distribution of perfective/imperfective morphology

(8) Ridere Trial test: contingency table and X square.

Contingency table age * ridere

			ridere		Total
			imperfective	perfective	
age	3	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	4	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	7	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	adults	Count	4	6	10
		Percentage	40,0%	60,0%	100,0%
Total		Count	30	30	60
		Percentage	50,0%	50,0%	100,0%

X square

	value	gl	Sig. asintotic (bilateral)
Pearson X ²	15,200	5	,010
Likelihood ratio	16,225	5	,006

(9) Dormire (1) Trial test: contingency table and X square.

Contingency table age * dormire1

			dormire1		
			imperfective	perfective	Total
age	3	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	4	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	7	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	adults	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
Total		Count		35	60
		Percentage		58,3%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X ²	20,914	5	,001
Likelihood ratio	22,806	5	,000

(10) Dormire Experiment: contingency table and X square.

Contingency table age * dormire2

			dormire2		
			imperfective	perfective	Total
age	3	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	4	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	5	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	6	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	7	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	adults	Count	4	6	10
		Percentage	40,0%	60,0%	100,0%
Total		Count		26	60
		Percentage		43,3%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	2,986	5	,702
Likelihood ratio	3,027	5	,696

(11) Fare Torta, Experiment: contingency table and X square.

Contingency table age * * fare torta

			fare torta		
			imperfective	perfective	Total
age	3	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	4	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	5	Count	3	7	10
		Percentage	30,0%	70,0%	100,0%
	6	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	7	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	adults	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
Total		Count		42	60
		Percentage		70,0%	100,0%

X square:

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	6,667	5	,247
Likelihood ratio	6,843	5	,233

(12) Telefonare, Experiment: contingency table and X square.

Contingency table age * telefonare

			telefonare		
			imperfective	perfective	Total
age	3	Count	3	7	10
		Percentage	30,0%	70,0%	100,0%
	4	Count	9	1	10
		Percentage	90,0%	10,0%	100,0%
	5	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	6	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	7	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	adults	Count	4	6	10
		Percentage	40,0%	60,0%	100,0%
Total		Count		29	60
		Percentage		48,3%	100,0%

X square

	value	gl	Sig. Asintotic (bilateral)
Pearson X^2	13,949	5	,016
Likelihood ratio	15,246	5	,009

(13) Mangiare Torta , Experiment: contingency table and X square.

Contingency table age * mangiare torta

			mangiare torta		
			imperfective	perfective	Total
age	3	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	4	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	5	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	6	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adults	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
Total		Count		52	60
		Percentage		86,7%	100,0%

X square

	Value	gl	Sig. asintotic (bilateral)
Chi-cuadrado de Pearson	2,885	5	,718
Razón de verosimilitud	4,093	5	,536

(14) Lavare Piatti , Experiment: contingency table and X square

Contingency table age * lavare piatti

			lavare piatti		
			imperfective	perfective	Total
age	3	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	4	Count	9	1	10
		Percentage	90,0%	10,0%	100,0%
	5	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	6	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	7	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	adults	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
Total		Count		23	60
		Percentage		38,3%	100,0%

X square

	Value	gl	Sig. asintotic (bilateral)
Chi-cuadrado de Pearson	11,351	5	,045
Razón de verosimilitud	12,016	5	,035

(15) Cantare, Experiment: contingency table and X square.

Contingency table age * **cantare**

			cantare		
			imperfective	perfective	Total
age	3	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	4	Count	9	1	10
		Percentage	90,0%	10,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	5	5	10
		Percentage	50,0%	50,0%	100,0%
	7	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	adults	Count	3	7	10
		Percentage	30,0%	70,0%	100,0%
Total		Count		23	60
		Percentage		38,3%	100,0%

X square

	Value	gl	Sig. asintotic (bilateral)
Chi-cuadrado de Pearson	9,659	5	,085
Razón de verosimilitud	10,370	5	,065

1.2.3 Differences of performance grouped for age

The statistical relevance in distinguishing telic and atelic verbs for the distribution of verb morphology is found at 3 and 4 years.

age= 3

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	3,10	,876	2	4	2,00	3,00	4,00
Atelic	10	1,90	1,287	0	4	,75	2,00	3,00

Contrastive statistic

	Atelic-Telic
Z	-1,924
Sig. asintót. (bilateral)	,054

age= 4

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	2,10	1,101	0	3	1,00	2,50	3,00
Atelic	10	1,00	1,247	0	3	,00	,50	2,25

Contrastive statistic

	Atelic-Telic
Z	-2,232
Sig. asintót. (bilateral)	,026

age= 5

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	2,90	,876	2	4	2,00	3,00	4,00
Atelic	10	2,30	1,494	0	4	1,00	2,50	4,00

Contrastive statistic

	Atelic-Telic
Z	-1,730
Sig. asintót. (bilateral)	,084

age= 6

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	2,50	,972	1	4	2,00	2,00	3,25
Atelic	10	2,90	1,287	1	5	2,00	2,50	4,00

Contrastive statistic

	Atelic-Telic
Z	-,863
Sig. asintót. (bilateral)	,388

age= 7

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	3,20	,789	2	4	2,75	3,00	4,00
Atelic	10	2,80	1,033	2	5	2,00	2,50	3,25

Contrastive statistic

	Atelic-Telic
Z	-1,265
Sig. asintót. (bilateral)	,206

age= adults

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	3,30	1,059	1	4	2,75	4,00	4,00
Atelic	10	3,40	1,647	0	5	2,00	4,00	5,00

Contrastive statistic

	Atelic-Telic
Z	-,632
Sig. asintót. (bilateral)	,527

1.2.4 Resume of the difference for age for telic/atelic verbs

Contingency table * telic

			telic					Total
			0	1	2	3	4	
age	3	Count	0	0	3	3	4	10
		Perc %.	,0%	,0%	30,0%	30,0%	40,0%	100,0%
	4	Count	1	2	2	5	0	10
		Perc %	10,0%	20,0%	20,0%	50,0%	,0%	100,0%
	5	Count	0	0	4	3	3	10
		Perc %	,0%	,0%	40,0%	30,0%	30,0%	100,0%
	6	Count	0	1	5	2	2	10
		Perc %	,0%	10,0%	50,0%	20,0%	20,0%	100,0%
	7	Count	0	0	2	4	4	10
		Perc %	,0%	,0%	20,0%	40,0%	40,0%	100,0%
	adult	Count	0	1	1	2	6	10
		Perc %	,0%	10,0%	10,0%	20,0%	60,0%	100,0%
Total		Count	1	4	17	19	19	60
		Perc %	1,7%	6,7%	28,3%	31,7%	31,7%	100,0%

X square

	Value	gl	Sig. asintotic (bilateral)
Pearson X^2	22,560	20	,311
Likelihood ratio	24,868	20	,207
Valid cases	60		

Contingency table * atelic

			atelic						Total
			0	1	2	3	4	5	
etad	3	Count	2	1	4	2	1	0	10
		Perc %	20,0%	10,0%	40,0%	20,0%	10,0%	,0%	100,0%
	4	Count	5	2	1	2	0	0	10
		Perc %	50,0%	20,0%	10,0%	20,0%	,0%	,0%	100,0%
	5	Count	1	3	1	2	3	0	10
		Perc %	10,0%	30,0%	10,0%	20,0%	30,0%	,0%	100,0%
	6	Count	0	1	4	1	3	1	10
		Perc %	,0%	10,0%	40,0%	10,0%	30,0%	10,0%	100,0%
	7	Count	0	0	5	3	1	1	10
		Perc %	,0%	,0%	50,0%	30,0%	10,0%	10,0%	100,0%
	adult	Count	1	0	2	1	3	3	10
		Perc %	10,0%	,0%	20,0%	10,0%	30,0%	30,0%	100,0%
Total		Count	9	7	17	11	11	5	60
		Perc %	15,0%	11,7%	28,3%	18,3%	18,3%	8,3%	100,0%

X square

	Value	gl	Sig. asintotic (bilateral)
Pearson X^2	37,323	25	,054
Likelihood ratio	40,842	25	,024
Valid cases	60		

Appendix II: Comprehension Task

2.0 Introduction

The experiment consisted of a story followed by a *who* question in the *passato prossimo*. The answer to the question regarded the knowledge of the perfective features encoded in the *passato prossimo*. Children had to choose between two pictures representing a completed and a non-completed (ongoing) situation. The *passato prossimo* should trigger a reading of completion. In Section 1 we provide the stimuli: both the pictures and the description of the videos. In section 2 we provide the statistics of the results.

2.1 Stimuli

The 8 stories represented in 4 cases telic transitive verbs and in the other four cases atelic unergatives. For each situation we give the verb, then a brief description of the video, the question performed and the picture children had to select.

The four situations that presented a telic transitive were:

(1) Bere latte
To *Drink a cup of milk*

[In the video the girl introduced as Tonia starts to drink a cup of milk, then she drinks up all the milk in the cup and shows to the camera the cup empty. Then,The girl introduced as Stella starts to drink the cup of milk but she does not like it very much, then she keep on drinking it very slowly, and she is not shown with the empty cup of milk.]

Children were asked to see two pictures: one presented Tonia with the empty cup of milk (*completed situation*), while the other presented Stella while she was still drinking (*ongoing situation*).
Then the subjects were asked: "Chi ha bevuto il latte?" (=Who has drunken the cup of milk?). Children had to choose the completed situation.

Completed situation

Ongoing situation

(2) Costruire il trenino
To *Build the train*

[Tonia starts to build up a train – toy. While she was putting together all the pieces she got confused and she was not able to build the train up. Stella starts to build the same train and at the end she successfully build it up.]
Children were shown two pictures: Tonia with all the pieces of the train on the table (*ongoing situation*) and Stella showing the train that she had built to the camera (*completed situation*). Then the subjects were asked: "Chi ha costruito il trenino?"(= Who has built the train). Children had to choose the completed situation

Completed situation

Ongoing Situation

(3) Mangiare il panino
To *Eat the sandwich*

[Tonia starts to eat a sandwich, she does not like the sandwich very much, she keeps on eating it very slowly and she will not finish it. Then, Stella starts to eat the sandwich and after few bites she ends it up.]
Children were shown two pictures: Tonia still eating the sandwich (*ongoing situation*) and Stella showing to the camera the dish that contained the sandwich empty (*completed situation*). Then the subjects were asked: "Chi ha mangiato il panino?" (=Who has eaten the sandwich?).
Children had to choose the completed situation

Completed situation

Ongoing Situation

(4) Rompere i palloni
To *Break the balloon*

[Stella starts to play with some balloons, she likes it and she keep on playing with the balloons. Tonia also plays with the balloons but after few seconds she decides to break them up. She takes a pen and she makes them exploit.]
Children were shown two pictures: Stella playing with balloons (*ongoing situation*) and Tonia with the pen in the hands and without balloons (*completed situation*). Then the subjects were asked: "Chi ha rotto i palloni?" (=Who has breaken up the balloons?). Children had to choose the completed situation
Completed situation

Ongoing Situation

The four situations that presented an atelic unergative were:

(5) Camminare
To *Walk*

[Stella starts to walk in her room, she keeps on walking and she does not stop. Tonia starts to walk and after few seconds she decides to sit down.]
Subjects were presented two pictures: Stella walking (*ongoing situation*) and Tonia sitting on a chair (*completed situation*). Then the subjects were asked: "Chi ha camminato?" (=Who has walked?). Children had to choose the completed situation.

Completed situation

Ongoing Situation

(6) Dormire
To *Sleep*

[Stella is sleeping. Tonia also is sleeping but after few seconds she wakes up.] Subjects were presented with two pictures: Stella sleeping (*ongoing situation*) and Tonia looking at the camera (*completed situation*). Then the subjects were asked: "Chi ha dormito?" (=Who has slept?) Children had to choose the completed situation

Completed situation

Ongoing Situation

(7) Ridere
To *Laugh*

[Tonia is reading a book while she reads she starts to laugh. She keeps on laughing and she does not stop. Stella is reading the same book she starts to laugh but after few seconds she stops laughing.] Then, the subjects were presented with two pictures: the first one showed Tonia laughing (*ongoing situation*), while the second one showed Stella looking at the camera with a serious face (*completed situation*). Then the subjects were asked: "Chi ha riso?" (=Who has laughed?).Children had to choose the completed situation

Completed situation

Ongoing Situation

(8) Telefonare
To *Phone*

[Stella starts to phone she starts to talk at the phone and after few seconds she puts down the phone. Tonia starts to phone and she keeps on talking at the phone till the end of the video.]
The subjects were presented with two pictures: the first one showing Stella looking at the camera with the phone close to her (*completed situation*), the second one showing Tonia talking at the phone (*ongoing situation*). Then the subjects were asked: "Chi ha telefonato?" (=Who has phoned?). Children had to choose the completed situation

Completed situation

Ongoing Situation

2.2 Statistic analysis of the results

The subjects are 50 children, 10 for each group of age and 10 adults. The objective is the statistic analysis of the proportions of distribution of *complete* versus *ongoing* reading. The analysis was performed by Anna Espinal of the "servei d' estadística de la universitat Autònoma de Barcelona".

2.2.1 Methods and Materials

The responses of the individuals in the experiment are analysed for the variables in (9)
.

(9) Variables of the statistic analysis

Age
Telic /atelic verbs
Complete/Ongoing reading

In the analysis, since the variable to verify is the complete/ongoing reading the complete reading is 1 and the ongoing reading is 0. The chi-square statistic has been used to test differences among the age groups. However, due to the presence of small frequencies in some cells of the contingency tables, the likelihood ratio statistic has been also used. To compare the two categories of verbs (telic and atelic) the Wilcoxon statistic has been used. All results have been obtained using SPSS v12.0. The significance level was fixed at 5%.

2.2.2 The distribution of complete /ongoing reading along verbs

(10) bere latte

Contingency table age * **bere latte**

			bere latte		Total
			0	1	
age	3	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	4	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	5	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	6	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adult	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
Total		Count	2	58	60
		Percentage	3,3%	96,7%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	4,138	5	,530
Likelihood ratio	4,534	5	,475

(11) fare trenino

Everydody gave a completed reading

(12) mangiare panino

Contingency table age * **mangiare panino**

			mangiare panino		
			0	1	Total
age	3	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	4	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	5	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	6	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adult	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
Total		Count	1	59	60
		Percentage	1,7%	98,3%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	5,085	5	,406
Likelihood ratio	3,670	5	,598

(13) rompere palloni

Everyone gave a completed reading

(14) camminare

Contingency table age * **camminare**

			camminare		
			0	1	Total
age	3	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	4	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	9	1	10
		Percentage	90,0%	10,0%	100,0%
	7	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	adult	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
Total		Count	33	27	60
		Percentage	55,0%	45,0%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	21,616	5	,001
Likelihood ratio	23,880	5	,000

(15) dormire

Contingency table age * **dormire**

			dormire		
			0	1	Total
age	3	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	4	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	5	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	6	Count	4	6	10
		Percentage	40,0%	60,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adult	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
Total		Count	15	45	60
		Percentage	25,0%	75,0%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	18,933	5	,002
Likelihood ratio	21,787	5	,001

(16) ridere

Contingency table age * **ridere**

			ridere		
			0	1	Total
age	3	Count	7	3	10
		Percentage	70,0%	30,0%	100,0%
	4	Count	8	2	10
		Percentage	80,0%	20,0%	100,0%
	5	Count	6	4	10
		Percentage	60,0%	40,0%	100,0%
	6	Count	9	1	10
		Percentage	90,0%	10,0%	100,0%
	7	Count	3	7	10
		Percentage	30,0%	70,0%	100,0%
	adult	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
Total		Count	35	25	60
		Percentage	58,3%	41,7%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	15,977	5	,007
Likelihood ratio	17,091	5	,004

(17) telefonare

Contingency table age * **telefonare**

			telefonare		
			0	1	Total
age	3	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	4	Count	3	7	10
		Percentage	30,0%	70,0%	100,0%
	5	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	6	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adult	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
Total		Count	9	51	60
		Percentage	15,0%	85,0%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	4,314	5	,505
Likelihood ratio	5,488	5	,359

2.2.3 Differences of performance grouped for age

The statistical relevance in distinguishing telic and atelic verbs for the distribution of verb morphology is found at 3 and 4 years.

age = 3

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	3,80	,422	3	4	3,75	4,00	4,00
Atelic	10	1,70	1,494	0	4	,75	1,00	3,25

Contrastive statistic

	Atelic-Telic
Z	-2,555
Sig. asintót. (bilateral)	,011

age = 4

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	3,90	,316	3	4	4,00	4,00	4,00
Atelic	10	1,90	,738	1	3	1,00	2,00	2,25

Contrastive statistic

	Atelic-Telic
Z	-2,836
Sig. asintót. (bilateral)	,005

age = 5

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	4,00	,000	4	4	4,00	4,00	4,00
Atelic	10	2,40	1,350	0	4	1,75	2,00	4,00

Contrastive statistic

	Atelic-Telic
Z	-2,410
Sig. asintót. (bilateral)	,016

age = 6

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	4,00	,000	4	4	4,00	4,00	4,00
Atelic	10	1,70	,949	0	3	1,00	2,00	2,25

Contrastive statistic

	Atelic-Telic
Z	-2,831
Sig. asintót. (bilateral)	,005

age = 7

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	4,00	,000	4	4	4,00	4,00	4,00
Atelic	10	3,50	,707	2	4	3,00	4,00	4,00

Contrastive statistic

	Atelic-Telic
Z	-1,890
Sig. asintót. (bilateral)	,059

age = adults

Descriptive statistics

	N	Mean	Standard deviation	Minimum	Maximum	Percentiles 25	50 (mediam)	75
Telic	10	4,00	,000	4	4	4,00	4,00	4,00
Atelic	10	3,60	,843	2	4	3,50	4,00	4,00

Contrastive statistic

	Atelic-Telic
Z	-1,414
Sig. asintót. (bilateral)	,157

2.2.4 Resume of the difference for age for telic/atelic verbs

Contingency table age * **telic transitives**

			Telic transitives		
			3	4	Total
age	3	Count	2	8	10
		Percentage	20,0%	80,0%	100,0%
	4	Count	1	9	10
		Percentage	10,0%	90,0%	100,0%
	5	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	6	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	7	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
	adult	Count	0	10	10
		Percentage	,0%	100,0%	100,0%
Total		Count	3	57	60
		Percentage	5,0%	95,0%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	7,368	5	,195
Likelihood ratio	7,312	5	,198

Contingency table age * **atelic unergative**

			Atelic unergatives					
			0	1	2	3	4	Total
age	3	Count	2	4	1	1	2	10
		Perc%	20,0%	40,0%	10,0%	10,0%	20,0%	100,0%
	4	Count	0	3	5	2	0	10
		Perc%	,0%	30,0%	50,0%	20,0%	,0%	100,0%
	5	Count	1	1	4	1	3	10
		Perc%	10,0%	10,0%	40,0%	10,0%	30,0%	100,0%
	6	Count	1	3	4	2	0	10
		Perc%	10,0%	30,0%	40,0%	20,0%	,0%	100,0%
	7	Count	0	0	1	3	6	10
		Perc%	,0%	,0%	10,0%	30,0%	60,0%	100,0%
	adult	Count	0	0	2	0	8	10
		Perc%	,0%	,0%	20,0%	,0%	80,0%	100,0%
Total		Count	4	11	17	9	19	60
		Perc%	6,7%	18,3%	28,3%	15,0%	31,7%	100,0%

X square

	Value	gl	Sig. Asintotic (bilateral)
Pearson X^2	38,677	20	,007
Likelihood ratio	47,766	20	,000