The Acquisition of Determiners.
A longitudinal study on an Italian child

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To Matteo and Gaia
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To Matteo and Gaia, who give me happiness, peace of mind, strength and confidence in the future, I dedicate this work.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Adjective</td>
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<tr>
<td>AP</td>
<td>Adjectival Phrase</td>
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<tr>
<td>Agr</td>
<td>Agreement</td>
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<tr>
<td>AgrP</td>
<td>Agreement Phrase</td>
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<tr>
<td>C</td>
<td>Complementizer</td>
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<tr>
<td>CP</td>
<td>Complementizer Phrase</td>
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<td>D</td>
<td>Determiner</td>
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<td>DP</td>
<td>Determiner Phrase</td>
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<td>I</td>
<td>Inflection</td>
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</tr>
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<tr>
<td>UG</td>
<td>Universal Grammar</td>
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<td>Phonological Phrase</td>
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<td>Prosodic Word</td>
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<td>Mora</td>
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<td>s</td>
<td>Strong</td>
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<td>w</td>
<td>Weak</td>
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Chapter 1

Introduction

1.1 Subject and Aim of the Work

The present work deals with the study of the early spontaneous production of an Italian child, concentrating on nominal phrases, in a perspective that views syntactic theory and empirical data as closely related and mutually “enriching”. In other words, on the one hand, the theories that syntacticians elaborate on the basis of cross-linguistic (adult) data provide a framework for the examination of children’s speech, allowing to raise pertinent issues and formulate pertinent hypotheses; on the other hand, in the perspective of generative linguistics (whose ultimate goal is to elaborate a universal theory of the nature of the grammars of all human languages), early acquisition data can enrich the empirical basis for linguistic investigation both quantitatively and qualitatively.

The need for an interaction between the field of linguistic theory and the actual study of first language acquisition is implicit in the concept of Universal Grammar (UG), which has always been at the core of the generative tradition, and which can be introduced as in (1) and (2) below:

(1) UG is “a general theory of linguistic structure that aims to discover the framework of principles and elements common to attainable human languages” (Chomsky, 1986, pp. 3-4).

(2) “UG may be regarded as a characterization of the genetically determined language faculty. One may think of this faculty as a language acquisition device” (Chomsky, 1986, pp. 3-4).

Despite this fundamental motivation, for a number of reasons linguistic research has not

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paid much attention to the actual course of language development until relatively recently\(^1\). From the last decade, however, we have been assisting to an exciting convergence between developments in syntactic theory and the study of natural language acquisition.

The present work originates from such growing interest in the interaction between the two fields. In particular, by examining the utterances produced by Gaia from the age of 19 to 30 months, it provides a contribution to the debate about functional categories in early child language, which in recent years has been rather lively. The introduction of functional projections into the syntactic tree, first proposed for clausal structure, and then extended to nominal structures as well, has had repercussions for language acquisition theories, raising a number of questions as to the availability or the status of functional elements at early stages of acquisition. This issue has consequences for the interpretation of UG as a model of the initial state, i.e. for the postulation of a Continuity or a Discontinuity hypothesis to characterize children’s initial grammar with respect to UG (these concepts will be briefly illustrated below in 1.3).

In particular, since the present research deals with the examination of early nominal phrases, its aim is twofold:

a) in trying to characterize the structure of Gaia’s nominal projections, we hope to be able to assess which elements, among the various prenominal items traditionally referred to as “determiners”, are actually to be considered as functional in the light of acquisition data;

b) by concentrating on the emergence of determiners, we should also be able to see whether nominal functional categories are projected since the earliest stages, thus contributing to the debate on continuity.

The issue in (a) has been the crucial point that I have been meaning to investigate since the present work was conceived. This issue has been raised from Giusti’s re-examination of the categorial status of determiners: on the basis of comparative work on (adult) data from several different languages, Giusti (1993, 1997) argues for a different syntactic status for articles, demonstratives and quantifiers, while providing a unified account for each class of determiners across languages. The detailed arguments for such an analysis are reported in

\(^1\)See the introductory chapters in Rizzi (2000) and Luas et al. (1994), for a general illustration of the past and current lines of research in language acquisition.
chapter 2; here we should only anticipate that, according to Giusti, only articles are functional nominal categories, occupying the highest head position of the D(eterminer) P(phrase), while the other so-called determiners are actually lexical elements. If, as it is likely, such an analysis for the syntax of determiners captures a common underlying knowledge of speakers across languages, in other words, if the different categorial status of determiners is part of UG, early acquisition data should reflect it. Therefore, I have examined the occurrences of those different elements in Gaia’s early production, with particular attention to their order of appearance, and their inflectional and distributional properties.

There is another important issue that is dealt with in the present work, an issue that I did not mean to consider at all when the work was conceived, and that nonetheless, by emerging from the analysis of the data, imposed itself to my attention: the prosodic organization of Gaia’s early utterances, and its interaction with syntax in shaping the child’s early speech. So, another crucial aim that has been pursued in the present work is the characterization of the prosodic structures into which Gaia’s utterances are organized, in order to see whether they could be held responsible for the shape of her early speech. This has given very interesting results that will be briefly introduced here in section 6.1.

Before giving a brief introductory section on the main results of the work, I am just going to illustrate very briefly the concepts introduced above, to characterize the framework in which the present work is inserted: the generative approach to the issue of language acquisition (1.2) and its current developments with respect to the issue of continuity, with reference to functional categories in children’s speech (1.3).

1.2 The Generative Approach to Language Acquisition

As already hinted at above, the notion of UG obviously implies a focus of generative grammar on language acquisition.

Chomsky (1959), in his celebrated review of Skinner’s *Verbal Behaviour* (1957), sets one of the milestones of the cognitive revolution, by arguing against the behaviorist approach, and concluding that *linguistic knowledge is inborn.*

The premises for the innateness hypothesis come from the consideration of some facts concerning acquisition that are commonly referred to as the “argument from the poverty of the stimulus”. Natural languages are extraordinarily rich and complex systems of knowledge; nevertheless, children are able to acquire any human language they are exposed to early in life,
at an age when other kinds of cognitive tasks cannot be yet accomplished, with considerable ease and rapidity. In particular, acquisition can be characterized as occurring\(^2\):

a) without explicit instruction;

b) on the basis of positive evidence;

c) in identical ways across different languages;

d) with the same result under varying circumstances.

It shall be interesting to look a little more closely at each of these points.

As stated in (a), to attain perfect competence in their native language children do not need any systematic instruction; on the contrary, as any adult studying a second language perfectly knows, learning a language in adulthood, even with explicit teaching, requires time and efforts, and the result is different from learner to learner and in any case it is never that of a native-like competence. Children instead acquire perfect competence in their language only by being exposed to linguistic input. They are rarely corrected, as parents usually pay more attention to what they are trying to say than to how they say it. See for example the following short exchanges\(^3\):

\[(1)\]

\[
\begin{align*}
\text{Adam:} & \quad \text{Where penny go?} \quad \text{(Adam, 2;5)} \\
\text{Mother:} & \quad \text{I don’t know.}
\end{align*}
\]

\[
\begin{align*}
\text{Adam:} & \quad \text{Where penny go?} \quad \text{(Adam, 2;5)} \\
\text{Mother:} & \quad \text{Didn’t you drop your pennies on the floor?}
\end{align*}
\]

Moreover, when children happen to be corrected, they often resist such corrections. Below I report a significant example, that Guasti takes from McNeil (1966):

\[(2)\]

\[
\begin{align*}
\text{Child:} & \quad \text{Nobody don’t like me.} \\
\text{Mother:} & \quad \text{No, say “nobody likes me.”} \\
\text{Child:} & \quad \text{Nobody don’t like me.} \\
\end{align*}
\]

(eight repetitions of this dialogue)

\[
\begin{align*}
\text{Mother:} & \quad \text{No, now listen carefully; say “nobody likes me.”} \\
\text{Child:} & \quad \text{Oh! Nobody don’t likes me.}
\end{align*}
\]

---

\(^2\)The illustration of the following issues is based on Guasti (2002), chapter 1.

\(^3\)The data reported here are taken from Guasti (2002), who reports them from the CHILDES database (McWhinney and Snow, 1985).
As can be seen, correction does not help this child to understand that double negation is not allowed in standard English, So, as he is using his grammar productively, and not just imitating what adults say, he goes on using the same construction (he eventually notices only the final -s of the verb). Examples such as these, while showing that children do not need (nor do they take advantage of) explicit teaching in their task of learning their mother tongue, also provide evidence for the absolute inadequacy of behaviorist models of language acquisition\(^4\).

As expressed in point (b) above, children acquire a language on the basis of what they hear: in other words, they rely on positive evidence, while negative evidence is usually not available to them. By being exposed to the language that is spoken around them, they became aware of what structures are possible grammatical expressions in their language, and even if they are not directly confronted with impossible structures, they nonetheless know that certain structures are ungrammatical, witness the fact that they do not produce them.

The statement in (c) expresses the fact that, regardless of the particular language they are exposed to, children achieve linguistic milestones in parallel fashion (Guasti, 2002). For example, at 6-8 months all children start to babble, around one year they speak their first words, and between 20 and 24 months they start combining words. Thereafter, all children, across languages make the same kinds of “errors”, for example they overregularize verb forms that are irregular in the paradigm of their target-language. Guasti\(^5\) notes that, interestingly, similarities in the course of acquisition can also be observed between spoken and signed languages. For instance, at the age when hearing babies start to babble, deaf children start to do the same, only they do it manually.

Finally, acquisition takes place successfully for all children that are exposed to natural languages, even under different circumstances and on the basis of an input that may vary greatly from child to child (as stated in (d)). Something that has always astonished me, since it came to my knowledge, is the fact that children are able to acquire a language even from a radically degenerate input. This is witnessed by the development of creole languages from pidgins. In the nineteenth century people in plantations and slave colonies developed a common rudimentary form of language to communicate, called pidgin, or lingua franca. The following generations, that had been exposed to a pidgin from their birth, refined and

\(^4\)Behaviorist psychologists have claimed that at the basis of language learning, as of other learning processes in animals and humans, is the mechanism of reinforcing the contingent association between stimulus and response. According to this view, children learn a language because of the negative or positive reinforcements they receive when they produce incorrect or correct expressions.

\(^5\)Referring to Petitto (1995).
expanded it, giving rise to creole languages, that, unlike pidgins, have function morphemes and the elaborate structure that characterizes all natural languages. Children exposed to American Sign Language show a similar ability to acquire a language from degenerate input. This happens when their parents are late learners of ASL and thus avoid complex structures and omit function morphemes; children, nevertheless, attain a more refined competence in such language.\footnote{See the references in Guasti (2002, p. 16) for further details.}

So, even if the linguistic stimulus that children receive is “poor” in all the senses specified above, they successfully accomplish at an early age\footnote{By about 5 years, although their vocabulary must still grow, they have mastered most of the constructions of their language (Guasti, 2002).} the complex task of acquiring syntactic competence in their language. More specifically the (adult-like) linguistic competence they arrive at allows them:

a) to produce a potentially infinite number of different sentences, on the basis on a limited input;

b) to judge whether a sentence is acceptable or not in their language (under a given interpretation), even if nobody has ever told them which sentences are ill-formed, or which interpretations sentences cannot have;

c) to avoid making certain kinds of errors, that children could be expected to make if they made wrong generalizations from the linguistic input.

For example, as expressed in (b), English-speaking children (as adults) know that the sentence in (3) below, though its meaning may be comprehensible, is not a possible English sentence:

(3) Dog a old a bone ate.

Linguistic competence also tells them that the sentence in (4) is correct, but can have only one interpretation, namely that Mary washed another person (not herself):

(4) Mary washed her.

As an example of the point in (c), English-speaking children never misapply the rule of the

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contraction between *want* and *to* resulting in the form *wanna*. They do not generalize the rule that makes (5a) possible to sentences like the one in (6), so they never produce sentences like (6b):

(5)

a) Who do you want to invite?

b) Who do you wanna invite?

(6)

a) Who do you want to come?

b) *Who do you wanna come?

So, they implicitly know that *wanna*-contraction is not possible if the questioned element is the subject of an infinitival clause\(^8\), even if they are obviously unable both to formally express such prohibition, and much less to motivate it.

All this is possible because they have acquired that complex system of knowledge called grammar, which assigns sentences structural representations and allows to make certain operations (and not others) that are based on those structures. According to the generative approach children’s remarkable accomplishment of learning their language can only be accounted for by assuming that much of this grammatical knowledge is inborn. This system of predetermined linguistic knowledge, Universal Grammar, also accounts for the strong structural similarities that are to be observed across languages. UG guides children in the preliminary analysis of the linguistic input they receive; whichever language they are exposed to, their genetic equipment will allow them to cope with its properties. So UG defines the range of possible structures in human languages, by making available a set of properties that hold universally, the *principles*, and a set properties that vary from language to language, the *parameters*. For example, the possibility for a language to leave the subject unexpressed, that holds for Italian, but not for English, is subject to a parametric choice, the so-called *pro-drop* or null subject parameter. The rules regulating the anaphoric interpretation of pronouns constitute, instead, a principle of UG, which holds cross-linguistically. The *Principles-and-Parameters model* (Chomsky, 1981) of UG, therefore, highlights the fundamental underlying uniformity of linguistic knowledge while defining a range of variations that accounts for the specificity of the different languages.

From the perspective of such a model, a particular grammar can be conceived as a particular instantiation of Universal Grammar under a specific set of parametric values: the grammar of

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\(^8\)I follow Guasti in reminding that such terms are used only for convenience, given that in the generative approach phenomena such as this are to be described in much more abstract terms, as processes that are blocked in certain syntactic configurations.
French is UG with the headedness parameter fixed on the “head-initial” value, the pro-drop parameter switched on the negative value, the verb-second parameter likewise fixed negatively, and the clitic parameters fixed positively with the clitic host(s) identified in the inflectional system, and so on (Rizzi, 2000). The grammar of English differs from that of French with respect to the value of the clitic parameters; the positive value of the pro-drop parameter in Italian, distinguishes this language both from English and from French. If the initial state can be conceived as UG before the fixation of parameters, or possibly with the parameters present on an unmarked value, the task (or better, one of the tasks) of children in acquiring their language is the fixation of parameters through experience, a process involving a limited number of operations.

1.3 Continuity or Discontinuity of UG. The debate on functional categories in early syntactic representations

If early work in linguistic theory, in particular through the principles and parameters model, has set out to explain the relative ease, rapidity and successfulness of language acquisition, much current generative research tries to address, conversely, the issue of development in language acquisition. This issue is based on the awareness that language acquisition, though relatively rapid, is nonetheless not instantaneous, as Chomsky himself already admitted:

(7) “The simplifying assumption of instantaneous learning of language is obviously false”

(Chomsky, 1975, pp.119, 121).

That there is some development over time in the speech that children are able to produce cannot by any means be denied. Simple empirical observations lead to identify a general path of acquisition which can be described in “ingenuous” terms as follows.

At around the age of one-and-a-quarter-years\(^9\), children are typically at the one-word stage: their utterances consist of single lexical words spoken in isolation. Consider, for example, the following utterances by an English-speaking child at around 17 months of age (taken from Bloom, 1973)\(^10\).

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\(^9\)The ages given here have only an indicative value, as there are inter-speaker variations; also note that they have been reported from Radford (1990) and are based on the examination of English-speaking children.

Adult: Where's the little man who rides the car?  
Child: Gone (gesturing “gone”)  
Adult: Who rides the car?  
Child: Gone (gesturing “gone”)  
Adult: Is he gone?  
Child: There (walking towards bag)  

Children's speech at the one word stage has been traditionally characterized as “asyn- 
tactic”. Then, between the ages of 18 and 24 months, they start to combine words in systematic 
patterns and thus show some grammatical (morphological and syntactic) competence. Still, 
however, they produce but one part of the inventory of the functional elements of the language 
they are acquiring. For example, the following multi-word utterances produced by Allison at 
22 months, while showing productive use of plural -s and gerund -ing inflections, still lack 
auxiliaries, determiners and sometimes even subjects, objects, and preposition:

a) Man drive truck.  
   Baby drive truck.  
   Baby doll drive truck.  
   Pig ride.  
   Baby Allison comb hair.  
   Baby eat cookies.  
   Mommy eat cookies.  
   Baby open door.  
   Mommy open.  
   Horse tumble.  

b) Get mommy cookie.  
   Eat apple juice.  
   Eat mommy cookie.  
   Open car.  
   Open box  
   Pour mommy juice.  
   Get toys.  
   Sit down.  
   Put on.  
   Build tower.  

c) Eating Mommy cookie.  
   Wiping baby chin.  
   Peeking Mommy.  
   Peeking lady.  
   Standing up.  

So, children’s speech at this stage of development, which has been traditionally referred to in 
general terms as “early patterned speech”, “early multi-word speech”, “telegraphic speech”, dif- 
ers substantially from the adult target language for having an elliptical character and lacking 
many grammatical elements. Only gradually over time children come to produce sentences 
that are always targetlike in their combination of lexical and functional items.

These simple empirical observations raise the issue of how to account for such development 
in children’s speech: does the development that we can observe during language acquisition 
reflect a real development in grammatical knowledge? If so, how should this grammatical 
development be represented? If not, what else can account for such difference between adult 
and child speech? These questions have been addressed by linguists in terms of continuity of 
UG from the initial state to the adult competence. Given change over time, does UG stay con-
stant, as in the Strong Continuity Hypothesis, or does children’s grammar substantially differ from adults’ syntactic structures as shaped by UG, as in various Discontinuity Hypotheses?

A fundamental native property of UG is the distinction between functional categories\(^{11}\) and lexical categories (N, V, A); syntactic theory generally assumes that the clause contains several layers of functional or inflectional projections (AgrOP, TP, AgrSP, CP), and a functional structure has been postulated for nominal projections as well (DP, AgrP, and a number of additional functional projections)\(^{12}\). This has raised the issue of the access of children’s early grammar to functional categories, and with respect to such issue the debate on continuity can be briefly illustrated as follows.

Those who argue for a Strong Continuity or Full Competence (for example Hyams, Poppel and Wexler\(^{13}\), Demuth) support the view that full adult-like representations of syntactic structure are available from the beginning of acquisition; so, functional categories are present since the beginning in children’s underlying competence, and the absence of functional elements from early utterances is to be attributed to non-syntactic constraints (see Demuth, 1994)\(^{14}\) or a non-standard exploitation of pragmatic principles (see Schaeffer, 1997)\(^{15}\).

Discontinuity is instead argued for by Radford (1990), who takes a “maturational” approach to language acquisition\(^{16}\). According to him functional categories are absent from early syntactic representations because they are supposed to mature, in other words to be projected only at a genetically predetermined point. Early child speech, therefore, includes only lexical projections, VPs and NPs; I(nflexion), C(omplementizer) and D(eterminer), as well as a case system, are lacking.

There is also a kind of intermediate position that has been taken with respect to continuity in a number of works on acquisition. Generalizing such positions as supporting a Weak Continuity hypothesis, UG is available, but structural representations in early child grammar might be “underspecified” compared with the respective structural representations of adult language (Clahsen et al. (1994), Clahsen et al. (1996), Wexler (1994), Hyams (1996), Hoekstra & Hyams (1995, 1998), Rizzi (1998, 2000)). There is currently some discussion on the exact

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\(^{11}\)There is a set of properties distinguishing functional categories from lexical ones; these are illustrated in 2.1, (8).

\(^{12}\)See 2.

\(^{13}\)See the references in Bohnacker (1997).

\(^{14}\)Reviewed here in 5.1.

\(^{15}\)Reference in Granfeldt (2003).

\(^{16}\)Radford is followed, for example, by Antelmi (1992, 1997), who likewise takes such a maturational approach to her longitudinal study of an Italian child.
concept of “underspecification”, and the different interpretations will not be reviewed here.\footnote{See Eisenbeiss (1999), and Granfeldt (2003), for references and for a brief illustration of these concepts.}

One notion of underspecification which is often made reference to is that based on the Lexical Learning hypothesis (Clahsen, Eisenbeiss and Vainikka (1994), Clahsen, Eisenbeiss and Penke (1996)), according to which the acquisition of lexical words “drives” the projection of functional categories, regulated by the innate principles of UG. So, the Lexical learning approach claims that functional projections are built up in a stepwise fashion as a result of children’s learning of lexical words and their morphological properties.

1.4 The Corpus of Data for the Present Work. Collection and transcription

The first stage of this research consisted in the collection of the data. I recorded\footnote{A digital camcorder was used to record such interactions.} the spontaneous interactions between Gaia, my daughter (born on 14\textsuperscript{th} November 1999), and me (or sometimes also other members of our family), from 19 to 30 months of age. A diary has also been kept on which interesting data were immediately noted (for example, first occurrences of certain grammatical elements or constructions, utterances with particular distributional properties, errors, non-target expressions etc.). Such diary has proved a useful tool for the recording and the dating of interesting phenomena. The entire collection of video-recorded material includes 35 videos of different length; however the present research is based on 14 videos (of around 30 minutes of length each), recorded at intervals of around one month from one another, which have been selected for transcription.

I have transcribed the videos in CHAT format, according to the conventions of the CHILDES System\footnote{The reason why not all the video could be transcribed and analyzed is that transcribing in CHAT format proved a very time-consuming activity. However I hope to be able to extend Gaia’s transcribed corpus for further research.}. The Child Language Data Exchange System is an international database organized for the study of language acquisition, through which researchers have access to the data of a large number of research projects in many different languages\footnote{The project has been directed by Brian MacWhinney in collaboration with Catherine Snow of Harvard University. CHILDES has led to the publication of over 1300 published research studies in the areas of language disorders, aphasia, second language learning, computational linguistics, literacy development, narrative structures, formal linguistic theory, and adult sociolinguistics (MacWhinney 1996).}. By transcribing Gaia’s corpus in such format I have made it ready to be included in the CHILDES Database and made available to the community.
Chapter 1. Introduction

CHAT, the standard transcription format adopted by CHILDES, includes detailed conventions for marking all sorts of conversational features, such as overlaps, interruptions, pauses, retracings, and so on. The system provides many options, but the transcriber only needs to select out those options that are relevant to the particular case. The list of CHAT symbols that I used is reported in the Appendix. The transcription\textsuperscript{21} has been very accurate. In particular, much care was taken in order to make transcripts as objective as possible. It should be noted, in fact, that transcription is a first level of analysis, as it implies the transformation of a phonological sequence into an orthographic string. So, alternative transcriptions have often been given for the child’s utterances.

1.5 Main Results of the Work

In examining Gaia’s earliest productions of articles in order to assess their status in the child’s early grammar, a variability in their use has been noticed: for a few months, while Gaia seems to be able to productively use the definite article (in various forms) and the masculine indefinite one, both in argumental and in predicative contexts, several cases of omission are to be observed. Looking for an explanation for such variability, I noticed that what distinguished “determined” nouns from bare nouns was to be found in their phonological shape. In other words, phonologic properties of nouns, such as number of syllables and stress position, seemed to be responsible for the presence vs. omission of the article that in the target language would precede such nouns. This intuition led me to re-examine the corpus of data from a phonological point of view, trying to find out whether, as it seemed the case, Gaia’s utterances might conform to regular phonological patterns, and whether those patterns might be held responsible for the omission of functional elements such as articles.

1.5.1 The need for a focus on phonology

By such analysis of Gaia’s productions from a phonological perspective, I have come to the main result of the present research: Gaia’s (or, as it seems likely, children’s) early utterances are organized into distinct prosodic units. Also by drawing on the works by other researchers taking a similar approach to early production data (in languages other than Italian), the findings have been formalized, identifying different stages in Gaia’s phonological representations;

\textsuperscript{21}Gaia’s corpus like the other corpora in the CHILDES Database provides an orthographic transcription.
these follow a developmental path in which utterances that are prosodically constrained to small units at the earliest stage, gradually expand through the relaxation of the relevant constraints, and, as a consequence, through the inclusion in the prosodic structure of elements that could not find their place before.

What is crucial is that such an analysis captures the fact, rarely considered when examining early productions only from a syntactic point of view, that children omit not only functional words, but also weak syllables\textsuperscript{22} of lexical words. So, the omission of functional morphemes is to be seen as part of a larger phenomenon involving weak syllables according to their position in prosodic structure. The parallel that is found between the shape of Gaia’s lexical words, and her combinations of lexical and functional items (as in the case of article-noun sequences) is a strong argument for postulating prosodic structure as the basic principle of organization of early productions.

Therefore, the main result of the present work is that it provides, we may say, an important caveat for the research in language acquisition based on production data: by taking early productions as reflecting children’s underlying syntactic representations, we run the risk of underestimating their competence; if, instead, we consider that what surfaces in children’s early speech is only the output phonological sequence that results from subjecting the (syntactically organized) input to prosodic constraints, we avoid being thus misled. Although this does not directly imply that adultlike syntactic representations are available, these results are consistent with such a view. In any case, such results suggest that the inverse implication must not be made: if some categories do not surface in children’s utterances, this does not directly imply that they are absent from their underlying syntactic structures.

These results point to the need of an interaction of syntactic and phonological analyses to better interpret early productions and characterize UG as a model of the initial state.

1.5.2 Functional structure in Gaia’s early noun phrases. The acquisition of determiners.

The picture that results from the analysis of Gaia’s early nominal projections, also in the light of what we have just been observing about the prosodic basis of their organization, is one where:

\footnote{I am using here such terms for convenience; as we shall see below in 5.2 we should not speak of omission of syllables but, rather, of a phonological reorganization that takes the entire word and restructures it to make it conform to a specific prosodic shape.}
a) Nominal projections, since the child’s earliest utterances, include at least one functional node Agr(eement);

b) Even if at the earliest stage nouns appear as bare, with no determiner produced, this does not imply that D is not available in her underlying syntactic representations.

c) Early articles, since their first appearance, are very likely instantiations of D, as they are productively used, and they seem to be inserted not for semantic reasons, but rather as expressing part of the inflectional morphology of nouns.

d) The other so-called “determiners”, i.e. demonstratives and quantifiers, seem already to have a different status from articles in the child’s grammar, as they are produced in isolation sooner than articles, as lexical categories. A different categorial status for these elements is also suggested by the analysis of the data in the prosodic perspective taken in this work: these data show that Gaia prosodifies articles differently from quantifiers and demonstratives, the former as clitics, the latter as independent prosodic words.

1.6 Plan of the Work

The present work is divided into two parts. In the first part, Chapter 2 gives an insight on the theoretical framework adopted in this work for the analysis of nominal structures, namely Giusti’s arguments about the syntax of determiners; Chapter 3 provides a descriptive analysis of the nominal phrases in Gaia’s corpus, presenting data that are relevant for examining the projection of functional categories in her early nominals and for assessing the categorial status of the various so-called “determiners” in the child’s early grammar; in a brief preliminary discussion of the data it will be suggested that the findings might be accounted for by appealing to phonological factors.

The second part, which constitutes the core of the work, provides a detailed re-examination of the data from a prosodic perspective. Chapter 4 introduces the basic concepts of prosodic theory; Chapter 5, reviews some works taking the phonological approach to early productions, which will be used as a source of cross-linguistic comparison (Section 5.1), examines the constrained prosodic structures into which Gaia’s utterances are organized, identifying and illustrating four stages of development (Section 5.2), and finally provides a discussion of the findings about Gaia’s nominal projections. Chapter 6 concludes the work, by summing up the
main results and suggesting some issues for further research.
Part I

The data: Gaia’s early Noun-Phrases
Chapter 2

The Framework: The Syntax of Determiners

The theoretical model adopted in the present study represents the noun phrase as a lexical projection headed by a functional category D (Determiner), according to the so-called DP-Hypothesis, and by some intermediate functional heads. In 2.1 I shall illustrate the structure of the DP that is currently assumed in the literature, a structure that has been elaborated starting from Abney’s (1987) and Szabolcsi’s (1987)\(^1\) identification of nominal functional heads, and further specified, by a number of comparative works, in terms of the articulation of its internal structure and of phenomena of N-movement inside it. In 2.2 I shall report the arguments provided by Giusti (1997) to re-examine the status of the various prenominal elements that are standardly referred to as “determiners”. As we will see, by drawing on data from several different languages, she argues that only articles are extended heads of the noun phrase; demonstratives and quantifiers are lexical heads that occupy different positions.

2.1 Functional Categories in the DP

The DP-Hypothesis originated by considering the parallelism that exists between clausal structure and nominal structure. It is currently assumed in syntactic theory that the verb builds a lexical projection VP which reflects its argument structure and further projects a functional structure: this includes C(omplementizer) P(hrase) and a number of functional nodes\(^2\) that result from the splitting of the inflectional features in I, the head of I(nflectional) P(hrase). The noun likewise forms a lexical projection NP reflecting its argument structure and further

\(^{1}\text{See Giusti (1997) for the references of most of the works referred to in the present chapter.}\)

\(^{2}\text{Agr(eement) O(bject) P(hrase), T(ense) P(hrase), and Agr(eement) S(ubject) P(hrase).}\)
projects a functional structure, which will be characterized in what follows. Key evidence for nominal structure being parallel to clause structure is provided by the subject-like behaviour of possessors in the noun phrase. Abney originally proposed that the possessive inflection of English be analysed as an instantiation of D, with the possessor DP in Spec,DP. Hungarian data, however, support the view that possessors morphemes are located below D and that there is a structural subject position below D. So, Hungarian facts further define the clause-noun symmetry, by providing evidence for the existence of both an inflection-like and a complementizer-like functional projection in the noun phrase.

Szabolcsi (1987, 1994) notes that in Hungarian the possessive argument of N that surfaces between the determiner and the noun, is marked with nominative case and enters person-number agreement with the noun, exactly as a subject does in relation to a verb in clauses. See the relevant examples from Szabolcsi (1994):

(1)
\begin{itemize}
  \item a) az en kalap-om
      the I hat-1st.s.
      "my hat"
  \item b) a te kalap-od
      the yiu hat-2nd.s.
      "your hat"
  \item c) a Mari kalap-ja
      the Mari-Nom hat-3rd.s.
      "Mary’s hat"
\end{itemize}

This argues for the existence of a functional category in the noun phrase parallel to I, or, better, to AgrS in the clause, where the agreement morphology on the noun is generated (or checked), and that hosts in its specifier the nominative possessive. This functional projection, which will be called AgrP, is dominated by the functional projection DP, whose head is filled by the determiner, and which can thus be viewed as parallel to CP in the clause. The structure that is argued for is given in Fig.2.1.
In the Hungarian noun phrase possessors can also occupy a higher position, and in that case they are marked with dative:

(2)
Mari-nak a kalap-ja
Mari-Dat the hat-3rd.s.
“Mary’s hat”

Szabolcsi (1994) accounts for (3) by proposing that it derives from the structure in Fig.2.1 by movement of the possessor from the nominative assigning position SpecAgrP to the dative assigning position Spec DP. The resulting structure is given below:

Phenomena of N-movement in various languages have likewise been proposed to account for the distribution of the noun with respect to its arguments, determiners and adjectival modifiers. For instance, the postnominal position of some adjectives in Romance, as opposed
to the obligatorily prenominal position of the same adjectives in Germanic, has led Cinque (1994) to postulate N-to-Agr movement. So, the distributional difference that we observe when comparing, for example, the Italian phrases in (3) and (4) with their English equivalents, is to be captured by structural representations as those reported in Fig. 2.3 below:

(3) Evaluating Size Colour

a) Eng: the beautiful big red ball
b) It: la bella grande palla rossa

(4) Manner Theme (Complement)

a) Eng: the terrible Italian invasion of Albania
b) It: la terribile invasione italiana dell’Albania
A cross-linguistically unified treatment of such phenomenon is obtained by arguing that N-movement takes place universally at Logical form, but its occurring in overt syntax is subject to parametric variation.

A further movement of the noun inside the DP is evidenced by the Rumanian data considered by Grosu (1988) and reported below:

(5)
- a) un frumos băiat român
  a nice boy Rumanian
- b) băiatul frumos (cel român)
  boy-the nice (the Rumanian)

While the word order in (a) (where an indefinite article is present) basically corresponds to that found in Italian DPs, in (b) the encliticization of the definite article to the noun gives a string where the noun is the leftmost element in the DP. To account for that, Grosu proposes that N, which moves to Agr in phrases like that in (a), takes a further step up the DP in (b), landing in the functional head D where it incorporates the definite article, as shown in Fig.2.4 below. Such N-to-D movement in Rumanian is triggered by the enclitic status of the definite article, since we do not find it when an indefinite article is in D.

![Figure 2.4](image)

Dealing with N-to-D movement, too, we realize that a comparative approach proves crucial, in that it allows a better understanding of language-particular phenomena in terms of more general properties that characterize the DP. Giusti (1997) considers the Italian data reported below in (6), noting that they might lead to conclude that N-to-D movement does not hold for Italian.
Chapter 2. The Framework: The Syntax of Determiners

(6)

a) la ragazza
   the girl
b) *ragazza-la
   girl-the

However, as she points out, the analysis given above for Rumanian DPs gives us an insight into the varying word order of the Italian phrases in (7), which correlates with the presence vs. absence of the article with proper names:

(7)

a) il mio Gianni
   the my Gianni
b) Gianni mio
   Gianni my
   “my Gianni”

We can assume following Longobardi (1994) that the order in (b) derives from that in (a) by movement of the proper name Gianni to D, thus by the same kind of movement found in Rumanian. The two phenomena only differ as to what triggers such movement: while in Rumanian the noun is caused to move by the property of the enclitic article that needs it as a host for its enclitization, in Italian it is the property of the proper name to be intrinsically referential that triggers its movement to D in order to check its [±Ref] feature. So, comparative data suggest a unified treatment of N-movement inside the DP: we can say that universally N moves to D; it depends on the strength of the features, however, whether such movement happens in overt syntax, as in Rumanian, or is procrastinated, taking place only at Logical Form.

Movement phenomena have led to the postulation of additional intermediate functional projections between DP and NP to provide landing sites for moving nouns. These intermediate projections, which do not need to be reviewed here, include Num(ber)P (see Ritter (1991)), W(ord marker)P (Harris (1991) and Bernstein (1993)), K(ase)P (Giusti (1995), and several AgrPs (one for each prenominal adjective, according to Cinque (1994), as shown in the structures in Fig.2.3 above).

In the characterization of the internal articulation of the DP, the distinction between functional categories and lexical categories is crucial. Abney (1987) indicates the following properties, that I report from Giusti (1997), as being typical of functional elements:
They constitute closed lexical classes.

They are generally phonologically and morphologically dependent. They are generally stressless, often clitics or affixes, and sometimes even phonologically null.

They permit only one complement, which is in general not an argument.

They are usually inseparable from their complement.

They lack “descriptive content”. Their semantic contribution is second-order, regulating or contributing to the interpretation of their complement. They mark grammatical or relational features, rather than picking out a class of objects.

These properties, though not constituting absolute criteria to decide on the status of an element, express nonetheless some tendencies that prove useful to assess whether an element is functional or lexical (so, as will be seen in 2.2, they will be referred to when arguing for the different categorial status of the various prenominal elements). (8a) generalizes the fact that, for example, complementizers, articles, and prepositions constitute closed classes, including a very limited number of items, as opposed to elements like nouns and verbs, which belong to classes that contain a potentially infinite number of items. (8b) captures the fact that articles in many languages are clitics, sometimes only in phonological terms (being stressless items phonologically attached to a stressed host), like in Italian, some other times also in morphological terms, like the Rumanian enclitic articles seen above. (8c) states that functional heads do not select arguments as lexical heads, like verbs, do; they embed a unique category as their complement, for example, in the noun phrase D embeds an AgrP. (8d) accounts, for example, for the ungrammaticality of (9b) below, resulting from the impossibility for a functional item like a complementizer to be left in place while its complement clause is topicalized:

Che Gianni è un cretino, ho detto!
That Gianni is an idiot [I] said

Gianni è un cretino, ho detto che!

(8e) refers to the intuitive characterization of functional elements as having grammatical rather than semantic meaning. A relevant example is the Italian preposition di, which introduces
different kinds of arguments, as shown in the examples below, where Gianni is respectively possessor, agent, theme, experincer:

\[(10)\]
\[
\begin{align*}
\text{a) } & \text{ il libro di Gianni} \\
& \text{“Gianni’s book”}
\end{align*}
\[
\begin{align*}
\text{b) } & \text{ la telefonata di Gianni} \\
& \text{“Gianni’s call”}
\end{align*}
\[
\begin{align*}
\text{c) } & \text{ la sconfitta di Gianni} \\
& \text{“Gianni’s defeat”}
\end{align*}
\[
\begin{align*}
\text{d) } & \text{ il dispiacere di Gianni} \\
& \text{“Gianni’s regret”}
\end{align*}
\]

A more principled conception of functional projections, one that defines them in more “economic” terms by deriving all the last three properties in (8) is Grimshaw’s notion of functional projection as the “extended projection” of the lexical head they embed. Grimshaw (1991) proposes that functional categories do not select a complement as lexical categories do, on the contrary it is the lexical head, by its inflectional properties, that projects its functional structure. This explains why functional elements are void of meaning (8e), and derives the statements in (8c) and (8d), by implying that thematic roles are assigned to the whole extended projection.

### 2.2 The Categorial Status of Determiners

Elements like articles, demonstratives and quantifiers have often been treated in the literature as all part of the class of determiners. This is at first sight supported by the complementary distribution of such prenominal elements in English:

\[(11)\]
\[
\text{these/the/many students}
\]

However, Giusti (1993, 1997) notes that this constitutes some trivial evidence and must not be taken to demonstrate that such prenominal items all occupy the same position in syntactic representation, namely the D position, (one of) the top functional projections of the nominal extended projection. As a matter of fact, the complementary distribution that can be observed in English does not hold universally. Consider, for example, the following Rumanian phrase, where the demonstrative cooccurs with the enclitic article:
Moreover, in many languages (and even in English), the distribution of quantifiers with respect to articles and demonstratives is quite complex, as shown in the data below:

(13)
   a) these/the many (*these/the) boys
   b) (*these/the) all these/the boys
   c) (*these/the) several (*these/the) boys

Such preliminary considerations reveal that a unified treatment for the prenominal elements in (11) is problematic, for being inconsistent with cross-linguistic data. By discussing data from many different languages Giusti (1997) shows a cross-linguistic parallelism between articles, and a contrast with the other prenominal elements across languages, and provides an analysis that accounts for this by postulating that each of the different so-called “determiners” actually constitute different syntactic categories. In this section I shall follow Giusti’s discussion by considering articles, demonstratives and quantifiers in turn. It will be shown that only articles are to be analysed as functional heads of the nominal extended projection; that demonstratives are instead lexical elements located in specifier positions; and that quantifiers are also lexical elements that can either be quantitative adjectives occupying specifier positions, or lexical heads selecting a full DP as their complement.

2.2.1 Articles

Articles exhibit the features that distinguish functional from lexical categories (see (8) above). They form a closed class: some languages have only one article (usually the definite one), for example Modern Greek; others, like Romance and Germanic, have two, the definite and the indefinite one. Some other languages have special kinds of articles, and there are also languages, like most Slavic languages, that have no articles at all.

---

3 Albanian, Bulgarian, Danish, English, Greenlandic, Eskimo, French, Hebrew, Irish, Modern Greek, Italian, Kiswahili, Niuean, Norwegian, Rumanian, Spanish, Swedish, Southern Tiwa.

4 Frison displays a special article for generics and proper names, and some Bulgarian dialects differentiate the definite article with respect to proximity to the discourse participants (see respectively Ebert (1970) and Stolting (1970)).
Articles are not independent lexical elements; on the contrary, they strictly depend on the nouns following them, and in more than one sense. Even when they are not morphological clitics like in Rumanian, they are at least phonological clitics, unstressed elements that attach to lexical words (usually the nouns that follow them). If we consider Italian data, for example, we shall note that the phonological dependency characterizing article-noun strings is rendered particularly evident by the presence of allomorphs, the occurrence of which depends on the initial sound of the noun:

(14)

<table>
<thead>
<tr>
<th></th>
<th>Articolo</th>
<th>Nome</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) il ragazzo</td>
<td>lo scolaro</td>
<td>l’amico</td>
</tr>
<tr>
<td>b) la ragazza</td>
<td>la scolara</td>
<td>l’amica</td>
</tr>
</tbody>
</table>

the boy/girl the student.m/f the friend.m/f

As will be shown in details in chapter 5, the status of Italian articles as phonological clitics has crucial consequences for the acquisition, or better, the production, of this functional element by the child studied in the present research (and, it may well be argued, by children in general).

Even when articles cliticize only phonologically to the noun, they can nonetheless be considered as morphologically dependent on the head noun in the languages where they agree with it for gender, number, case. Languages like Bulgarian, Rumanian and Albanian show that such morphological dependency may even be so strict as to make articles change their form according to the class of the noun stem, even if number and gender are the same. This is shown in the examples below:

(15)

<table>
<thead>
<tr>
<th>Language</th>
<th>Example</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Bul</td>
<td>momce-te, xora-ta</td>
<td>“the boys, the people”</td>
</tr>
<tr>
<td>b) Rum</td>
<td>băiat-ul, frate-le</td>
<td>“the boy, the brother”</td>
</tr>
<tr>
<td>c) Alb</td>
<td>dial-i, shok-u</td>
<td>“the boy, the friend”</td>
</tr>
</tbody>
</table>

So, the article may well be analysed as part of the inflectional morphology of the noun.

It is not surprising, therefore, that articles cannot be separated from their complement. The examples in (16) show that they do not give rise to floating constructions, contrary to some quantifiers; those in (17) show that, contrary to both demonstratives and quantifiers, articles cannot pronominalize, they cannot leave their complement empty:
(16)
a) Ragazzi, ne sono arrivati molti
   boys, CL have arrived many
b) *Ragazzi, (ne) sono arrivati i/questi
   boys, (CL) have arrived the/these

(17)
a) Ho visto il/un *(ragazzo).
   I saw the/a *(boy)
b) Ne ho visto uno.
   CL [I] saw one
c) Ho visto quello
   [I] saw that

That the article is to be regarded as part of the inflectional morphology of the lexical head has already been shown above, when dealing with article-noun sequences; this notion of articles as functional heads projected by the lexical element in their extended projection (in Grimshaw’s sense) is further confirmed by the presence of articles on adjectives and quantifiers in some languages. Consider the examples from Hebrew (18) and from Rumanian (19) that are reported below:

(18)
a) ha-bayit ha-gadol
   the house the big
   “the big house”
b) bayit gadol
   house big
   “a big house”

(19)
a) portretul *(al) unei fete
   portrait-the a.Gen girl
b) portretul frumos *(al) unei fete
   portrait-the beautiful A-the Masc a.Gen girl
c) un portret *(al) unei fete
   a portrait A-the a.Gen

If we should be tempted to conclude, from Hebrew data, that adjectival articles are a mark of agreement for “definiteness” between noun and adjective, the Rumanian examples will warn us that we are on the wrong direction. In Rumanian, as noted by Grosu (1988), the article, encliticized on the dummy preposition -a, must appear on a genitival phrase when this is
not adjacent to a nominal definite article. What is crucial in those examples is the contrast between (19a) and (19c), that clearly shows that the insertion of the genitival article is independent from the definiteness of the noun phrase, since it appears after a noun preceded by an indefinite article. That we are not dealing with a kind of agreement for definiteness is also demonstrated by the following Albanian examples, when the adjectival article is inserted only depending on the properties of the adjectival stem:

(20)

\[
\begin{align*}
\text{a) një djalë i mirë} & \quad \text{një djalë besnik} \\
\text{a boy the good} & \quad \text{a boy faithful} \\
\text{“a good boy”} & \quad \text{“a faithful boy”} \\
\text{b) djali i mirë} & \quad \text{djali besnik} \\
\text{boy-the the good} & \quad \text{boy-the faithful}
\end{align*}
\]

All these data suggest that the article is not inserted for semantic reasons, as are other determiners, but rather for syntactic needs. The syntactic, thus functional, nature of the article is further confirmed by data on Rumanian quantifiers. In Rumanian, as in Italian, there are quantifiers that, while lacking their ending when adjacent to the noun, must end with a morpheme marking their φ-features when the noun is absent. The following examples, will make this phenomenon clear, also showing the parallel between the two languages:

(21)

\[
\begin{align*}
\text{a) un(*o) ragazzo} & \quad \text{“a boy”} \\
\text{b) nessun(*o) ragazzo} & \quad \text{“no boy”} \\
\text{c) Un*(o) ha detto che...} & \quad \text{“Someone said that...”} \\
\text{d) Nessun*(o) è venuto} & \quad \text{“No one arrived”}
\end{align*}
\]

(22)

\[
\begin{align*}
\text{a) un(*ul) băiat} & \quad \text{“a boy”} \\
\text{b) nici un(*ul) băiat} & \quad \text{“no boy”} \\
\text{c) Un*(ul) a spus că...} & \quad \text{“one said that...”} \\
\text{d) Nici un*(ul) a spus că...} & \quad \text{“No one said that...”}
\end{align*}
\]

What is interesting in the Rumanian data is that the relevant ending (in the nominative-
accusative form), is omophonous to the definite article, and the same happens with other quantifiers such as \textit{tot(ul)} “all”, \textit{intregu(ul)} “whole”, \textit{vreun(ul)} “some”, \textit{alt(ul)} “another”, etc. The article \textit{-ul} that appears on quantifiers is clearly a realization of \(\phi\)-features. This confirms that articles are part of the inflectional morphology of the lexical head (when it is a quantifier, as well as when it is a noun). Moreover, the fact that the definite article can appear on existential quantifiers (as happens in Rumanian), which are indefinite, demonstrates that the relevant features do not include definiteness, so their nature is syntactic.

Some further evidence shows that articles, contrary to lexical prenominal elements, are not (only) inserted on semantic grounds. The Italian sentence in (23a) below shows that a definite article does not always imply specific interpretation of the noun phrase:

\begin{enumerate}
\item \[a) \text{Scommetto che non troverai mai la segretaria di un onorevole che sia disposta a testimoniare contro di lui.} \]
\[ \text{I bet you'll never find the secretary of a deputy who is-SubJ willing to witness against him} \]
\item \[b) \text{*Scommetto che non troverai mai questa segretaria di un onorevole che sia disposta a testimoniare contro di lui.} \]
\[ \text{I bet you'll never find this secretary of a deputy who is-SubJ willing to witness against him} \]
\end{enumerate}

If a definite article can be compatible with non-specific interpretation, this is not the case with a demonstrative, as evidenced by the ungrammaticality of (32b). That the definite article is not always automatically associated with specific interpretation is also shown by its occurrence in sentences like the following:

\begin{enumerate}
\item \[a) \text{Ho preso l’autobus} \]
\[ \text{“I took the bus”} \]
\end{enumerate}

Such a sentence does not necessarily refer to a particular train, but it rather means the same as “I came by bus”. By contrast, the presence of a demonstrative in the same context would trigger specific interpretation. Conversely, a definite description does not always need the definite article, as indicated by phrases such as \textit{at home}, \textit{to school}, that obviously refer to a specific place though lacking a definite article.

Rumanian data provide further evidence for considering the insertion of the article as not strictly dependent on the semantic notion of definiteness. In this language all prepositions except \textit{cu} (with) enforce the absence of the definite article; an indefinite article, a demonstra-
tive, or a quantifier, however, are allowed (in unmodified singular nominals):

(25)  
   a) Merg la professor(*ul).  
        I’m going to professor-(*the)  
   b) Merg la un/acest/vreun professor  
        “I’m going to [the]/a/this/some professor’s place”

If we assumed that the trigger for the insertion of the definite article was definite interpretation, we would need to find an independent explanation to account for its absence in (25a), as opposed, moreover, to its presence in (26) below:

(26)  
   Merg la professor*(ul) mare.  
       I’m going the the eminent professor’s place

If we assume, instead, following Giusti, that the article’s primary role is that of a realizer of the noun’s $\phi$-features, which include case, we can account for (25a) by noting that a preposition can make these features recoverable, thus dispensing the article from being inserted; the article would instead be needed to license the $\phi$-features on the modifier\(^5\).

Finally, there is a very interesting further argument that Giusti provides to support the view that (definite) articles are realizers of inflectional morphology. This comes from the comparison of contemporary linguistic data to data from earlier stages of languages such as those of the Indo-European family (for which such early stages have been recorded). At early stages articles were absent in these languages, and their appearance at some intermediate stage coincided with the loss of inflectional morphology on nouns and adjectives.

All the arguments given provide clear evidence for the status of articles as functional heads. In the following paragraph it will be shown that such arguments do not extend to demonstratives.

### 2.2.2 Demonstratives

One first evidence for arguing that demonstratives cannot occupy the D position, comes from languages in which they can cooccur with articles. Giusti (1993) reports examples from many different languages:

(27)

a) Javanese: ika n anak
   this the child
b) Hungarian: ez a haz
   this the house
c) Macedonian: toj covek-ot
   this man-the
d) Gothic: þan wig jainan
   the street this
e) Old Icelandic: sa gamli madrinn
   this old man-the

Rumanian, in particular, provides very interesting data for studying the position of demonstratives in the nominal projection. In Rumanian, beside a construction where the demonstrative is in complementary distribution with the article (as happens in Italian and English), another construction is allowed, where an enclitic article on an initial noun is followed by a demonstrative:

(28)

a) acest/acel (frumos) băiat (frumos)
   this/that (nice) boy (nice)
b) **acestul băiat
   this-the boy
c) **acest băiatul
   this boy-the

(29)

a) băiatul acesta/acela (frumos)
   boy-the thisA/thatA (nice)
b) frumosul (*acesta) băiat
   c) băiatul frumos (*acesta)
   d) frumosul băiat (*acesta)

The structure that Giusti elaborates for (29a) is reported below:
Here the noun has moved to D, crossing the demonstrative as well as the adjective. This clearly shows that the demonstrative is not in D, which is already occupied by N+Art; nor can it be in an intermediate functional head, otherwise it would be picked up by the N-movement, which cannot skip a head-position⁶. Moreover, (29b) shows that the demonstrative blocks the movement of the AP to SpecDP, which can otherwise take place in Rumanian; this confirms that it occupies a Spec, a position filled by a maximal projection.

Now, an analysis locating the demonstrative in SpecAgrP in (29) and in D in (28) would of course not be welcome. A unified account of the two different constructions may instead be given by assuming that the demonstrative, which occupies a Spec position in all cases, has moved to SpecDP in (28a); once DP contains in its specifier an element with enough features, it is not necessary (and in minimalist terms it is impossible) for its head to be filled. The relevant structure is given below:

⁶According to the Head Movement Constraint, currently assumed in the literature, head movement is strictly local.
Since the demonstrative can only be preceded by N+Art, and not by any AP, it must occupy a high position in Rumanian. Data from Modern Greek, however, indicate that this is not always the case:

\[(30)\]

a) afto to oreo to vivlio  
   this the good the book
b) to oreo afto to vivlio  
   the good this the book
c) to oreo to vivlio afto  
   the good the book this
   “this good book”

These examples, which once again confirm that article and demonstrative do not compete for the same position, also indicate that demonstratives are also found in low positions; an analysis of demonstratives that holds cross-linguistically may assume that they start from a low Spec and move up to SpecDP at the latest at Logical Form (so, languages vary as to the level in which such movement takes place).

If we consider again the Rumanian and the Greek data above, we shall see that in both languages the movement of the demonstrative to SpecDP can also happen in overt syntax; however, while in Rumanian the presence of the demonstrative in the highest Spec blocks the insertion of the article in D, in Modern Greek it does not. In this respect a parallel can be drawn between nominal and clausal extended projections. The “doubly-filled COMP Filter” of Chomsky and Lasnik (1977) accounts for the complementary distribution of elements occu-
Chapter 2. The Framework: The Syntax of Determiners

...pying the Spec and the head position of CP. This principle, it must be noted, is not universal; therefore, the postulation of a similarly parameterized principle for the DP accounts for the different distributions that can be observed cross-linguistically. So, a functional projection must realize a bundle of $\phi$–features; these features must be visible in order to be properly interpreted at Logical Form. If there is an element in Spec that has a “strong” specification for the relevant features, the head remains empty; otherwise, if these features are not “visible” enough on the Spec, or the Spec is even empty, the head must be filled. Many languages, among which English and Italian, display the demonstrative in first position and don’t allow its cooccurrence with articles; this means that the demonstrative has moved to SpecDP in overt syntax and that its specification of $\phi$–features is strong enough to make the insertion of the article unnecessary.

There remains an issue to be addressed concerning the movement of the demonstrative, namely from exactly which position it starts moving, in other words what is its basic position. The Spanish examples that Giusti reports from Brugè (1994) show that in that language the demonstrative is the lowest modifier of the noun phrase, since it follows all adjectives, even thematic ones (while preceding all PPs):

(31)  
a) la reacción alemana esa a las críticas  
the reaction German this to the criticisms  
“This German reaction to the criticisms”
b) *la reacción esa alemana(as las críticas) 
c) *la reacción alemana as las críticas esa 
d) $[\text{DP} \text{ la } [\text{AgrP} \text{ reacción}] [\text{AgrP} \text{ alemana τ}] [\text{AgrP} \text{esa NP t} \text{ } [\text{PP a la críticas}])))$

Brugè proposes that the position of the demonstrative in Spanish (shown in the structure given above in (31d)) constitutes the basic position for such element in UG.

If we now go back to the general characterization of functional categories presented above in (8), and we consider the behaviour of demonstratives with respect to those properties, we shall find further arguments for attributing them the status of lexical, not functional, categories. First, demonstratives, though constituting a closed class, do have semantic value. They are part of the broad semantic field of deixis which includes adverbials, pronominals, possibly aspect morphemes, and as such, they are crucial for the interpretation of the referential index of the noun phrase (Giusti, 1997). Second, differently from articles, demonstratives are not morphologically and phonologically dependent from the noun. As a matter of fact, they can
also appear in absence of the noun they modify, as shown by English examples like *I want this and that*. See also the Italian examples given above in (17), which likewise show that demonstratives can pronominalize, a possibility that is precluded to articles.

Evidence for the lexical status of demonstratives comes even from languages lacking articles. Carstens (1991) analyses the distribution of the elements in the nominal projections of Kiswahili. In this language, which has no articles, adjectives are only postnominal and demonstratives can be either postnominal or prenominal, as shown in the following examples:

(32)
\[
\begin{align*}
  a) & \quad \text{magari marya} \\
  & \quad \text{car new} \\
  b) & \quad *\text{marya magari}
\end{align*}
\]

(33)
\[
\begin{align*}
  a) & \quad \text{kitabu hiki} \\
  & \quad \text{book this} \\
  b) & \quad \text{hiki kitabu} \\
  & \quad \text{this book}
\end{align*}
\]

When the noun is in initial position, N has moved to D. Additional adjectives can precede or follow a demonstrative in postnominal position:

(34)
\[
\begin{align*}
  a) & \quad \text{shati hili langu zuri} \\
  & \quad \text{shirt this my good} \\
  b) & \quad \text{shati langu hili zuri} \\
  & \quad \text{shirt my this good} \\
  c) & \quad \text{shati langu zuri hili} \\
  & \quad \text{shirt my good this}
\end{align*}
\]

The analysis that Carstens provides for the demonstrative in Kiswahili is the same as the one independently formulated by Giusti for the Rumanian demonstrative. If the postnominal position is due to N-movement, and given that such head movement is strictly local (as also seen above), the demonstrative cannot be a head, otherwise it would intervene in the movement of N, blocking it. Therefore, the postnominal demonstrative must occupy a Spec position similar to that of adjectives; when it is in prenominal position it has moved to SpecDP.

All the arguments presented in this section clearly point to the necessity of attributing a different categorial status to articles and demonstratives: while articles are functional categories, demonstratives are lexical elements that are base-generated in a low specifier and further moved (at the latest at Logical Form) to SpecDP, passing through an intermediate
SpecAgr position immediately lower than D.\textsuperscript{7}

\section*{2.2.3 Quantifiers}

Quantifiers, which differ from demonstratives for being strandable in a large number of languages, are dealt with by Giusti differently from both articles and demonstratives. According to their distribution with respect to articles, quantifiers may be described as dividing into three different classes: those that must precede an article, those that may follow an article, and those that cannot cooccur with articles at all. These three kinds are respectively exemplified in (35), (36), and (37) below:

\begin{enumerate}
\item \begin{enumerate}
\item \texttt{tutti} *(i) \texttt{ragazzi}\\
"all the children"
\item \texttt{*i tutti ragazzi}
\item \texttt{li ho visti tutti}\\
"I saw them all"
\end{enumerate}
\item \begin{enumerate}
\item \texttt{molti} Ø*i \texttt{ragazzi}\\
"many boys"
\item \texttt{i molti ragazzi}\\
"the many boys"
\item \texttt{ne ho visti molti/*ne ho visti i molti}\\
"I saw many of them"
\end{enumerate}
\item \begin{enumerate}
\item \texttt{alcuni/*i ragazzi}\\
"some boys"
\item \texttt{*gli alcuni ragazzi}
\item \texttt{ne ho visti alcuni}\\
"I saw some of them"
\end{enumerate}
\end{enumerate}

Giusti (1991a, 1993, 1997) argues for two different analyses for quantifiers that are not preceded by a definite article (like \texttt{tutti} in (35a), \texttt{molti} in (36a), and \texttt{alcuni} in (37a)), and quantifiers that appear after a definite article (like \texttt{molti} in (36b)). The former are external to DP: they are lexical heads Q that select a DP as their argument, and project a QP, as in the structure given below:

\textsuperscript{7}Giusti (1997) leaves the question open of whether demonstratives should be simply given the category label of A(djective), since they are modifiers of the noun, or whether a new category Ind(exical) should be assumed.
When a quantifier is preceded by a determiner, it has instead the status of a quantitative adjective, which occupies a high specifier position; as such it does not display selectional properties over the noun phrase and behaves as a regular adjective. The relevant structure is the following:

Such an analysis for quantifiers accounts for the data in (35c), (36c), and (37c), since a Q, being external to DP, may well be left in place when extracting a pronoun from the DP it selects. The impossibility for the quantifiers in (36a) and (37a) to be followed by an article is due to their selectional properties that require the following noun to be indefinite\(^8\). Given

\(^8\)According to Cardinaletti and Giusti (1992), the indefinite interpretation is reduced to partitive case assignment of the quantifier to the noun phrase.
their different structural positions, quantifiers (Qs) and quantitative As are expected to behave differently with respect to floating. As will be shown below, Qs can allow their complement to move leaving them in place; such possibility is excluded for quantitative As, since that movement involves a whole extended projection, and As, being internal to DP, cannot remain in place while chunks of the projection move.

This proposal implies that the Italian quantifiers *molti* (“many”) and *pochi* (“few”), for example, have an ambiguous status, or, I would rather say, have two omophonous forms for the Q and the adjectival function. It is very interesting, in this respect, to note that Rumanian, as argued by Giusti (1991b, 1994) displays two synonymous lexical items, meaning “both”, one specialized for the Q function (*amîndoi*), the other for the adjectival function (*ambii*). As shown above, in Rumanian the definite article can encliticize on a noun, which in that case has moved to D and is, therefore, the leftmost element of the DP. However, a Q, being external to DP, is allowed to appear before the N+Art string. This is what happens with the quantifiers *toţi* (“all”) and *amîndoi*, as shown in the following examples:

(38)  
(a) *toţi/amîndoi* băieţii  
all/both children-the  
(b) *toţi/amîndoi* băieţi  
all-the/bith-the children

Note that the enclitic article, which in Rumanian can also appear on a prenominal adjective, cannot be encliticized on *toţi* and *amîndoi*. On the contrary, *ambii* carries the enclitic article, and displays, therefore, the behaviour of an adjective:

(39)  
(a) *ambii/frumoşii* băieţi  
both-the/nice-the children  
(b) *ambii/frumoşii* băieţii  
both/nice children-the

The behaviour of the two different forms with respect to floating is consistent with the analysis proposed, as indicated by the following examples:

(40)  
(a) băieţii am văzut pe toţi/amîndoi  
children-the [I] have seen all/both  
(b) băieţii(i) am văzut pe ambii(i)/frumoşii(i)  
children-(the) I saw both-nice

The argumentation exposed so far already excludes an analysis of quantifiers as functional
elements, equated to articles. However, by referring to the diagnostics in (8), we shall find further evidence for attributing to quantifiers the categorial status proposed by Giusti.

Quantitative adjectives behave like other kinds of adjectives in that they agree for number and gender with the noun they modify, so they may well be considered as lexical heads with their own functional extended projection. Qs are likewise inflected for nominal features in agreement with the nominal extended projection they select\(^9\).

Quantifiers, contrary to what one may guess at first sight, do not constitute a closed class. As Giusti (1997) interestingly notes, new quantifiers can be created from descriptive adjectives. Italian words like *numerosi* (“numerous”), *diversi* (“different”), *vari* (“various”), for example, are descriptive adjectives, as they can appear in postnominal position; however, they can also be used both as quantitative adjectives, and in that case they can only be prenominal, and as Qs, located in the first position with no cooccurring determiner\(^{10}\). This is shown in the following examples from Giusti (1997):

\(\text{(41)}\)

\begin{align*}
\text{a)} & \text{ Ha una famiglia numerosa} \\
& [(s)he] \text{ has a big family} \\
\text{b)} & \text{ Ha un’opinione diversa dalla tua} \\
& [(s)he] \text{ has a point of view different from yours} \\
\text{c)} & \text{ Una dieta varia fa bene alla salute} \\
& \text{ a varied diet is healthy}
\end{align*}

\(\text{(42)}\)

\begin{align*}
\text{a)} & \text{ Conosco i tuoi numerosi problemi} \\
& \text{[I] know (the) your numerous problems} \\
\text{b)} & \text{ Ho questi diversi problemi da risolvere} \\
& \text{[I] have these different problems to solve} \\
& \text{“I have to solve these many problems”} \\
\text{c)} & \text{ Le sue varie pretese mi hanno stancato} \\
& \text{His various requests have tired me} \\
& \text{“I am tired of his many requests”}
\end{align*}

\(\text{(43)}\)

\begin{align*}
\text{Ho numerosi/diversi/vari libri da recensire} \\
& \text{[I] have numerous/different/various books to review} \\
& \text{“I have several books to review”}
\end{align*}

---

\(^9\)The nominal projections selected by Qs, as Giusti notes, are also inflected for case, as shown by the clitics li and ne that appear, for example, in (35) and (36) above.

\(^{10}\)The impossibility of a preceding determiner is implicit in their Q status (being Qs external to DP) and the impossibility of a following one results from their property of selecting an indefinite noun phrase (as already seen for molti above).
We can easily test the Q status of the quantifiers in (43), by leaving them in place while extracting a pronoun (*ne*) from the DP. The following examples show that, while such a construction is impossible for descriptive adjectives, it is allowed with the quantifiers we are being considering, thus confirming their status as Qs:

(44)

b) ne ho numerosi/diversi/vari da recensire  
   CL [I] have numerous/different/various to review  
   “I have to review several of them”

c) *Ne ho interessanti da recensire.  
   CL [I] have interesting to review

That these elements occupy different positions according to whether they are used as descriptive adjectives or a quantitative adjectives, is evidenced by the fact that both kinds can cooccur without being coordinated:

(45)

a) Conosco le molte famiglie numerose che vivono in questo quartiere  
   I know the many family numerous that live in this district

b) Mi interessano i molti tipi diversi di cucina che si possono trovare in India  
   I’m interested in the many type different of cooking that you can find in India

Furthermore, the same element has different meanings when its status changes from that of a descriptive adjective to that of a quantitative one. In the following sentence (which, though not being very good from a stylistic point of view, is perfect from a grammatical point of view) the difference is clear, as also shown by the gloss that is provided for it:

(46)

a) le numerose famiglie numerose che abitano in questo quartiere  
   the numerous(=many) big families that live in this district

In sum, we have enough evidence for considering quantifiers as not forming a closed class.

Quantifiers further differ from articles (the only prenominal element that we have identified, following Giusti, as a functional category of the noun phrase) in that they are neither phonologically, nor morphologically dependent from the noun. They are not clitics in phonological terms, as they constitute an independent (prosodic) word; and they have their own morphological features that agree with the noun for gender and number. See, for instance, Italian examples like *molte scarpe* (many-fem+pl. shoes-fem+pl.), *molti stivali* (many-masc+pl. boots-masc+pl.). They can also quantify adjectival phrases, as is shown by Italian exam-
ples like *molto bello* ("very beautiful"), *tutta rota* ("completely broken"), *troppo caro* ("too expensive").

Finally, a strong evidence for the status of Qs as lexical heads, external to the DP, is their possibility to appear in discontinuous position with respect to their complement. This means that, in terms of the diagnostics in (8) above, quantifiers are not inseparable from their complement as are functional elements; and that, moreover, they also differ from demonstratives that, being part of the DP, cannot appear in floating constructions. See the relevant examples below:

(47)

<table>
<thead>
<tr>
<th></th>
<th>a)</th>
<th>Boys have the left</th>
</tr>
</thead>
<tbody>
<tr>
<td>b)</td>
<td>*Boys have these left</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>The boys have all left</td>
<td></td>
</tr>
</tbody>
</table>

Floating constructions are accounted for by Sportiche (1988) (followed by Shlonsky (1991) for Hebrew and Giusti (1990) for German) as derived from noun phrase movement and Q stranding. Subject noun phrases, according to Sportiche, are forced to move from a SpecVP position, where their thematic role is assigned, to a functional Spec where nominative case is assigned to them\(^{11}\):

(48)

\[
\text{[The boys], have }_\text{VP[all[t]]} [v,\text{left}]
\]

Data from Hebrew discussed by Shlonsky (and reported in Giusti (1997)) demonstrate that Q is a head and not an adjunct, in that it allows movement to and through its Spec:

(49)

<table>
<thead>
<tr>
<th></th>
<th>a)</th>
<th>Kol ha-yeladim axluj lexem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>the-boys ate bread</td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Ha-yeladim kulam axlu lexem.</td>
<td></td>
</tr>
<tr>
<td>the boys</td>
<td>all-them ate bread</td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Ha-yeladim axlu kulam lexem.</td>
<td></td>
</tr>
<tr>
<td>the boys</td>
<td>ate all-them bread</td>
<td></td>
</tr>
</tbody>
</table>

In (49a) the whole QP (the quantifier plus the noun phrase it selects) has moved to the IP-subject position. In (49b) the QP has likewise moved, but there is also a further movement: the DP, complement of Q, moves to SpecQP leaving Q in place, which, in this case

\(^{11}\)According to Sportiche, whose proposal is precedent to the IP split postulated by Pollock (1989), the landing position of clause subjects is SpecIP; now, subject noun phrases can be assumed to move, more specifically, to SpecAgrS.
must display an agreement morpheme. This is represented in the structure below:

\[(50)\]

\[QP[ha-yeladim][Qkul-am][DPt]i\]

Thus, the categorial status of Q is that of a head selecting a whole DP, which can move to its Spec, as in (49b). In (49c) SpecQP is used by the DP as an escape hatch to leave the Q in place and further move to the IP-subject position.

So, given that the movement giving rise to floating constructions is restricted to full extended projections, the possibility for Qs and no other determiner (or modifier of the noun) to appear in such constructions is perfectly consistent with the syntactic position that Giusti proposes for Qs: as shown in Fig.2.7 above, Qs, contrary to other determiners, are lexical heads external to extended nominal projections.

To sum up, Giusti’s analysis of quantifiers suggests that they are divided into two classes: quantitative adjectives and Qs proper. Both are lexical categories, so neither of the two is in D, and they do not share their position with demonstratives, either.

2.2.4 Conclusions

In this section Giusti’s arguments for postulating a different syntactic status for the various types of “determiners” have been reported. It has been demonstrated that only articles are functional heads in the extended projection of the noun phrase, occupying the D position. Demonstratives are lexical element generated in the Specifier of a functional head and move to SpecDP either in overt syntax, or, at the latest, at Logical Form. Quantifiers are of two different categories: Qs proper are lexical heads external to the extended nominal projection and take a DP as their complement; quantitative adjectives are lexical elements that, like other As, constitute a maximal projection occupying the specifier of a functional nominal head.

Such analysis, while attributing a different status to each kind of “determiner”, allows to give a unified account to each of these different categories across languages. Giusti’s proposal can capture various phenomena concerning determiners across languages, making it possible to avoid the postulation of a language-specific syntax of determiners.
2.3 Implications for Acquisition

If, as is likely the case, the different categorial status of determiners is part of UG, early acquisition data should reflect it, showing different developmental paths for the acquisition of articles, with respect to demonstratives and quantifiers. In particular we expect:

- an earlier appearance of demonstratives and quantifiers, with respect to articles;
- a different distribution of these elements in the noun phrase, with demonstratives and quantifiers first appearing in isolation, pronominalized, as is typical of lexical categories; and later possibly appearing also in positions other than the prenominal one, in which articles always appear.

Moreover, in order to investigate the initial state of Gaia’s syntactic representation of nominals, particular attention will also be paid to:

- the inflectional properties of articles, demonstratives and quantifiers, in order to assess Gaia’s realization of agreement features;
- the distribution of nouns with respect to their modifiers, in order to assess the early availability of N-movement across the nominal extended projection.

Therefore, the occurrences of those different elements in Gaia’s early production will be examined, with particular attention to their order of appearance, and their inflectional and distributional properties.
Chapter 2. The Framework: The Syntax of Determiners
Chapter 3

Functional Categories in Gaia’s Early Noun Phrases

3.1 The acquisition of D: Articles

As shown in the previous section, there are strong reasons to think that, among the prenominal elements commonly referred to as “determiners”, only articles constitute a functional category and occupy the D position in the extended nominal projection DP.

This seems to be confirmed by the data in Gaia’s corpus. Gaia’s early productions suggest that her initial grammar distinguishes between the various so-called determiners, since her acquisition of articles, demonstratives and quantifiers follow different paths. This will be made clearer in the course of the work, but it has been anticipated here because it explains why the following descriptive analysis of Gaia’s representation of D will be based on her production of articles.\(^1\)

The following table presents the data about Gaia’s production of article+noun sequences vs. bare nouns in all the contexts that require (or allow) the insertion of such elements. Both definite and indefinite articles have been considered\(^2\). Since Gaia often utters the same noun many times in a video, the number of different items has been indicated, along with the total number of occurrences\(^3\). For each video, I provide the percentage of articles

\(^1\)Given the different courses of development observed, the inclusion of demonstratives and quantifiers in the count of bare vs. determined nouns would not have contributed to giving a clear picture of the child’s acquisition of the D category.

\(^2\)Both kinds of articles appear at the same time and their acquisition seems to be parallel. Moreover, when naming objects (or animals, or people) seen in books and magazines (a very common situation in the recordings) Gaia seems to use indifferently the definite and the indefinite article, independently from semantic factors.

\(^3\)Note that the occurrence of a noun preceded by a definite article and the same noun preceded by the indefinite one, count as two different items, and if the noun is preceded by a preposition combined with an article (such as \textit{del}, \textit{della}) or an adjective is inserted between article and noun, it is likewise considered as a
produced by the child.

<table>
<thead>
<tr>
<th>Age of Child</th>
<th>N</th>
<th>Art+N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total No. of Occurrences</td>
<td>No of diff. items</td>
</tr>
<tr>
<td>1;6,29</td>
<td>37</td>
<td>8</td>
</tr>
<tr>
<td>1;8,8</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>1;9,1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>1;9,16</td>
<td>29</td>
<td>17</td>
</tr>
<tr>
<td>1;9,24</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>1:10,29</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>1;11,13</td>
<td>51</td>
<td>19</td>
</tr>
<tr>
<td>1;11,28</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>2;0,28</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2;2,1</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>2;2,28</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>2;4,0</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

As can be seen, in the first videos, until the age of 1;10,29, all nouns appear as bare, with no article produced. Thereafter, Gaia starts inserting her first articles, but determined nouns still alternate with bare ones. Articles will be produced always in targetlike way only at a final stage. The findings about Gaia’s production of article+noun sequences vs. bare nouns can be represented as in the following histogram:
As is clear from such data, articles are missing from Gaia’s syntactic structures for a long time; moreover, when they appear, some variability is still to be observed in the child’s production of such elements, which will be more systematically realized over time. So, the picture of Gaia’s acquisition of this functional category is rather complex. Before trying to account for it, the different stages will be illustrated, by examining productions and omissions of articles; I shall also refer to data about demonstratives and quantifiers, which suggest that the different categorical status assumed above for such elements with respect to articles, is consistent with the acquisition data.

### 3.1.1 First Period

A first stage can be clearly distinguished in Gaia’s acquisition, when all utterances consist of single words. At this time (from the first video, recorded at the age of 1;6,29, to that of 1;10,29), Gaia’s nouns are always bare, without any determiner. Below I give some sample pieces of transcripts, which will give an idea of the reduced nature of Gaia’s speech at that first stage:

(1)

@Age of CHI: 1;6.29

*CHI: 0 [% manda bacini guardando il display].

*ROB: a chi dai bacini?
*MAT: alla tata dai bacini?
*ROB: +< alla Gaia?
*CHI: tata!
%act: indicando la sua immagine sul display
*CHI: &gnògnò [=? gnò gnò]
%com: vocali allungate
*ROB: cosa?
*CHI: &gnò!
%gls: uomo, probabilmente
*ROB: l' uomo # con la birra?
*ROB: l' uomo della birra.
%exp: ciò che sta indicando non è inquadrato, probabilmente è l' etichetta di una bottiglia di birra.
*CHI: p(i)ù.
*ROB: più cosa?
*ROB: la birra?
*ROB: più, se l' è bevuta tutta!
*MAT: dai, fai l' animaletto, che mi piace!
*CHI: 0 [% imita un roditore con la bocca].
*CHI: 0 [=! piagnucola].
%act: indica fuori
*ROB: cosa c' è, cosa?
*CHI: papo [: parco], papo [: parco]!
*ROB: al parco ci andiamo domani.
*ROB: racconta al papà +...
*ROB: allora, noi siamo andate al parco, abbiamo incontrato +/.
*CHI: no!
%act: dandosi piccole bottine sulla testa
*ROB: no botte, no, # no, no, no, aveva fatto il birichino quel bambino +...
*ROB: ah, ecco perché in testa, pèrchè aveva [= Giulio] dato il rastrello in testa a Andrea, poverino, e allora si è messo a piangere +...
*ROB: ma non importa, dai, ogni tanto fanno così i bambini, sai Gaia.
*CHI: tati.
*ROB: sì, i tati.

@Age of CHI: 1;9.16
*CHI: (l)atte!
%act: indicando le confezioni di latte
*CHI: mamma.
*ROB: la mamma te lo da il latte.
%com: la allattavo ancora un po’ in quel periodo
*GAB: e queste # cosa sono queste [= olive]?
*CHI: nigno [: dito] [?] [=? mign(ol)i].
%act: indicando il suo dito indice
%com: si divertiva spesso ad infilare le olive snocciolate sul dito

Gaia is unable to insert an article even when it is obligatorily required in the context in which the noun appears, as shown by the following examples:

(2)  
@Age of CHI: 1;9.1
*ROB: chi è che bagna l’ orto, a casa?
*CHI: nonno!
*ROB: il nonno chi?  

*CHI: &mammi [: dammi] [?] # pompa!
%sit: Gilberto la stava sistemandolo e stava per dargliela

@Age of CHI: 1;9.16
*GAB: cosa vuoi?
*CHI: momo!
%exp: momo è un termine che in Veneto gli adulti usano coi bambini per indicare cioccolatini e dolciumi in genere

*GAB: ma perché, cosa vuoi?
*CHI: o(liv)a, o(liv)a!
%act: indicando il vaso di olive

In this period when not one single article is produced, we can instead find demonstratives and quantifiers; however, these occur only in isolation, they are never combined with nouns at this stage. The earliest occurrences of quantifiers and demonstratives are reported respectively in (3), and (4) below:

(3)
@Age of CHI: 1;9.1
*ROB: quanta ne abbiamo data, amore?
%sit: ora la tiene lei, ed è tranquilla
*CHI: tanta!

@Age of CHI: 1;9.16
CHI: &tutta!
%act: indicando la cioccolata

(4)
@Age of CHI: 1;9.16
GAB: tieni il formaggio # quale vuoi?
*CHI: q(u)e(s)to!

The following example is very interesting, as it is probably to be taken as a very early occurrence of a demonstrative combined with an adjective, though in reduced form (the preceding lines of the transcript are also given, as they constitute the relevant context for the interpretation of the utterance):

@Age of CHI: 1;9.16

4In the northern variety of Italian that Gaia is acquiring kinship nouns are always preceded by the definite article.
Chapter 3. Functional Categories in Gaia’s Early Noun Phrases

So, we can conclude that a first period can be recognized in Gaia’s acquisition, where articles are always omitted, and the other “determiners” display the distribution of lexical categories.

3.1.2 Second period

In the video recorded at the age of 1;10.29 Gaia produces her first article, the feminine definite article *la*, before a proper name (according to the northern variety of Italian that she is acquiring):

(5)

*ROB: no, no, no, no, non si tira fuori la macchina fotografica!
*CHI: (l)a Pimpa [: Mirca]!
*CHI: Pimp [: l]a Pimpa [: Mirca]!
%exp: Mirca, una mia amica, probabilmente le aveva fatto delle foto poco tempo prima
*ROB: cosa?
*CHI: (l)a Pimpa [: Mirca]!
%act: tirando fuori la macchina fotografica

In the same video, we also find the first occurrence of the masculine indefinite article *un*, though in the fixed expression “un po’”.

However, many nouns still remain bare, as shown in the utterances reported below from the same transcript:

(6)

*ROB: e chi è passato prima, chi è che ci è venuto a trovare?
*CHI: baubau@o [= cane]!
%act: <aft> si gira per guadarlo

*CHI: (l)una o(r)so!
*CHI: (l)una (l)una o(r)so!
%exp: si riferisce ad un cartone animato, ogni episodio del quale termina con un dialogo fra un orso e la luna
*ROB: cosa?
*CHI: (l)una o(r)so!

*CHI: (l)ont(r)ina.

%act: prende la sua lontra di peluche

The appearance of the sequence article+noun is not paralleled by a “determiner-like” use of demonstratives and quantifiers: we still do not find such elements combined with nouns; in the video we are considering they appear in utterances such as those reported below:

(7)
*CHI: (qu)e(s)ta!
%act: mi passa Paquita, la scimmietta

(8)
*CHI: 0 [% continua a giocare con la sabbia].
*CHI: tanta, tanta!
%exp: vuole mettere tanta sabbia nel mulino

*ROB: quanto ne vuoi di quel liquido verde?
*CHI: tanto!

In the video recorded only two weeks later, we find various occurrences of nouns preceded by the definite articles la, il (feminine and masculine singular forms), and i (masculine plural), and by the indefinite article un. In the next video all these forms are again productively used and there appears also the feminine plural form le. Some examples from both videos are given below:

(9)
@Age of CHI: 1;11.13
*ROB: cosa beve il tato?
*CHI: i(l) thè.

*ROB: cosa ti faceva male?
*CHI: il dito.
*ROB: povero ditino, aspetta che gli do un bacino.
*CHI: più!
*ROB: piú, non fa più male!
*CHI: (gl)i occhi, bua.

*CHI: i momi [= cioccolatini].
*ROB: i momi?
*CHI: am!
*ROB: chi se li mangia?
Among the many Art+Noun sequences occurring in the latter video (see table above), I have chosen the few lines above as examples of Gaia’s productive use of articles: they show that her grammar provides her with paradigms, not just with unanalysed forms attached to the noun (the so-called “impostors” postulated by Radford (1990) to account for the earliest occurrences of articles by English-speaking children, in periods when such occurrences alternate with significant omissions). Gaia, in other words, already seems to master the inflectional properties of nouns and articles (and, as we shall see below, of adjectives and quantifiers, as well). If this might lead to the conclusion that D is available, there is still, however, an inconsistency that needs to be accounted for, namely the variability in the production of articles that is still to be observed: while it is true that she often produces articles, and even in contexts that would not necessarily require them, it is also true that omissions are still found in her corpus, so she sometimes leaves off the article when the syntax of her target language would require her to insert it. See, for example, the following utterances and their context (taken from the two videos considered so far, and also from the next one):

(10)  
@Age of CHI: 1;11.13  
*ROB: mi dici con cosa scrive Mattia a scuola?  
*CHI: penna # (Ma)ttia.  
*ROB: che cosa vuoi?

*CHI: (l)a Gaia!  
*CHI: un p(i)atto!  
*CHI: gaio [: giallo]!  
*CHI: un piatto ## ve(r)de!  
*ROB: allora, sopra il piattino cosa mettiamo?  
*CHI: (l)a pappa!  
@Situation: sfogliando un giornale, guardiamo una pagina con foto di bimbi e disegni di animali  
*CHI: i tati!  
*ROB: e questi?  
*CHI: i ciucci!  
*CHI: (l)a tata!  
*CHI: (l)a tata.  
*CHI: (l)e tate.  
%act: ha girato pagina  
*CHI: (l)a tata.  
*CHI: un tato.
*chi: gaiolo [giallo] ## grande [% piagnucola].
*rob: grande?
*rob: ma cosa?
*chi: am!
*rob: la forchetta?
*chi: cucc(i)ino.
*chi: cucc(i)ino.
*chi: cucc(i)ino.
*rob: vuoi il cucciaino!
*chi: sì!

@age of chi: 1;11.28
*chi: il tato.
*rob: cos’ha in testa quel tato?
*chi: cappucc(i)o.

@age of chi: 2;0.28
*rob: cos’è stato che ha fatto rumore?
%sit: si sente un rumore da interferenza che proviene dalla pianola
*chi: padogna [: pianola].
*rob: cosa?
*chi: paogna [: pianola].
*chi: q(u)e(s)ta.
%act: indicandola

*mat: e poi cosa hai fatto con la nonna Lisetta, con che giochi hai giocato oggi, con cosa hai giocato?
*chi: giochi.
*mat: con +..?
*chi: +< omini!
*mat: con gli omini?
*chi: sì.

The following transcriptions, instead, exemplify cases in which the article is not produced in situations of naming, which, for constituting contexts that we could call “predicative”, would not require the article so strictly as other kinds of contexts do (for example when the noun phrase is inserted in a sentence as an argument). However, since in such situations many nouns are nonetheless “determined”, such bare nouns should not go unnoticed:

(11)
@age of chi: 1;11.28
*rob: e questo cos’è?
*chi: il gufo!
*rob: il gufo!
*chi: un ciuccio, un tato, tanti tati!
*rob: e questo [= pulcino]?
*chi: ba +//.
*rob: cosa?
*chi: il ciuco.
*rob: e questo qua?
The examples above, apart from witnessing a variability in the insertion of articles, are also interesting in that they shed light on another significant issue, namely whether in children’s early grammar articles have mainly a syntactic function (as is typical of functional categories), or whether they are rather inserted for semantic reasons. The utterances above suggest that the definite article, at least in early stages of acquisition is not necessarily associated with definiteness of the noun they precede; early definite articles seem not to imply specific interpretation. As a matter of fact, when referring to pictures in magazines, Gaia uses indifferently definite and indefinite articles.

A phenomenon that is finally to be noticed, as regards the use of articles in the period under consideration, is the absence of the feminine indefinite article from Gaia’s production. Whereas the appearance of the masculine indefinite article un is contemporary to the first occurrences of definite articles, and such masculine form is constantly produced thereafter, the feminine article una make its first appearance in the videos no sooner than at the age of
2;2.1. And this does not seem to result from a lack of contexts for its use. Gaia even incurs in an error, using the masculine form instead of the target form *una* before a feminine noun:

(12)

@Age of CHI: 1;11.13
*ROB: cosa vede Topolino?
*CHI: un [/] un tata.

%sit: nel libro, che leggiamo spesso, è scritto "Topolino vede una bambina"

Such a gender “mistake”, which is attested also in the diary, with a noun that is so common in her speech as is *tata* (child language form for *bambina* (“little girl”) is not consistent with the rest of Gaia’s data. As shall be better illustrated below, from the earliest stages of her acquisition Gaia shows a mastery of agreement features in the nominal projection. So, such phenomenon needs to be accounted for.

As regards demonstratives, it is further to be noted that in the whole second period (not just in the video where the earliest articles are found, for which demonstratives and quantifiers have already been considered) they are still used in a pronominal way, either in isolation (as happened in the previous stage), or, from the age of 1;11.28, also combined with other elements, but not yet with nouns:

(13)

@Age of CHI: 1;11.13
*ROB: ascolta Gaia # vuoi che guardiamo insieme un libretto?
*CHI: q(u)ello.
*ROB: quale?
*CHI: q(u)e(s)to.
*ROB: questo?
*ROB: prendilo!
*CHI: no.
%act: si sposta indicando altri libri

*CHI: q(u)e(s)ti.

*ROB: vuoi portare qualcosa in bagno con noi?
*CHI: no ## q(u)e(s)ta ## [//] q(u)e(s)te!

@Age of CHI: 1;11.28
*CHI: (l)eggo q(u)e(s)to [% vuole che io legga]!

@Age of CHI: 2;0.28

\(^{5}\)I anticipate here that a more detailed analysis of this and another phenomenon involving indefinite articles will be given in 5.2, since a satisfactory account for them will be provided by the phonological approach taken in Part II of the present work.
Quantifiers, which still appear in isolation at 1;11,13, are used in combination with nouns from the age of 1;11,28:

(14)
@Age of CHI: 1;11.13
*CHI: [% passandomi un mucchio di libri] ùuoi # tanti!
%sit: ci spostiamo
*CHI: tutti.
*ROB: +< leggiamo questo qui.
*CHI: +< tutti.
*ROB: questo qui.
*CHI: (l)ib(r)j.
*CHI: (l)ib(r)j.

*CHI: i momi [= cioccolatini].
*ROB: i momi?
*CHI: am!
*ROB: chi se li mangia?
*CHI: (l)a Gaia!
*ROB: la Gaia!
*CHI: tanti!
*ROB: tanti momi!

@Age of CHI: 1;11.28
*CHI: tanti tati!

*CHI: tanti o(r)setti!
*CHI: tanti [//] due o(r)setti +/.

3.1.3 Third period

From the age of 2;3, omissions are extremely rare, and both definite and indefinite articles are productively used in all of their forms. Some extracts from the transcript of a video recorded in this period will best illustrate that by this time articles may be definitely considered as acquired:

(15)
@Age of CHI: 2;2.28
*CHI: (l)a sua m [///] i(l) tato con la sua mamma che c +/.
@Situation: sfoglia velocemente
*CHI: un ciuccio g(r)a [///] una tetta(r)ella g(r)and [///] un ciuccio g(r)ande de(l) tato!
As can be seen, in this period Gaia is able to produce complex nominal structures, where nouns are not only preceded by articles, but also combined with possessives, and descriptive adjectives. Gaia only shows still some problems in inserting articles in the form l’ (especially when combined with prepositions), which in Italian precede masculine and feminine nouns starting with a vowel. The indefinite article appears now also in its feminine form and an interesting phenomenon involving indefinite articles is the recurrent use of the allomorph uno, in contexts when un is instead required by Gaia’s target language.

3.2 The Acquisition of Agr

As seen in the previous chapter, AgrP is a functional projection, dominated by DP in the nominal extended projection, where the agreement morphology of adjectives (or nominal modifiers in general) is realized, and whose head constitutes a landing site for the movement of the noun across the DP.

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6The phenomenon will be better illustrated in 5.2.4, where some hypotheses to account for it will be presented.
3.2.1 Agreement features on adjectives, demonstratives and quantifiers.

Since the earliest recordings Gaia shows she can master agreement features: these are in fact correctly realized on quantifiers, demonstratives and descriptive adjectives. The examples given above in (3), (4), (7) and (8) demonstrate her early realization of agreement on demonstratives and quantifiers; below I report some early examples of adjectives correctly inflected for number and gender:

(16)
@Age of CHI: 1;6.29
*MAT: +< guarda il gattino, Gaia!
*CHI: mao@o mao@o!
*ROB: com’ è il gattino?
*CHI: totto [: rotto]!
*ROB: è rotto.

@Age of CHI: 1;9.1
*CHI: (at)tento!
*ROB: attentó!
*LIS: +< attento nomno!

*LIS: anche la Gaia attenta, vero?
*CHI: (at)tenta!

*LIS: prendi!
%act: le porge una boccia verde
*CHI: dai, da!
%act: non la prende guarda le altre bocce
*CHI: ocia [: rossa]!
*CHI: ocia [: rossa]!
%act: indicando verso le altre

3.2.2 The position of N

Adjectives, which for a long period appear in isolation, as soon as they start being combined with nouns in more complex nominal projections, appear in postnominal position, as can be seen in the following table:
The only prenominal adjectives that we find are *altro* (“other”), and *brutti* (in the sentence “che b(r)utti occhi”), which are prenominal also in Gaia’s target language.

So, even if we do not have many occurrences, it can fairly be concluded that for Gaia N-movement across the nominal projection is not a problem (of course at a stage when nouns are combined with modifiers). These data are also consistent with those in Bernardini (2001).

### 3.3 Preliminary Discussion. How to account for omissions of articles

The data described above seem to indicate that at least some functional structure is projected in Gaia’s syntactic representations of nominals: the very early correct realization of agreement features on adjectives, demonstratives and quantifiers points to the presence of a functional node Agr in her initial grammar.

As regards the DP layer, however, the data are less transparent. As has been shown, for a period of four months, not a single article is produced by Gaia before the nouns she utters. This confirms what has been observed in the rather famous literature on early speech in English (Bloom (1970), Brown, (1973), Radford (1990)), and a similar initial lack of articles in early productions has also been attested for French (see Granfeldt (2003))\(^7\). Such findings can only lead to the postulation of a stage in children’s acquisition where nominal projections do not extend above the NP node, if we take early production as directly reflecting children’s underlying syntactic knowledge. However, if we follow Radford’s maturational approach, and

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\(^7\)But see Bohnacker (1997) for different findings on Swedish early child language.
thus argue for an initial lack of the functional category D, we shall nonetheless face the problem of accounting for the variability that is to be observed in the following stage of development. A way to account for it in maturational terms would be to consider the first articles, those which occur in periods when significant omissions are found, as “impostors”, i.e. unanalysed forms attached to the noun without constituting instantiations of D. Such view, however, seems not to provide a convincing characterization of Gaia’s early article-noun sequences, which, as seen above, involve the productive use of various forms of articles (the indefinite un (masc.), and the definite la (fem. sing.), il (masc. sing.), i/gli (masc. plu.))\(^8\). The child seems to be aware that the article is distinct from the following noun in morphological representation. This awareness is evidenced by the presence of paradigms in Gaia’s corpus from this period: the same noun can appear with or without article (e.g., “nonna / (l)a nonna”), and also with different articles (e.g., “(l)a tata / un tata”, “un p(i)atto/i p(i)atti”). Another way to account for the variability in the insertion of articles by appealing to syntactic factors is the analysis of the determined vs. bare nominals in relation to their status as predicate or argument. In other words, it could be possible that children insert articles to give a noun the syntactic status of argument\(^9\). So, a noun appearing in elliptical contexts, or generally in a predicative position, would be more likely to be left bare. Beside the fact that it is difficult to assess the argumental or predicative position of nouns at the earliest stages, when they are uttered in isolation, Gaia’s data, even at first sight, do not seem to be accountable for in such terms. This is particularly evident in the words produced by Gaia when looking at magazines and puerculture catalogues. In these situations Gaia names what she sees (objects, people, animals), and such predicative contexts seem not at all to favour omissions, as most of the times articles are present; conversely, omissions can be found in argumental, as well as in predicative position.

An alternative approach emerged, from a preliminary analysis of the data, as the one that could best account for the variability observed. I noticed that Gaia’s bare nouns and article-noun sequences, though differing from a syntactic point of view (the former seemingly forming an NP, the latter a DP), had nonetheless something in common: they constituted a parallel sequence from a phonological point of view. In other words, I noticed that both kinds of utterances (lexical, or functional+lexical element) displayed the same alternance of unstressed and stressed syllables, they filled the same prosodic structure. This intuition

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\(^8\)The seemingly reduced form, in which Gaia’s definite articles appear is due to her incapacity to articulate the [l].

\(^9\)Such approach is taken by Bernardini (2001) and Granfeldt (2003).
led me to re-examine the entire corpus from a prosodic perspective, and the results, also obtained through the comparison of Gaia’s data to data analysed in other researches taking the same phonological approach, pointed to the need of an interaction of phonological and syntactic analysis to better interpret children’s early productions. Such results, and the detailed prosodic analysis of Gaia’s utterances that led to them, will be dealt with in II.
Part II

A Prosodic Account of the Emergence of Articles
Chapter 4

An Overview of Prosodic Phonology.

Theories of prosodic phonology hold that a sentence is endowed with a hierarchically organized prosodic structure that is distinct from its morphosyntactic structure.

A set of prosodic units, from the syllable (and even subconstituents of the syllable) up to the utterance, define the levels of prosodic structure. These are illustrated in (0) below, along with sample pieces of the phonological content that they may take:

(0) The prosodic Hierarchy

<table>
<thead>
<tr>
<th>Utt (Phonological Utterance)</th>
<th>I think Peter likes bananas</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP (Intonational Phrase)</td>
<td>Peter likes bananas</td>
</tr>
<tr>
<td>PP (Phonological Phrase)</td>
<td>likes bananas</td>
</tr>
<tr>
<td>PW (Prosodic Word)</td>
<td>bananas</td>
</tr>
<tr>
<td>F (Foot)</td>
<td>nanas</td>
</tr>
<tr>
<td>σ (Syllable)</td>
<td>nas</td>
</tr>
</tbody>
</table>

These are motivated by being the domains of phonological phenomena: phonological rules crucially apply between segments within the same unit, and not when segments are separated by a boundary delimiting that relevant unit. Thus, being the domain for the application of a phonological rule constitutes the main evidence for the existence of a constituent as a distinct unit of prosodic structure. Below, in 4.1, I shall give for each prosodic constituent an example

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1This scheme is adapted from Demuth (2000).
Prosodic structure can be represented (see Fig 1) as well-formed trees (or bracketing equivalents), such that the lines cannot cross (e.g., syllables belonging to a single foot cannot belong to two different prosodic words) (Gerken, 1996)\textsuperscript{2}.

![Figure 4.1: Prosodic structure of a sentence](image)

The inventory of prosodic categories building the structure in Fig. 4.1 is assumed to be basically correct by most phonologists, though various proposals for modifying it have been made. In particular there seems to be no need (see Dresher, 1996 and Selkirk, 1996) for postulating a further prosodic constituent \textit{clitic group}, that Hayes (1989)\textsuperscript{3}, Nespor (1993) and Nespor & Vogel (1986) locate in the prosodic tree between the PW and the PP levels, and that should consist in a PW plus functional elements phonologically attached to it (namely \textit{prosodic clitics}). As will be shown in section 4.3, Selkirk’s (1996) analysis of clitics does not require such additional prosodic unit, a prosodic clitic being definable just with respect to the category \textit{prosodic word}\textsuperscript{4}. Moreover, as will be made clear further on in this chapter, the range of categories assumed above is sufficient to account for the data in my study of Gaia’s

\textsuperscript{2}Note that the uppermost node doesn’t branch in this example, because it contains only one intonational phrase. The utterance node is nonetheless projected, since, as stated by the principle of headedness (see 4.2) each higher prosodic category must dominate the next lower category; that means that even a single word pronounced in isolation is an utterance.

\textsuperscript{3}Reference in Dresher (1996).

\textsuperscript{4}More specifically, she shows that clitics fall into one of three configurations (the free, internal or affixal clitic structure), that differ from one another in terms of their relations of domination and sisterhood with the \textit{prosodic word} unit (see section 4.3), arguing that only the existence of relevant phenomena not accountable for with reference to those structures would make it necessary to postulate the \textit{clitic group} category.
utterances, and it is on this same inventory that the other researches I make reference to are based.

The next section gives a definition (where it is possible) or a characterization of each of the prosodic units introduced so far.

4.1 The Prosodic Hierarchy

It has been seen from the introductory sketch above, that the prosodic hierarchy extends below the level of the word, with such units as syllables and feet, as well as above the word level, with larger constituents such as phonological and intonational phrases, up to the entire utterance. It shall be seen below that it is not always easy to define these units, and this is most true when we are dealing with the larger units of prosodic structure, that are characterized by a relative “fluidity”, with boundaries that can vary depending on several factors. In the following a brief descriptive paragraph is dedicated to each of the prosodic constituents.

The Syllable

The basic prosodic unit is the syllable ($\sigma$). It is the domain of several different prosodic features, such as tone, and it is the unit that can bear stress, so that in Italian, as well as in English there are stressed syllables (denoted by s) and unstressed syllables (denoted by w for weak).

The significance of the syllable as a phonological unit has been recognized at least since Aristotle, who observes that a syllable is more of the sum of the segments that compose it. That is to say, in terms of contemporary linguistics, that the notion of syllable allows us to make generalizations that cannot be made only by referring to sequences of phonemes. In spite of the syllable’s long history, the necessity to give it the status of a phonological constituent has often been the object of much controversy, above all because of the difficulty to give it precise boundaries on phonetic bases. However, since it has been demonstrated that a model adopting the syllable has a descriptive and explanatory power superior to one that ignores it, the syllable may well be considered a relevant distinct unit in phonological theory.

A syllable can be defined as a phonological unit which consists of at least a syllabic element.

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5In this paragraph I basically follow Nespor (1993) for a characterization of the syllable unit.

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called *nucleus*, that in Italian is always a vowel.\(^7\) Below I give some examples of syllables (delimited by a full stop) in Italian and English words:

(1)

(a) a.pri.le  b) e.le.phant  
    pa.u.ra          o.ri.gi.nal  
    bam.bi.no       trum.pets  
    pren.de.re      e.ra.ser  

As can be seen, there are vowels which exhaustively form a syllable. However, most syllables contain also consonants: the most common syllable consists in one consonant followed by one vowel. This sequence (CV) is the universally less marked syllable, the only one that we find in every language in the world, and (as also confirmed by the data analysed in the present study) the first to be acquired by children. In Italian around 60% of syllables have the CV form. The consonant, or the consonants, preceding the vowel inside a syllable form its *onset*. Syllables ending in a vowel are said to be *open*, but there are also syllables that are *closed* by one or more consonants which form their *coda*. When more than one consonant is inserted in the onset or in the coda, their order is subjected to a sonority scale: consonants that have a higher value in this scale must appear closer to the nucleus than those with a lower sonority. In Italian, for example, onsets must end with a liquid, and codas must consist in a liquid or a nasal consonant.\(^8\) Beside this restriction on the order of consonants in a syllable, which holds universally, there are language-specific restrictions as to the number and type of consonants filling onsets and codas: syllables that are well-formed in a language may not be allowed in another.

Now that a description of what a syllable consists of has been given, it will be interesting to consider at least one example of a phonological phenomenon that can be described only by referring to this constituent. It must be remembered that the existence of such phenomena constitutes the main evidence for its status as a prosodic constituent.

In Italian, even if the length of vowels does not distinguish meanings, there is a surface lengthening of vowels in some circumstances that can be defined by making reference to the syllable. See the examples in (2)\(^9\):

\(^7\)In other languages, however, even a syllabic consonant can form the nucleus of a syllable. For instance in English “bottle” can be pronounced with a syllabic l as nucleus of the second syllable.

\(^8\)The possibility for phonemes other than [r], [l], [n], [m] and [n] to form the coda of an Italian syllable is restricted to the case of geminate consonants, when, in other words, the syllable ends with the same segment as the first of the syllable following it.

\(^9\)Taken from Nespor (1993).
(2) a) f[ɔː][ɹo]  p[ɛː][ɹo]
b) f[ʌ][ɹno]  p[ɛ][ɹno]  
c) f[o][ɾnɛndo]  p[e][ɾò]

Vowels in square brackets in (2a) are long, while those in (2b) and (2c) are short. Vowels in (2a) distinguish from those in (2c) for being stressed, and from those in (2b) for occurring in an open syllable. A phonological rule can therefore be thus formulated: the stressed vowel of an open syllable, not word-final\(^{10}\), is lengthened. Without the notion of syllable this generalization could not have been made.

Another important fact supporting the relevance of the syllable in prosodic structure is that it is present in the native competence of speakers. Everybody intuitively knows what is a syllable, and it is significant in the context of the present study, that very early in acquisition children seem to recognize the syllable as a distinct and important unit and use it to organize their first utterances. But this will be shown in more details in section 5.2, in the analysis of Gaia’s utterances, and also with reference to other analyses that adopt a similar perspective.

So far, three “parts” of the syllable have been mentioned, which can be considered as its constituents, so that the structure of a syllable could be schematized as follows:

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Figure 4.2 : Subconstituents of the syllable
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However, there are reasons to think that these subconstituents are organized in a hierarchical structure, where the nucleus and the coda are dominated by an intermediate constituent, the rhyme, sister to the onset and daughter to the syllable:

\(^{10}\)Notice that the final vowel of “però” in (2c) is not lengthened, though being stressed and in an open syllable.
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The first reason why the rhyme should figure as a sub-syllabic unit is that it determines syllabic weight\footnote{As will be seen in the next sections, weight seems to be relevant in the shape of children’s early words.}: a syllable is heavy when it is closed or ends in a long vowel, an open syllable with a short vowel is instead light. The onset plays no role, it is the rhyme that is relevant to the definition of a syllable in these terms. Syllabic weight is important because it determines the position of stress in the words of many languages\footnote{For example, in Latin primary stress falls on the penultimate syllable if it is heavy, otherwise it falls on the one preceding it.}. Two more arguments for giving a constituent status to the rhyme come from verse and from phonological errors. In the poetic tradition (not necessarily written) of all languages there is verse with poetic rhymes, definable as the identity of two lines from the nucleus of the last stressed syllable to the end\footnote{It is also important to suggest that further evidence for the relevance of the rhyme comes from children’s sensitivity to poetic rhymes.}. As for errors, it has been shown\footnote{Fudge (1987), reference in Nespor (1993).} that people’s most common phonological errors consist in shifting syllable onsets while leaving rhymes intact (for example, in Italian “bangio e mevo” for “mangio e bevo”).

But these are not the only subconstituents of the syllable that have been postulated by phonologists. Other proposal recognize the mora as an important unit at the sub-syllabic level.

The concept of mora recurs in discussions of length within different theoretical frameworks. Although it is not easy to give a precise definition of this term, the mora ($\mu$) may be described as “a unit or measure of length, such that “short” syllables can be said to constitute one mora, and “long” syllables two moras” , according to Fox (2000, p. 46). Thus, moras have to do with syllabic weight: reformulating the notion of weight in moraic terms, light syllables may be said to have one mora, heavy syllables (e.g., CVV or CVC) may be said to have two. Fox refers to Prince (1980), who observes that moras cannot simply be equated with segments
or segmental positions: hypercharacterized syllables, with either VVC or VCC rhymes, have still only two moras, and not three. Moras can be incorporated in the tree structure, as an immediate constituent of the rhyme, as shown by Fox (p. 79) and schematized here in Fig. 4.4, as an example of a syllable CCVVC. In the case of a syllable with more coda consonants, the additional segments will be accommodated under the second mora, thus not increasing the mora count. It is of course possible to have a non-branching second mora for VC or VV rhymes.

![Figure 4.4: Syllable structure with moras](image)

As will be seen in Chapter 5, the notion of mora can be useful for characterising a stage in the development of the prosodic structure in which children organize their early words, so I will come back to it.

The next paragraph deals with the foot; syllables, thanks to their property of being stressed or unstressed, will play a fundamental role in the definition and characterization of feet.

**The Foot**

The foot occupies the second level of prosodic structure, dominating one or more syllables. A *foot* consists in one strong syllable which can be either preceded or followed by one or more weak syllables. The notions of “strong” and “weak” can be expressed differently in different languages. In Latin meter, for instance, syllables are strong when they are heavy; in Italian feet, as in English ones, strong syllables are stressed and weak syllables are unstressed.

Nespor (1993) provides a typology of possible feet, which is given in Fig. 4.5 below, specifying that feet with the structures in (g) and (b) are highly marked. It must be pointed out

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15 This description of the foot unit is mainly based on Nespor (1993).
16 Despite the existence of sub-syllabic constituents, the levels are numbered from the syllable upwards, because syllables and all the constituents that dominate it are structured according to the same principles (while units inside the syllable are not).
that in fact in many other analyses (Selkirk, 1996 and McCarthy & Prince, 1993\textsuperscript{17}, among others) single unstressed syllables cannot figure as feet at all (type (b) in Nespor’s scheme) and are defined as “unfooted”. As we will see in 5.1 and 5.2, this has great relevance in the analyses of children’s utterances.

A foot with the structure in (c), a strong syllable followed by a weak one, is a trochee, the foot of English, for instance; a binary foot with the strong element to the right (as in (d)) is instead an iamb; a strong syllable and two following weak syllables form a dactyl (structure (e)); and when, as in (f), the strong element of a ternary foot is at the right edge, we have an anapaest. These are all well-formed feet.

By contrast, feet with such structures as those schematized in Fig. 4.6, with no strong syllables, or with more than one, are impossible:

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure4.5.png}
\caption{Possible foot structures}
\end{figure}

\textsuperscript{17}Reference in Gerken (1996).
The representations in the figures above show that stress is to be considered a relative feature, not an absolute one. In other words, it defines the relative prominence of a syllable with respect to another. Thus, we cannot say that an element is strong or weak if there is no other element next to it, which can be compared to it. That’s why inside a foot there must be one single strong element, that is always situated on the edge, either the right or the left. This property, as we will see, characterizes every constituent of the prosodic tree (a prosodic word has one strong foot, on either the right or the left edge, and other optional weak feet, and so on up to the top of the tree).\textsuperscript{18}

The concept of relative prominence will be clear if we consider, for example, the intonation curve that a quadrisyllabic Italian word takes when it is pronounced. A structure like the one in Fig.4.7 for “altalena”, represents and accounts for the prosodization of such words:

Here, relative prominence inside the two feet is assigned to the left syllables of each. But\textsuperscript{18} in a tree there will be one single element (at the level of syllables) that is dominated uniquely by strong nodes: this is called \textit{designated terminal element} (DTE).
inside the prosodic word, relative prominence is also assigned to one foot with respect to the other. Thus, while there are two syllables that are characterized as strong, and as such have some stress, only one of these bears word-stress, the one belonging to the prominent foot. So, in the present example “le” has primary stress, “al” a secondary stress, the foot being the domain of secondary stress assignment, the prosodic word that of primary stress.

The existence of secondary stress, which creates a rhythmic alternance of tonic and atone syllables, is a strong evidence for the status of the foot as a prosodic unit. And it is for this reason that the foot has first been introduced in the prosodic hierarchy. But, as will be shown below, there are also phonological rules that apply in its domain, thus demonstrating its relevance.

It must already have been noticed, from the example in Fig. 4.7, that Italian feet have their strong element to the left: they are, in more precise terms, head-initial. But this does not hold for every language. For a language to have head-initial, or head-final feet is the object of a parameter of universal grammar. Therefore a language will have either trochaic or iambic rhythm.

Two other parameters, as explained in Nespor (1993), govern the structure of feet in the different languages. One concerns the relation of stress assignment to syllabic weight: in a language, stress assignment is or is not weight-sensitive: a couple of examples will better illustrate this concept. Italian words like “sot.tì.le” and “dùt.tì.le” show that in Italian the same syllable in the same position inside the word can be either stressed or unstressed, independently from weight; things are different in Latin, where stress can fall on the penultimate syllable only if it is heavy, otherwise it falls on the preceding one. The third parameter has to do with the number of syllables that a foot can contain, which can be either limited (to a maximum independently fixed by the specific language), as in Italian, or unlimited. As a result, there are languages with a regular recurrence of secondary stresses, and languages allowing relatively long sequences of unstressed syllables. If a language has limited feet, these will contain, according to Nespor, at most three syllables. However, as she points out, this is a controversial issue: Hayes (1981)\(^\text{19}\), for instance, fixes to two the maximum number of syllables that a limited foot can contain.

To summarize the characteristics of Italian feet (already anticipated in the course of the paragraph) with respect to these parameters, the Italian foot can be described as: i) head-

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\(^{19}\text{Reference in Nespor (1993).}\)
initial; ii) weight-insensitive; iii) limited. Therefore, at the foot level Italian sentences will consist of a combination of trochees and dactyls, apart from monosyllabic feet, that can be present, too. Below I give some examples of Italian words with different foot structures:

Figure 4.8: Foot structures of some Italian words

The words in (c) and (d) are significant because they show that, since Italian feet are head-initial, words with primary stress on the final vowel (apocopate words) are not composed by iambic or anapaestic feet, they consist instead of one strong monosyllabic foot preceded by a weak foot (in (c) a trochee, in (d) a monosyllabic foot). Bearing in mind what has been said above regarding weak monosyllabic feet, a slightly different structure for a disyllabic apocopate word like that in (d) should also be given: following McCarthy & Prince (1993) and Selkirk (1996), I represent the structure of such a word as in Fig. 4.9:

Figure 4.9: Structure of an Italian word with an unfooted syllable
Now the representation of Italian feet, that will be used in my analysis of Gaia’s productions, can be considered complete. Before going on with the next paragraph dealing with the prosodic word, I will conclude my description of the foot unit by giving one example of a phonological rule that applies in its domain, thus confirming its status as a prosodic constituent. In English the stop consonants [p], [t] and [k] are aspirated in certain circumstances. Compare the examples in (3a) and (3b) with those in (3c)\(^{20}\):

3)

\begin{align*}
\text{a) } & \text{[p}\text{h}\text{ower] } \text{b) su[p}\text{h}\text{erior] } \text{c) *ra[p}\text{h}\text{jid] } \\
\text{[t}\text{h}\text{ower] } & \text{en[t}\text{h}\text{ire] } \text{*me[t}\text{h}\text{er] } \\
\text{[k}\text{h}\text{ar] } & \text{ra[k}\text{h}\text{oon] } \text{*ba[k}\text{h}\text{on] }
\end{align*}

Such a phenomenon can be easily generalized in terms of the foot unit: soundless stops in English are aspirated when they are foot-initial.

\section*{The Prosodic Word}

The *prosodic word* (PW, in many works also named *phonological word*) is at the third level of the prosodic hierarchy. So far we have been dealing with constituents that are purely phonological: to describe the syllable and the foot, it has been necessary to make reference only to phonological notions. Such units have no independent place in grammar, apart from the place the have in phonology. They are not isomorphic with any morphosyntactic unit, in other words the division of a word in syllables and feet has nothing to do with the boundaries delimiting the morphemes that compose that word. On the contrary, words already have their place in grammar, they are units of morphologic and syntactic trees. So, one could wonder whether above the level of the foot there might be direct correspondence between morphosyntactic units and phonological units, whether, in other words, morphosyntactic structure is “literally translated” in a phonological output sequence. The answer is no. There is some relation between these different components of grammar, but it is not direct; there is an interface between syntax and phonology, that phonologists have tried to define in terms of constraints on the syntax-phonology map (as will be seen in 4.2), however, phonological structure is not isomorphic with morphosyntactic structure. Prosodic units are constructed on the basis of morphosyntactic information contained in the S-structure, through mapping rules that, starting from a syntactic string, come to a phonological sequence organized into a different hierarchy, with different boundaries. Once prosodic constituents have been built, phonological rules apply in their

\(^{20}\)Taken from Nespor (1993).
domain. These rules have no access any more to information coming from other components of grammar. All this holds for the prosodic word, too, the unit we are dealing with in this paragraph.

Writing about the prosodic word, Dresher (1996) starts his illustration of this constituent pointing to the non-isomorphism of lexical and prosodic words: “there are various kinds of mismatches between words as they are generated by the lexicon and the morphology (i.e., the grammatical words) and what count as words for the purposes of phonology” (p. 46). As I will further explain below, the major mismatches have to do with clitics, functional elements that are independent words as far as syntax is concerned, but that must attach to a lexical host in phonology. But even in Nespor (1993), where clitics are not analysed as part of the prosodic word\(^\text{21}\), we find evidence for the non-isomorphism of phonological words and morphosyntactic words. For example, in Dutch and in Italian, compounds, which count as one single grammatical word, behave like two distinct words in phonology. If compounds are two prosodic words, a specific prediction can be made: that they will have two primary stresses. This can be easily checked in Italian examples, like those in 4):

\[(4)\]

\[
\begin{align*}
\text{a) portaombrelli} & \quad \text{b) paraurti} \\
\text{extraterrestre} & \quad \text{videoregistratore}
\end{align*}
\]

Although the strongest stress always falls on the second member of these compounds, this is just the consequence of the prominence given to the second PW with respect to the first. This is because in Italian every prosodic constituent above the foot has its strong element on the right edge. However, though being less prominent than the second, the first stress of these compounds is not a secondary, but a primary stress. This is evidenced in (4a) by the presence of the vowels $\text{[ɔ]}$ and $\text{[ɛ]}$, which in Italian can occur only in syllables bearing primary stress; and in (4b) by the lengthening of the vowels of the first words, that, once again, is a phenomenon restricted to syllables with primary stress.

It has been seen above that the PW is the domain for the assignment of word-stress. It has also been said that PWs, and all the units above them, give prominence to the rightmost unit in their domain. This holds for Italian and, for example, also for the other romance languages and for Turkish; by contrast, languages like Czech and Finnish assign relative prominence to units on the left (Nespor, 1993). In Italian, as a consequence, primary stress can fall on

\(^{21}\)Clitics in Nespor (1993), are dominated by the constituent clitic group.
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one of the last three syllables, depending from the structure of the last foot (whether it is monosyllabic, disyllabic or trisyllabic). Three relevant examples are given in 22:

Figure 4.10 Some Italian words with stress in different positions

Such a combination of feet and prosodic words characterizes one of the most common accentual systems in the world (Spanish and Greek, for instance, assign the same prominences). If both foot and PW have their DTE on the right, the result is an accentual system like that of Turkish and French, where primary stress falls on the last syllable.

So far the prosodic word has been somehow characterized, for example for being the domain within which primary stress is assigned; but it has not been defined yet. It is difficult to give a precise definition of the prosodic word that holds universally. Nespor (1993) points out that, for instance, that compounds form two PWs, as in Italian, is not true for every language in the world; in Greek, for example, the two members of a compound form but one PW. And the framework is further complicated by the presence of clitics: I will assume, following Dresher (1996), Selkirk (1996), Gerken (1996), that there is no need to postulate the further prosodic unit clitic group, posited by Hayes (1989) and Nespor (1993) and that clitics are combined with lexical words, taking various structures inside the PW and the PP (as will be explained in more details in 4.3). So, I will provide a very general definition, following Gerken, by saying that “prosodic words are composed of one or more feet from a single lexical word plus adjacent function words”, such as determiners. It shall be interesting to see in Chapter 5, what children’s productions show about how they organize such elements into units of prosodic structure, PWs and PPs in particular.

With respect to syntax-phonology mapping, the formation of prosodic words is sensitive to lexical category membership and syntactic structure (Dresher, 1996). On most accounts of prosodic phonology, for example, function words form prosodic words with the adjacent

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22These examples are taken from Nespor (1993).
lexical word in the same phrase (e.g., Nespor & Vogel, 1986). Thus, an object article would form a PW with the following noun, because both are contained in the same DP. However, Gerken (1996) shows that this is not always the case: object articles can also be attached to a preceding monosyllabic verb. Anyway, the issue of the rules governing the interface between syntax and phonology is currently the subject of some debate, therefore I will just hint at it in 4.2 below.

I will complete my description of the prosodic word unit by giving in Fig. 4.11 some examples of English PW structures (taken from Gerken, 1996), and in Fig. 4.12 some for Italian, as well:

---

Figure 4.11: Some English PW structures

Figure 4.12: Some Italian PW structures

It is important to make it clear that these are just the simplest examples: it will be seen below that there are also other kinds of structures for PWs and that determiners often combine with PWs at the level of phonological phrases\(^\text{23}\). But it is beyond the scope of this introductory paragraph to deal with this subject in more details, so a more complete picture will only be given below. Here it must just be noted that in the structures above there are determiners

\(^\text{23}\)Such an analysis (that of the so called free clitics) is in fact given by Selkirk (1996) for all English articles (see 4.3).
that occupy the same position as unstressed syllables of lexical words. This will be an essential point in the analyses of children’s productions.

The Phonological Phrase

The phonological phrase (PP) is the prosodic constituent that has been most studied. That is because it has a crucial role in the interface between syntax and phonology, so that it has been defined by phonologists in terms of notions pertaining to the structure of syntactic trees. There are several proposals as to how syntactic structure is mapped into phonological phrases, and, as in the case of the prosodic word unit, the issue is controversial. So, I shall not attempt here to deal with it in details\textsuperscript{24}, and, for simplicity, I shall quote Gerken who, following Hayes (1989), Jackendoff (1977) and Nespor & Vogel (1986), defines phonological phrases as units “composed of prosodic words up to and including the heads of syntactic phrases. He specifies that heads must be members of the syntactic categories Noun, Verb, or Adjective. So, for example, the subject NP “my brother” in Fig.4.13 below\textsuperscript{25} is both a syntactic phrase and a phonological phrase.

![Diagram](image)

Figure 4.13 : Prosodic structure of a sentence

The phonological phrase is the domain of phonological phenomena. A significant example is a rule applying in central and southern Italian that geminates a word-initial consonant when the preceding word ends in a stressed vowel (Nespor, 1993). See the examples in (5)\textsuperscript{26}, where

\textsuperscript{24}Section 4.2 gives some hints about this issue, but see Drescher (1996) and his references (Hale & Selkirk, 1987, Selkirk, 1986, Nespor & Vogel, 1986, Hayes, 1989) for further details.

\textsuperscript{25}Taken from Gerken, 1996, p. 684.

\textsuperscript{26}The examples in (5), (6) and (7) are taken from Nespor(1993).
phonological phrases are indicated in square brackets:

(5)
  a) [Marco]PP [era già [p:artito]PP

The examples in (6) show that, by contrast, the rule is not applicable when the word-final stressed vowel is followed by a phonological phrase boundary:

(6)
  a) [In questa città]PP [[t]ira sempre vento]PP
  b) [Questo orribile frappè]PP [[n]on mi piace]PP
  c) [Dicono]PP [che [m:angerà]PP [[[m]olto bene]PP [con Costantino]PP

It very interesting to note that, beside cases requiring the application of this rule and cases blocking it, there are also sentences in which its application seems to be optional. This is shown in the examples in (7), where the consonants that can be geminated are underlined:

(7)
  b) [Il frappè]PP [freddo]PP [mi piace]PP
  c) [Scriverò]PP [poesie]PP [quest’estate]PP

To account for cases such as these, it has been proposed that, through a *phonological phrase restructuring*, a PP that consists of only one prosodic word and that is the complement or the modifier of a preceding syntactic head may be incorporated in the PP containing the head (Nespor, 1993, Gerken, 1996, who refers to Nespor and Vogel, 1986). The second PPs in (7) meet these requirements and thus have the possibility to form a single PP with the initial ones, and in that case the gemination must be applied. See also the structure in Fig. 4.13 above, where, consistent with phonological phrase restructuring, the verb and object NP form one single phonological phrase.

Since the phonological phrase unit is defined in terms of syntactic phrases, it is interesting to note some cases of non-isomorphism. One is caused by the influence of discourse level information on the formation of phonological phrases (Gerken, 1996). The presence of focal or contrastive stress is responsible for a change in the division of an utterance in PPs. Compare for example the sentences (8a) and (8b) below:

(8)
  a) [He kissed the dog]PP
  b) [He KISSED]PP [the dog]PP
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In (a), the verb and the object NP form a single phonological phrase; in (b), the verb is focused and thus it is necessary to place a phonological phrase boundary after it\(^{27}\). This is an instance of how non-syntactic factors can influence the composition of the PP, the unit that, of all prosodic constituents, is the one most directly related to syntactic phrasing. In the next paragraph it will be seen that intonational phrases are still more variable, depending on several different factors.

**The Intonational Phrase**

This and the following paragraph, which conclude the present overview of the prosodic hierarchy, will provide only a brief characterization of the highest constituents, since the study presented in the present Part deals with the prosodic organization of early child language, and therefore concerns in particular the lower constituents, or, better, the constituents up to the phonological phrase level.

The *Intonational phrase* (IP) is commonly defined as the domain of an intonation contour. Moreover, intonational phrases can be characterized as delimited by pauses, or better, by what is perceived as a pause. Some phenomena creating this effect are the initial shortenings and the final lengthenings that follow and precede an intonational phrase boundary (Nespor, 1993). Consider, for example, the three occurrences of *are* in the following Italian sentence:

(9)

\[
\text{Quando vado al mare}, \text{ come si può immaginare}, \text{ adoro fare il bagno}. 
\]

As can be easily perceived in pronouncing this sentence, in the first and the second occurrence the stressed vowel is lengthened, while in the third it is not, although here, too, the vowel bears primary stress. This is a consequence of how the sentence is divided into intonational phrases:

(10)

\[
[\text{Quando vado al mare}]_\text{IP} [\text{ come si può immaginare}]_\text{IP} [\text{ adoro fare il bagno}]_\text{IP}
\]

It can have already been noticed that the clause between commas in (9) above has the status of an intonational phrase. Parenthetical expressions like that, are part of a group of constructions that obligatorily form their own IP. This group includes: non-restrictive relative

\(^{27}\)As Gerken points out, research with infants suggests that they detect a phonological phrase boundary after words with focal stress.
clauses; items of lists; certain extrapozen elements, i.e., moved from their base position to the end of the sentence; and, as anticipated, parenthetical expressions (Nespor, 1993, Dresher, 1996 and the references therein). Below, one example for each of these constructions is given:

\[(11)\]

a) [Lions],IP [as you know],IP [are dangerous],IP
b) [My brother],IP [who loves animals],IP [just bought a cat],IP
c) [They brought milk],IP [eggs],IP [bread],IP [and cheese],IP
d) [They’re almost always insufferable],IP [these football fans],IP

Since parenthetical clauses, like that in (a) and non-restrictive relative clauses, like that in (b), form an independent IP, the surrounding material must also be grouped into at least one IP on each side.

Intonational phrase boundaries also tend to occur, though not obligatorily, after subject-noun phrases and at clause divisions (Dresher, 1996).

It is important to note that prosodic structure at the intonational phrase level is influenced by a number of non-syntactic factors. Semantics plays an essential role in determining which phonological phrase within a IP will be the prominent one. Therefore, while it is true that in Italian, for instance, above the foot level, prominence is assigned to the rightest unit, it is also true that a semantically prominent phrase will also receive phonological prominence, even if it is not in the rightmost position. Thus, for reasons of emphasis, any one of the phonological phrases within the IP can be the strongest.

The division of an utterance into intonational phrases can also vary according to performance factors. A constituent that forms one single intonational phrase when it is short, tends to be broken up as its length increases. Anyway, intonational phrases may be longer or shorter at the discretion of the speaker; very much depends on speech rate, and also register and other rhetorical factors have some influence.

**The Phonological Utterance**

The highest constituent of the prosodic hierarchy is the *utterance* (Utt), dominating one or more intonational phrases. There is no precise definition of what may constitute a single Utt:

\[\text{As Nespor notes, phonologists agree on this point. There is no agreement, instead, on the mapping rules that can define the domain of intonational phrases, and on whether syntax or semantics has the greatest influence on such definition.}\]

\[\text{Taken from the references just mentioned.}\]

\[\text{See the references in Nespor (1993), p. 208, for a discussion of the influence of semantics on IP structure.}\]
utterances can be said, in very general terms, to correspond to main clauses, but they can also be restructured and comprise more than one clause. This happens mainly for semantic reasons, when sentences are logically connected. And, of course, also length and speech rate have some influence. Dresher (1996), referring to Nespor and Vogel (1986) gives some examples of sequences forming single utterances, which I give in (12):

(12)

a) John plays the trumpet, but Bill plays the clarinet.
b) The third from the right.
c) Turn up the heat. I’m freezing.
d) That’s a nice cat. Is it yours?

As can be seen, apart from ordinary sentences, like (a), even fragments of a sentence, like (b) can form an utterance. More interesting examples are those in (c) and (d), which exemplify the possibility for distinct sentences to be united into one single utterance. That this is exactly what happens when such sentences are pronounced, can be evidenced by the existence of phonological rules that take the entire sequence as their domain. Nespor and Vogel (referred to by Dresher) observe that this is the case with the (North American) English rule of $t$-flapping, whereby a $t$ or $d$ between vowels is pronounced as a quick “flap” [D], rather than as a stop. Compare, for instance, *late* with *latter*, where the pronunciation can be the same as in *ladder*. This rule can apply to the final $t$ in the words *heat* and *cat* in the examples (c) and (d) above, even if they are followed by a full stop. This shows that the phonological utterance in those examples extends to the entire sequence. By contrast, a sequence of unrelated sentences is not grouped together as a single utterance, and, as a consequence there can be no flapping across two sentences like, for instance *Turn up the heat. I’m Frances*.

The hierarchy of prosodic constituents just described forms the core of the theory of phonological constraints on prosodic structure. These are the subject of the next paragraph.

### 4.2 Constraints on Prosodic Structure and Optimality Theory

It has been proposed that prosodic structures conform to two classes of constraints: constraints on prosodic domination and constraints governing the interface between syntax and phonology. According to Optimality Theory these constraints are all ranked in grammar in a way that
may differ from language to language and that is responsible for the surface phonological representation of sentences. The present paragraph is meant to give a brief illustration of these concepts; they are relevant for the purposes of the next chapter, since, as will be seen in 5.1 and in 5.2, children’s prosodic representations and the development of those representations, can be adequately accounted for in the framework of a constraint-based phonology.

The organization of a sentence into a prosodic structure is ruled by a set of constraints on prosodic domination, sometimes also referred to as strict layering constraints. According to the Strict Layer Hypothesis (Selkirk, 1996, who refers to Nespor & Vogel, 1986, and to Selkirk, 1981, 1984) these constraints universally characterize prosodic structure. Selkirk (1996) explains that, “expressed as a monolithic whole, the Strict Layer hypothesis reads as a single constraint requiring that a prosodic constituent of the level C immediately dominate only constituents of the next level down in the prosodic hierarchy, C_{i-1}” (p. 189). However, following Inkelas (1989) and Ito and Mester (1992)\textsuperscript{31}, she argues for a decomposition of the Strict Layer Hypothesis into more primitive component constraints, as shown in (13): \textbf{(13)}

\begin{center}
\textit{Constraints on Prosodic Domination} (Selkirk, 1996)
\end{center}

(where C\textsuperscript{n} = some prosodic category)

\begin{itemize}
  \item \textbf{Layeredness}
  \begin{itemize}
    \item No C\textsuperscript{i} dominates a C\textsuperscript{j}, j>i,
    \item e.g. “No σ dominates a F.”
  \end{itemize}
  \item \textbf{Headedness}
  \begin{itemize}
    \item Any C\textsuperscript{i} must dominate a C\textsuperscript{i-1}(except if C\textsuperscript{i} = σ),
    \item e.g. “A PW must dominate a F.”
  \end{itemize}
  \item \textbf{Exhaustivity}
  \begin{itemize}
    \item No C\textsuperscript{i} immediately dominates a constituent C\textsuperscript{j}, j<i-1,
    \item e.g. “No PW immediately dominates a σ.”
  \end{itemize}
  \item \textbf{Nonrecursivity}
  \begin{itemize}
    \item No C\textsuperscript{i} dominates a C\textsuperscript{j}, j=i,
    \item e.g. “No F dominates a F.”
  \end{itemize}
\end{itemize}

Paraphrasing, the \textit{layeredness} constraint holds that a lower category cannot dominate a higher category. The \textit{headedness} constraint states that each higher category must dominate the next lower category; this implies, for example, that a word pronounced in isolation forms not only a prosodic word but also a phonological phrase, and intonational phrase and an utterance,

\textsuperscript{31}Reference in Selkirk (1996).
even if those higher constituents do not branch. The *exhaustivity* constraint holds that each prosodic unit is dominated by the immediately higher unit. The *nonrecursivity* constraint states that no unit in the prosodic hierarchy can dominate another unit of the same kind.

The principles of layeredness and headedness, which together embody the essence of the Strict Layer Hypothesis, hold universally, in all phonological representations: they are, in other words, inviolable. By contrast, exhaustivity and nonrecursivity can be violated. For instance it has been observed that in some cases a syllable can be immediately dominated by a prosodic word, thus violating the exhaustivity constraint (Selkirk, 1996 and his references). As will be seen in the following chapter, this is crucial in the proposal offered here to account for omissions of functional words in children’s utterances.

Beside these domination constraints, which constitute one central class of constraints on prosodic representations, there is another significant class, that of the constraints determining the syntax-phonology mapping rules. It has already been anticipated above, that there seems to be some relation between nodes of the syntactic tree and the various prosodic levels, in particular the phonological phrase level. Hale and Selkirk (1987), referred to by Dresher (1996) expressed this relation between phonology and syntax by the *Designated Category Parameter*, given in (14):

\[(14)\]

The designated category Parameter (Hale & Selkirk, 1987):

> For each level \(P_i\) of the prosodic hierarchy there is a single designated category \(DC_i\) in the syntactic structure with respect to which phonological representation at level \(P_i\) is defined.

Thus, in some languages the relevant syntactic category for defining a given prosodic category may be the maximal projection of a category or set of categories, in others it may be the head. Further conditions have been proposed to be relevant, for example whether the category is lexical or not.

There are different proposals as to how designated categories should be mapped into prosodic categories (Dresher, 1996), but it is not my purpose here to illustrate them in details. I am just going to briefly hint at some of them for two simple reasons: because Selkirk’s analysis of the prosodic structure of function words, which I give in the next paragraph, makes reference to mapping constraints; and because, as will be seen below, prosodic constraints are crucial in the characterization of children’s early words and phrases, so, even if I will
only make reference to some of them, I would like to give, for the sake of completeness, at least an idea of the range of constraints that are held to be responsible for the phonological representation of sentences.

According to Selkirk, the mapping from syntactic to prosodic categories is to be defined in terms of constraints on the alignment of the two structures: such constraints require that, for any constituent of category \( \alpha \) in syntactic structure, its right or left edge coincides with the edge of a constituent of category \( \beta \) in prosodic structure. See in (15), how she schematises this concept:

(15)  

*Edge-based theory of the syntax-prosody interface* (Selkirk, 1996):

Right/Left edge of \( \alpha \) → edge of \( \beta \),

\( \alpha \) is a syntactic category; \( \beta \) is a prosodic category

It is interesting to note that the notion of edge-alignment can be further generalised: McCarthy and Prince (1993), referred to by Selkirk, show that many phonological phenomena yield in terms not only of syntactic-prosodic structure alignment, but also in terms of constraints on the alignment of edges of different prosodic units.\(^{32}\)

With a different approach, but one that achieves similar results, Nespor and Vogel (1986), referred to by Dresher (1996) and Nespor (1993), have suggested that what is relevant in the definition of the syntax-phonology interface is the direction of syntactic branching. In particular, they argue that phonological phrase formation tends to follow the direction of syntactic branching in a language, so that the domain of a PP is defined by grouping a clitic group containing a lexical head with all the clitic groups at the non-branching side of that language. So, in right-branching languages like Italian and English, phonological phrases should be formed by grouping a head with its specifiers in the left.\(^{33}\)

As regards the class of constraints on the syntax-phonology mapping, I shall stop here, observing that the issue is currently the subject of some debate. I am now going to describe briefly how constraints are dealt with in the framework of optimality theory. According to Optimality theory (OT) (McCarthy and Prince (1993), referred to by Selkirk (1996)), the

\(^{32}\)As Dresher(1996) notes, end-based mapping has interesting implications for perception and acquisition, as it points to a general strategy of “pay attention to ends”, that could help children in their task as language learners.

\(^{33}\)See Nespor & Vogel (1986) for details.
output phonological representation corresponding to a particular input grammatical one, is that representation (out of all the candidate structures generable on the basis of that input) that best satisfies the constraint system. Constraints, with the exception of layeredness and headedness, are assumed to be violable. The degree of violability of a constraint is a consequence of its ranking, with respect to other constraints. The ranking of constraints is stipulated by the grammar of a language; so different languages can have different rankings, and this will result in different output prosodic representation. The output sequence is in fact not necessarily well-formed with respect to all the relevant constraints, but the best-formed, or optimal, out of all possible representations generable on the basis of the syntactic input. The optimal representation is the one that, while violating low-ranked constraints conforms to the higher-ranked constraints of that particular language.

Given this framework, the task of the language learner could be thought of as that of learning the constraint ranking of his or her particular language, the content of the constraints being universally given (Selkirk, 1996).

4.3 The Prosodic Structure of Function Words

As my work deals in particular with the emergence of determiners, and given that I am going to examine it in a prosodic perspective, it is necessary to give some insight of how functional categories are prosodified, according to the current proposals. That’s what I am going to do in the present section.

As shown in Selkirk (1996), words belonging to functional categories display phonological properties significantly different from those of words belonging to lexical categories. For example, in standard Serbo-Croatian, while lexical words always bear a high tone accent on one of their syllables, functional words do not. In Tokyo Japanese lexical words never lose their high tone accent, while functional words do lose it when preceded by another accented word in the same phrase. In English words belonging to lexical categories always appear in their stressed unreduced form, whereas monosyllabic function words –determiners, prepositions, auxiliaries, personal pronouns– display two different surface prosodizations, depending on their position in the sentence. They appear in a “strong” form, and are undistinguishable for stress and vowel quality from monosyllabic lexical items, in particular circumstances: when they are pronounced in isolation, when they are focused, and when they occupy a phrase-final position. By contrast, when a function word is non-focused and is located inside a syntactic
phrase it standardly appears in a “weak” reduced form. Pronouns that are objects of verbs or prepositions present a special case in that, though being phrase-final, they may appear in weak forms. Compare the prosodization of the functional items in sentence (16a) below with their equivalents in (16b)\(^3^4\):

(16)

\begin{enumerate}
\item[i] Diane can paint her portrait of Timothy at home.
\item[ii] We need him.
\item[b] can
\item We need HER, not HIM.
\item What did you look at yesterday?
\end{enumerate}

In (a) function words display the same properties that stressless syllables in multisyllabic words have: vowel reduction, appearance of syllabic sonorants, loss of onset \(h\), etc.:

(17)

\begin{align*}
\text{for Timothy} & \quad (\text{cf. fertility}) \\
\text{can pile} & \quad (\text{cf. compile}) \\
\text{need him} & \quad (\text{cf. Needham}) \\
\text{at home} & \quad (\text{cf. atone}) \\
\end{align*}

As seen in 4.1, prosodic theory analyses stressed syllable as the prominent or only syllable of the foot. Thus, the strong forms of function words have the status of a head of a foot, whereas their weak equivalents do not; and, according to Selkirk (1996), the foot-head status of strong forms is in most cases the consequence of their having also the prosodic word status. By contrast, the status of a weak form is that of a \textit{prosodic clitic}. The options in the surface prosodization of function words simply reflect the way in which they are organized into prosodic words (whether they are prosodic words or not and, if not, what type of prosodic clitic they are).

Given the class of constraints on the syntax-phonology map hinted at above, the possibility for a function word not to share the same PW status of lexical words needs to be accounted for. Selkirk’s proposal is that “the set of constraints governing the interface between morphosyntactic and prosodic structure makes no reference to functional categories at all” (1996, p. 191). Those constraints, that, as we have seen, Selkirk conceives in terms of alignment of words in morphosyntactic representation with prosodic words of phonological representation, are restricted to lexical categories and their phrasal projections. Such a restriction is responsible for the availability of a prosodic clitic analysis for function words.

\(^{3^4}\)The examples in (16), (17) and (18) are a selection from Selkirk (1996).
Thus, while an input of two lexical words in morphosyntactic representation (S-structure) gives two prosodic words as prosodic output (P-structure) (see (18)), a sequence of a functional and a lexical word can be prosodized in different ways. The typology of structures that Selkirk provides for such a string is given in (19).

(18)

S-structure \([\text{Lex Lex}]\)

P-structure \([(\text{lex})_{PW} (\text{lex})_{PW})_{PP}]\)

(19)

i. Prosodic Word \([(\text{fnc})_{PW} (\text{lex})_{PW})_{PP}]\)

Prosodic Clitics:

ii. free clitic \([(\text{fnc} (\text{lex})_{PW})_{PP}]\)

iii. internal clitic \([(\text{fnc lex})_{PW})_{PP}]\)

iv. affixal clitic \([(\text{fnc} (\text{lex})_{PW})_{PW})_{PP}]\)

These structures can be represented in trees as follows:

**Prosodic Words**

```
  PP
   \(PW\)  \(PW\)
    fnc    lex
```

**Prosodic Clitics**

```
  PP
   \(fnc\) \(PW\)
    fnc    lex
  PP
   \(fnc\) \(PW\)
    fnc    lex
  PP
    \(PW\)
      lex
```

Figure 4.14 The prosodic status of functional morphemes
In (i) the functional element has the independent status of a PW and combines with a lexical PW forming a Phonological Phrase; in all of the other cases the function morpheme is a prosodic clitic, a term defining a morphosyntactic word that is not itself a PW. In (ii), the case of the free clitic, the function word is sister to the lexical PW and daughter to the PP. In (iii) the function word is an internal clitic and attaches to his sister lexical word, thus forming a PW together with it. Case (iv) represents the affixal clitic, that is sister to the lexical PW, and combines with it forming one more PW level below the PP.

This is the array of structures that are in principle available; which one is assigned to a given functional element will vary both from language to language, as well as within the same language. Selkirk’s detailed analysis\(^{35}\) gives evidence for English functional words to be prosodized as follows:

- strong forms like the examples in (16b) take the structure in (19.i), having the status of \textit{prosodic words};
- weak forms like those in (16a.i.) take the structure in (19.ii), thus being defined as \textit{free clitics};
- weak forms of object pronouns, like the example in (16a.ii.) take the structure in (19.iv), thus being analysed as \textit{affixal clitics}.

Explaining in detail the arguments that lead Selkirk to these conclusions would go beyond the scope of the present introductory overview of prosodic theory. It will suffice to make it clear that his analyses shows that the prosodic configurations that functional words assume depend on: a) differences in the morphosyntactic input structure in which the function word is located; b) cross-linguistic differences in the ranking of the relevant constraints. As seen in 4.2, in the optimality theoretic perspective constraints are universal, but their hierarchical ordering is not. So, given the different morphosyntactic inputs, the grammar of constraints (organized in a ranking specific for a given language) will derive the output prosodic structure for functional words. In English different morphosyntactic input structures, all subjected to the same ranking of constraints, result in different prosodizations for function words. In three Serbo-Croatian dialects differences in the prosodization of functional items with identical morphosyntactic structure, is caused by rankings that differ from dialect to dialect\(^{36}\).

\(^{35}\)Selkirk’s work is based on the linguistic facts of English and Serbo-Croatian.

Chapter 5

The Shape of Early Utterances: Evidence for Prosodic Constraints

5.1 Some Past Analyses of Early Productions from Metrical and Prosodic Perspectives

Some recent works have contributed to the debate about functional categories in early language by appealing to phonological rather than to syntactic aspects of children’s developing grammars. These researches analyse early productions with exactly that approach that the data in Gaia’s corpus suggested as the one to be taken, the one that could better account for the variable presence of articles in the child’s utterances. So, even if none of them examines data from Italian, they have been very useful as a source of comparison, and provide a framework for the analysis of Gaia’s data from a prosodic perspective.

In the present section I am going to provide a very brief review of some of these studies, namely the analyses of children’s productions by Demuth (1994, 1996, 2000) and Lleò (2000), which draw particularly from English, Sesotho, Spanish and German. As already said, the following review is meant to be brief; some details about the findings in the works just mentioned will only be given in Section 5.2 when they are relevant as a comparison to the data in Gaia’s corpus.

Demuth (1994), dealing with the underspecification of functional categories in early language, argues that early child grammars are much richer and more fully developed than early child productions might suggest. First, she examines data from English and Sesotho (a southern Bantu language) that show a variable and gradual acquisition of functional categories. For example, she considers the data reported in Radford (1994) for English, data that led him to
argue for an initial lack of functional categories; the picture she receives from those data is in fact one where the production of function items occurs in some contexts but not in others, and not one of an all-or-nothing use of them, as shown by the examples she quotes from Radford, a couple of which are given below:

(1)

   a) I _ do it, I can. (Lisa-2;10) (23c in Radford)
   b) That _ making noise, isn't it? (Gary-3;0) (31b)

A more detailed illustration of the variability in the use of functional categories is given by Demuth for Sesotho data, that are particularly interesting for my purposes in that they also concern nominals. She found that nouns, which in Bantu languages are typically composed of a nominal stem, plus a noun class prefix providing gender/class and number information, very often occur without prefix in the speech of Sesotho-speaking 2-year-olds. Noun class prefixes are produced more consistently around 2;6 years, and by the age of 3 they are generally present. However, Demuth interestingly notes that, by contrast, the agreement prefix on demonstratives and possessives appears very early. In (2)¹ I report two examples that show this apparent inconsistency; such examples, she argues, indicate that children know the appropriate noun class to which stems belong, even if a prefixless noun surfaces.

(2)

   Child - H 2;1 yrs.   Adult target form + gloss
   kolo sà-ne        ( se-kòlo sà-ne)
    7-school 7DEM-that
        “that school”

   ponko là-ne        (le-phoqo là-ne)
    5-green corn stalk 5DEM-that
        “that green corn stalk”

Much variability is also found in Sesotho early IPs, with respect to production of functional heads: preverbal functional heads (like subject marker, object marker, and tense marker) collapse into one or two shadow vowels, whereas verbal suffixes occur consistently². Development in this domain parallels the one observed for nouns, with preverbal markers being generally well formed by the age of three.

²For details and examples, see Demuth (1994), p. 122-125.
Such kind of variability in the production of functional categories, added to the gradual nature of their “acquisition” cannot be convincingly accounted for, Demuth argues, neither by Radford’s maturational hypothesis, nor by a simultaneous grammar approach (which proposes that children may be operating under two grammars simultaneously, one with functional projections, the other without)\(^3\). She shows, instead, that a Metrical Model of Production can not only explain much of the variation found, but it can also make correct predictions about which functional categories will occur and which are most likely to be reduced or omitted. Such model is arrived at by first considering the importance of stress and feet in early productions, as evidenced by works by Gerken and Gerken and McIntosh. They found that English-speaking children tend to produce stressed word units (like monosyllabic verbs) or parts of words that incorporate a trochaic foot, while omitting the initial unstressed syllable of iambic feet or unstressed syllables preceding a trochaic foot\(^4\). What is extremely interesting is that this scheme applies both to multisyllabic words and to sequences with a functional and a lexical item. The same pattern appears to hold for the early stages of Sesotho, a language with penultimate stress. Demuth therefore proposes that a Minimal Word Constraint is responsible for children’s early word formation:

\[(3)\]

**Minimal Word Constraint** (Demuth, 1994): A prosodic word contains a foot.

Thus, the maximal setting for utterances at early stages of acquisition is one foot\(^5\), and syllables falling outside it will be treated as extrametrical and will be null or reduced.

Given such a constraint, and noting that functional elements, as is known, are generally unstressed, Demuth reconsiders the examples given earlier and others, too, and she demonstrates that the omission of auxiliaries, determiners, agreement morphemes, tense markers, and even subject pronouns\(^6\) is part of a much larger phenomenon that concerns unstressed,

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\(^4\)See Gerken (1991) and Gerken and McIntosh (1993), references in Demuth (1994).

\(^5\)Note that such formulation of the Minimal Word Constraint leaves the choice of the type of foot open, so as to be maximally applicable cross-linguistically. According to Demuth, the trochaic form cannot in fact be universally generalised to early productions, in particular to stress-final languages like Maya K’iche’ (reference to Pye, 1983) and French. She therefore argues that the metrical structure of the languages being acquired interacts with the construction of the feet that form minimal words.

\(^6\)Demuth refers to Gerken (1991) for a metrical account of the omission of English pronominal subjects (vs. realization of lexical subjects), and also deals briefly with Sesotho pronouns and pronoun agreement in the same framework.
extrametrical syllables in general. This phenomenon is accounted for by her Metrical Model of Production, which I report in (4) below, which makes probabilistic predictions about which syllables children will be most likely to retain or omit:

(4) **Metrical Model of Production** (Demuth, 1994)

a) Stressed syllables of a word are most likely to be retained.

b) Unstressed syllables of a prosodic word are most likely to be omitted or reduced.

c) Unstressed syllables that fall within a foot are more likely to be retained than extrametrical syllables.

Gradually over time, she adds, there will be adjustments in the incorporation of extrametrical syllables, with intra- and inter-speaker variation. Thus, Demuth then concludes by arguing that an understanding of children’s production as shaped by constraints that are gradually relaxed over time, is essential in determining the nature of Universal Grammar.

In a later work, dealing with the prosodic structure of early words, Demuth (1996) further develops her argument about how children’s productions are formed, from a prosodic perspective. Starting from the observation (already made in her previous analysis) that by appealing to phonological notions a unified account could be given for omissions of both functional items and unstressed syllables inside words, she proceeds to a more detailed characterization of the shape of early words.

By examining data from English, Dutch, Sesotho, and K’iche’ Maya, she demonstrates that early words, though ill-formed with respect to adult targets from a segmental, syllabic, or morphological point of view, are nonetheless well-formed minimal words. In other words, children take the target input sequence and reorganize it to form an output word that, subject to the Minimal Word Constraint, constitutes a prosodically well-formed minimal word. As Demuth shows by reviewing findings in several works\(^7\), children create minimal words from adult targets both through processes of apocope (syllable deletion) and through strategies of epenthesis (syllable addition). Particularly interesting are cases where either the medial or the final unstressed syllable of a word can be retained (attested in Dutch) and the cases

of “merging” of different syllables from multisyllabic words. Differently from early words in English, Dutch and Sesotho that tend to be organized into disyllabic trochaic feet, first words in K’iche’, a language with word final stress, are monosyllabic, the initial weak syllable being omitted.

Demuth argues that those cross-linguistic data escape the accounts that had been given in the past for the shape of early words, namely perceptual accounts (proposing that omissions of unstressed syllables might be due to the low perceptual salience of such items) and accounts based on articulatory constraints (suggesting that children’s productions are limited to two syllables due to an incapacity to articulate more). Thus, she goes on dealing in more details with the concept of minimal word.

Drawing from recent developments in prosodic phonology, she argues for the relevance of the notion of minimal word: cross-linguistically, it seems that minimal word units constitute the minimal structure that open class items must contain to be classified as legitimate words. She provides a definition of such a unit by stating that a minimal word must contain one binary foot, where a foot is composed of either two syllables or two moras (e.g., CVV, CVC). Thus, even single syllables with a long vowel (including tense vowels and diphthongs) or with coda consonants constitute a foot because they count two moras. English monosyllabic lexical words have such bimoraic structures and constitute well-formed feet; they contain sufficient phonological information to be classified as words. It will be seen that this concept proves very useful for the characterization of Gaia’s earliest words, so I will come back to it with more details in 5.2. Here it is important to emphasize that the data considered by Demuth point to the analysis of children’s early words as constrained by the Minimal Word Constraint, which had been already formulated, but that now is more precisely defined in terms of moraic structures. Given this specification, it is clear that even the monosyllabic CVC forms found in K’iche’, constituting binary feet, conform to the Minimal Word Constraint, though being different from early words in the other languages considered by Demuth. This difference, she argues, depends on the realization of foot structure in the target language. All this provides evidence of children’s sensitivity to prosodic information, their ability in constructing

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8Further details and relevant examples from those reported in Demuth (1996) will be given in the next section because they can be compared to what I have found in the data in Gaia’s corpus.


well-formed prosodic representations: representations that are sensitive both to properties of universal grammar and to language-particular instantiations of feet. She concludes by suggesting that, in an Optimality theory framework, we might see the development in the structure of prosodic words as a process in which constraints on prosodic representations are reorganized over time.

Demuth gives us an idea of how such development can proceed in a more recent work (Demuth, 2000), dealing with syllable omission and the emergence of grammatical morphology in early Spanish, from a prosodic point of view.

First, Demuth outlines the gradual expansion of prosodic word structure in early English and Dutch\textsuperscript{12}, noting that many children spend several months at the Minimal Word stage, producing first disyllabic feet and then also monosyllabic bimoraic feet, and only later they start producing words with two feet; it is at this later stage that children’s utterances became prosodically more complex, being composed of more than one word and expanding at the phonological phrase level. Demuth sketches such development as in 5.1:

\begin{figure}[h]
  \centering
  \includegraphics[width=0.5\textwidth]{figure5.1.png}
  \caption{Development of prosodic structure in early English and Dutch (Demuth, 2000)}
\end{figure}

The identification of these stages raises some questions. First, is such a pattern of prosodic development universal? Second, what implications can it have on the acquisition (but I would rather say on the production) of grammatical morphemes? By the analysis of the spontaneous production of Sofia, a child speaking Argentinian Spanish, from 1;8 to 1;9 years, Demuth\textsuperscript{12}Drawing from Fikkert (1994), Demuth & Fee (1995).
provides some first answers to these questions.

Interestingly, she finds that from the first recording Sofia has available to her a different PW structure from those identified in early English and Dutch: a foot preceded by an unstressed syllable. So, though most of her trisyllabic targets are reduced to a trochaic foot, some are produced in their entire WSW form. Such a PW structure can also host article-noun sequences. Quadrisyllabic words are instead reduced to trisyllabic sequences conforming to the usual WSW stress pattern. This, Demuth argues, demonstrates that Sofia’s production is not shaped by metrical constraints, which would predict the entire SWSW pattern to surface, but rather by prosodic constraints, limiting the structure that a PW can take to one foot, optionally preceded by an unfooted syllable. As all this is consistent with what I have found in Gaia’s data, I shall report the relevant examples from Sofia’s corpus later in section 5.2, where, compared to Gaia’s utterances, they will be shown in some cross-linguistic context. Other interesting data are those concerning Sofia’s production of multimorphemic utterances, that, differently from lexical words, can be composed of four syllables, but this is because the structures extend up to the level of the Phonological Phrase. So, utterances consisting in a preposition or a verb followed by their complements are prosodified at the PP level, and in this case more syllables are allowed to appear; in any case, however, there’s a limit to four syllables, because the amount of structure that can be represented at the PP level, Demuth argues, is still constrained to one syllable. This illustration of the prosodic structures allowed by Sofia’s grammar at that stage of her development, can be represented as follows:

![Prosodic Structure Diagram](image)

Figure 5.2 : Prosodic structure Sofia’s utterances (1;8 - 1;9 years)

Given that Sofia’s utterances can take the shape of the above representation, certain grammatical morphology will be either included or excluded from her early production depending on the level of structure at which the particular morpheme is prosodified. This is a consequence of the prosodic constraints that operate at that particular stage.
These findings about early Spanish are very interesting, Demuth observes, since they demonstrate an early awareness of different levels of prosodic structure. They are particularly significant in consideration of the questions that had been raised above. The data examined for Sofia seem to indicate that Spanish children’s prosodic development takes a different course from that observed for English and Dutch. Spanish children might begin to represent larger and higher units of prosodic structure earlier than children learning English and Dutch. Demuth notes that this hypothesis needs to be tested over larger groups of children with longitudinal data, but suggests that some preliminary reports by other studies indicate that this may be the case. It shall be seen in the next section that my study of Gaia’s early productions provides a contribution to the discussion on this issue, showing similarities between Italian and Spanish early prosodic representations.

The issue of a possible difference between prosodic structures at the early stages of different languages is dealt with by Lleò (2000), where it is also developed in an Optimality Theory framework that views such difference as resulting from the language-particular rankings of constraints. Lleò analyses the emergence of articles in the early acquisition of Spanish and German, by examining data of three Spanish children and four German children from the age of 1;5 to 2;3. She starts by considering the striking difference that can be observed in the courses of development of the two groups: first of all there is an impressive temporal displacement in the emergence of articles in the two languages, with Spanish children starting to produce proto-articles several months earlier than German children; moreover, the two courses of development seem to follow two different paths. I can best show the phenomenon by reporting Lleò’s graphic:
Figure 5.3: Development of (proto-)articles + noun in Spanish and German (mean percentages) (Lleò, 2000)

Whereas by 1;7 Spanish children have already reached 50% of proto-article\textsuperscript{13} production (out of all expected articles), German children produce almost no article at all. The development of articles in German takes place about half a year later than in Spanish; however, once started it shows a steep increase, an almost exponential growth. The two language groups meet at 2;3, with almost identical numerical values. A further important difference between the two groups concerns the position of the (proto-)article in the utterances. German children produce most of their early articles when nouns are inserted within longer utterances, and not when they are pronounced in isolation. By contrast, Spanish children, who produce articles since the one-word stage, tend to produce higher percentages of nouns preceded by an article when these are in isolation; when article-noun sequences are produced within a longer utterance, they are usually preceded by disyllabic verbs (like \textit{mira} “look”) and the article plus noun constitute a new intonation curve. Below I report some of the examples given by Lleò for article-noun sequences within longer utterances in the two languages:

\textsuperscript{13}Proto-articles consist of an unstressed, phonetically unspecified syllable (often constituted by a laryngeal and an open vowel) preceding disyllabic or monosyllabic nouns, that fills the position of the article, and thus they are often called “fillers”. See Lleò (2000) and the references therein.
Chapter 5. The Shape of Early Utterances: Evidence for Prosodic Constraints

In order to account for the two different developments, Lleò first compares the prosodic structures of the articles in the respective target languages, to consider how these are reflected in the children’s grammars. German articles, as she shows following Wiese (1996)\textsuperscript{14}, may have a reduced and an unreduced form; if unreduced, they constitute a prosodic word on their own, and if reduced, they are prosodified as clitics with their host on their left, thus as enclitics. As for Spanish, Lleò follows Harris (1989)\textsuperscript{15} in describing Spanish definite articles as proclitics prosodically attached to the following noun; she further argues that indefinite articles, too, are generally pronounced as proclitics hosted by the noun to their right. This implies that, differently from Spanish articles, German cliticized articles can never be initial, but must belong to a previous phonological constituent, so they must be preceded at least by a part of a foot (like a monosyllabic verb).

These differences in the prosodization of articles in Spanish and German, together with the ranking of constraints in the two languages, are responsible for the different courses of development of article production of the two groups of children. As we have seen, at the one-word stage German children do not produce any articles, neither in full, nor in reduced form. This suggests that they adopt for these function words the same prosodic structure that the target language attributes to them: unreduced articles have the status of PWs and thus

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\textsuperscript{14}Reference in Lleò (2000).

\textsuperscript{15}Reference in Lleò (2000).
cannot be produced at the Minimal Word stage, when utterances are limited to one foot. The same constraint prevents them from having an host available for reduced articles. Spanish children, too, adopt the target prosodic representation for articles, so they give them the status of proclitics. Therefore, they do not need to wait for the expansion of early prosodic structure to more than one PW; they can insert (proto-)articles as soon as their grammar allows one unstressed syllable to precede the foot in one single PW, so even at the one-word stage. It must be noted that such prosodization of articles in Spanish entails violating the constraint on exhaustivity, which, as seen above in 4.2, requires syllables to be dominated by feet. However, this constraint is violable; and, as in Spanish many lexical words are trisyllabic and consist in one foot plus a preceding unstressed syllable, this target language makes Spanish children familiar with violations of exhaustivity; and, as a result children can produce structures violating it, both for trisyllabic words, which are soon produced in their full form, and for (proto-)article plus noun sequences. On the contrary, in German children’s grammar exhaustivity must be more highly ranked. This prevents them from producing target trisyllables, which are truncated in their early productions for a relatively long time (as Lleò shows by drawing on examples from Lleò (1998)); and this high ranking of exhaustivity can also explain why German children have not the option of reanalysing articles as proclitics by reducing them to proto-forms and attaching them to the noun as Spanish children do. That’s why the emergence of articles runs at such different rates in the two groups. However, once in German children’s grammar the constraint disallowing more than one F and PW is demoted, they will produce articles in targetlike way, rapidly reaching the curve of their Spanish-speaking peers (see graphic in Fig. 5.3). By examining the German data Lleò also finds another difference in the ranking of constraints in the two languages considered: the constraint governing the interface between phonology and syntax that Lleò calls Pros-Synt mapping constraint, has a lower ranking in German than in Spanish. It has been already said that German children prefer to insert articles inside longer phrases, rather than before nouns in isolation (see the examples in (5) above). In particular, they tend to insert them after a monosyllabic word, so that the reduced article forms a foot and a prosodic word with the preceding word. This implies a violation of Pros-Synt since, prosodically, the function word is not parsed together with the following constituent (the noun), to which it syntactically belongs, but is parsed together with a preceding verb or adverb.

The analysis of children’s data by Lleò and her arguments, that I have only briefly re-
ported, show that target prosodic structures and constraint rankings in the different languages have great influence on children’s early production, so that they may cause different courses of development of functional morphology. This demonstrates, as Lleò argues, children’s innate sensitivity to prosodic units.

5.2 The Prosodic Structure of Gaia’s Utterances: Constraints and Development

In this section I will provide a detailed analysis of the data in Gaia’s corpus from a prosodic perspective. In so doing, I will show that the child’s early production surfaces as one shaped on a prosodic basis: what Gaia produces in the early stages of her acquisition are sequences organized into distinct prosodic units. It will be seen that her first words and phrases very often differ from the adult targets from a segmental, syllabic or morphological point of view; thus, differences do not only concern the omission of functional items, but also the shape of lexical words. This happens, I will argue, because Gaia’s early utterances must conform to the prosodic structures determined by prosodic constraints (like, at the first stage, the Minimal Word Constraint). The structures produced will be described at different prosodic levels, making use of the theoretical notions outlined in 4, and compared to those found in the other researches briefly reviewed above. As will be shown in the course of the present section, the prosodic structures Gaia produces develop over time, through a progressive relaxation of the relevant constraints. So, different stages of development will be identified and illustrated. I shall also give some tentative hypotheses as to what may trigger certain kinds of development.

5.2.1 First Stage

From the age of 1;7 to 1;10 years, apart from some monosyllabic words such as “sì” (“yes”), “no”, “su” (“up”), “giù” (“down”), Gaia produces disyllabic words forming a trochaic foot, some of which are reported in (1)\textsuperscript{16}, where adult targets are given when the child’s words differ from them:

\textsuperscript{16}Some of these words occur many times in the videos.
<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bùbu</td>
<td>pàrco</td>
<td>proper name</td>
<td>1:6.29 (gaia_18-29.cha)</td>
</tr>
<tr>
<td>pàpo</td>
<td>pàrco</td>
<td>“park”</td>
<td></td>
</tr>
<tr>
<td>màmìa</td>
<td>tàta</td>
<td>“Mum”</td>
<td></td>
</tr>
<tr>
<td>tàti</td>
<td>tòtto</td>
<td>“little girl”</td>
<td></td>
</tr>
<tr>
<td>tàtò</td>
<td>ròtto</td>
<td>“children”</td>
<td></td>
</tr>
<tr>
<td>ài/àli</td>
<td>cereàli</td>
<td>“broken”</td>
<td></td>
</tr>
<tr>
<td>tàto</td>
<td>tabàcco</td>
<td>“cereals”</td>
<td></td>
</tr>
<tr>
<td>bùa/bùba</td>
<td>bàua (=male, dolore)</td>
<td>“tobacco”</td>
<td>1:8.8 (gaia_20-08.cha)</td>
</tr>
<tr>
<td>tàta/àta</td>
<td>àcqua</td>
<td>“hurt, pain”</td>
<td></td>
</tr>
<tr>
<td>màmma</td>
<td>tènto</td>
<td>“water”</td>
<td></td>
</tr>
<tr>
<td>nònno</td>
<td>tènta</td>
<td>“Mum”</td>
<td>1:9.1 8 (gaia_21-01.cha)</td>
</tr>
<tr>
<td>bába</td>
<td>bàguà (or bràva)</td>
<td>“careful” (masc.)</td>
<td></td>
</tr>
<tr>
<td>tànta</td>
<td>tònta</td>
<td>“careful” (fem.)</td>
<td></td>
</tr>
<tr>
<td>tànta</td>
<td>tònta</td>
<td>“he waters” (or “good”)</td>
<td></td>
</tr>
<tr>
<td>tànta</td>
<td>tònta</td>
<td>“much”</td>
<td></td>
</tr>
<tr>
<td>tànta</td>
<td>tònta</td>
<td>“all”</td>
<td></td>
</tr>
<tr>
<td>bàpa/bàba</td>
<td>bàsta</td>
<td>“pump”</td>
<td></td>
</tr>
<tr>
<td>Pàmpo</td>
<td>Pàncio</td>
<td>“stop”</td>
<td></td>
</tr>
<tr>
<td>ócia</td>
<td>ròssa</td>
<td>nickname</td>
<td></td>
</tr>
<tr>
<td>tòge</td>
<td>congelatore</td>
<td>“red”</td>
<td>1:9.16 (gaia_21-16.cha)</td>
</tr>
<tr>
<td>àtte</td>
<td>latte</td>
<td>“freezer”</td>
<td></td>
</tr>
<tr>
<td>àpi</td>
<td>àpri</td>
<td>“milk”</td>
<td></td>
</tr>
<tr>
<td>òa</td>
<td>oliva</td>
<td>“open” (imperative)</td>
<td></td>
</tr>
<tr>
<td>mòmi</td>
<td>mòmi (=cioccolatini)</td>
<td>“olive”</td>
<td></td>
</tr>
<tr>
<td>pùpo</td>
<td>prosciùtto</td>
<td>“chocolates”</td>
<td></td>
</tr>
<tr>
<td>nìgno</td>
<td>mìgnolo</td>
<td>“ham”</td>
<td></td>
</tr>
<tr>
<td>nàna</td>
<td>ruffiàna</td>
<td>“little finger”</td>
<td></td>
</tr>
<tr>
<td>Mìam</td>
<td>Miriam</td>
<td>“bootlicker”</td>
<td></td>
</tr>
<tr>
<td>ini</td>
<td>orecchini</td>
<td>proper name</td>
<td></td>
</tr>
<tr>
<td>nìni</td>
<td>fiorellini</td>
<td>“earrings”</td>
<td></td>
</tr>
<tr>
<td>lo</td>
<td>“I”</td>
<td>“little flowers”</td>
<td>1:9.24 (gaia_21-24.cha)</td>
</tr>
<tr>
<td>Bèpi</td>
<td>èrba</td>
<td>proper name</td>
<td></td>
</tr>
<tr>
<td>èba</td>
<td>èrba</td>
<td>“grass”</td>
<td></td>
</tr>
</tbody>
</table>

It should already have been noticed that this list includes some very interesting examples
of multisyllabic target words reduced to disyllabic trochaic words, like for instance “tento” for *attento*, “toxe” for *congelatore*, “pûpo” for *prosciûtto*. Thus, at this early stage, the child’s utterances seem to be subject to a constraint limiting the prosodic structure permitted to one foot. Not a single word is found, in a period of four months, that contains more than two syllables. This restriction limiting Gaia’s production is to be expressed, as will be better explained below, in terms of the Minimal Word Constraint postulated by Demuth.

These data from Gaia’s corpus confirm the importance of the trochaic foot for the shape of children’s early words as described by Demuth (1996), who examines data from different languages. She shows, by referring to works by Echols & Newport (1992), Gerken (1991, 1994), and Gerken & McIntosh (1993), that English-speaking children’s early productions take the shape of trochaic feet. Such structures can be produced by reducing multisyllabic words, like in the following examples:

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>nana</td>
<td>banana</td>
<td></td>
</tr>
<tr>
<td>nano</td>
<td>piano</td>
<td></td>
</tr>
<tr>
<td>rais[a]</td>
<td>eraser</td>
<td></td>
</tr>
<tr>
<td>[e]fan</td>
<td>elephant</td>
<td></td>
</tr>
</tbody>
</table>

But, as Demuth notes following Fee & Ingram (1982), disyllabic trochaic forms are also created from monosyllabic words by the use of a reduplication strategy (C1V2 →C1V2C1V2). Similar findings are also found in analysing early words by Dutch children. They, too, not only reduce multisyllabic words to trochaic feet, but also tend to transform monosyllabic words into a trochaic foot, by epenthetic processes: they insert a vowel between two coda consonants (CVCC →CVCVC), or they add a vowel to a closed syllable ((C)VC →CVCV). See the examples below:

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[jœRɔk]</td>
<td>jurk</td>
<td>“dress”</td>
</tr>
<tr>
<td>[mɛlɔk]</td>
<td>melk</td>
<td>“milk”</td>
</tr>
<tr>
<td>[oɔma]</td>
<td>oom</td>
<td>“uncle”</td>
</tr>
<tr>
<td>[bɔlɔ]</td>
<td>bal</td>
<td>“ball”</td>
</tr>
</tbody>
</table>

Early words in Sesotho are also disyllabic, as Demuth reports from Connelly (1994), give-

---

17 Taken from Demuth (1996), who refers to Fikkert (1994).
ing these examples, where syllable boundaries are marked by “.”, and morpheme boundaries between noun class prefixes and nominal stems are marked by “-”:

(4)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ta.te</td>
<td>n.ta.te</td>
<td>“father”</td>
</tr>
<tr>
<td>tim.pa</td>
<td>ma.-sim.ba</td>
<td>“chips”</td>
</tr>
<tr>
<td>tee.te</td>
<td>che.le.te</td>
<td>“money”</td>
</tr>
</tbody>
</table>

Demuth observes that these early words can be represented as trochaic feet, even if Sesotho has no word-level stress, because the first syllable receives prominence through the presence of penultimate lengthening. All these findings, to which we can now add the contribution of Gaia’s data, show that, cross-linguistically, the trochaic foot has great relevance as a unit used by children to organize the shape of their earliest words.

So far, we have seen that the vast majority of Gaia’s utterances are words constituted by one trochaic foot. However, the picture of this first stage of development is rendered a little more complex (and more interesting, I would add) by the occurrence of some sequences of a different kind: beside monosyllabic targetlike words, already mentioned above, there appear some sequences that could be seen as iambic feet, like for instance “gnagnà” for *cagnolona* (“big dog”). These will be examined in details below, because first I am going to give a closer look at how trochaic feet are formed by the child at the stage under consideration.

At first sight, one could generalise a kind of model for the production of such feet, simply by saying that the child keeps the syllable bearing word-stress and the last syllable of the word; if the word contains any other unstressed syllables, these are omitted (such a tendency had been observed by Echols & Newton (1992)\textsuperscript{18} in English-speaking children). This seems to be true when we look, for example, at the target word *Miriam*, which is reduced to “Miam, or *congelatòre*, reduced to “toge” (where the last syllable is only mispronounced because the child is unable to articulate the “r”). However, at a closer examination, we realize that the phenomenon is not to be described simply in terms of omissions of syllables: words are not simply truncated. We should rather describe the phenomenon as a restructuring of the word, a process that takes the input target sequence and gives an output trochaic foot. This process is particularly sensitive to stressed vowels and final vowels\textsuperscript{19}, but often there is no exact correspondence, from a segmental point of view, between target syllables and the syllables.

\textsuperscript{18}References in Demuth (1996).

\textsuperscript{19}This shows a sensitivity to agreement features, as in Italian final vowels carry information about gender and number.
that are actually produced. Examples like those given in (5) below, show that, first of all, syllables with different substructures tend to conform, in the child’s output, to the CV pattern (which, as we have seen in 4.1, is the universally less marked syllable), above all in the very first phases. Much more interesting are the utterances in (6), where the syllables are created by combining segments that in the target (multisyllabic) word are located in different syllables:

(5)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
</tr>
</thead>
<tbody>
<tr>
<td>pápo</td>
<td>párco</td>
</tr>
<tr>
<td>tòtto</td>
<td>ròtto</td>
</tr>
<tr>
<td>bùba</td>
<td>bùa</td>
</tr>
<tr>
<td>tâta</td>
<td>àcqua</td>
</tr>
<tr>
<td>bàba</td>
<td>bàguna or bràva</td>
</tr>
<tr>
<td>nàna</td>
<td>ruffiàna</td>
</tr>
<tr>
<td>nìni</td>
<td>fiorellìni</td>
</tr>
</tbody>
</table>

(6)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
</tr>
</thead>
<tbody>
<tr>
<td>tàto</td>
<td>tabàcco</td>
</tr>
<tr>
<td>pùpo</td>
<td>prosciùtto</td>
</tr>
<tr>
<td>òa</td>
<td>oliva</td>
</tr>
<tr>
<td>mìgno</td>
<td>mìgnolo</td>
</tr>
</tbody>
</table>

The first two examples in (6) escape a description in terms of preservation or omission of syllables; rather we see a kind of “merging” strategy that reduces two syllables to one, by keeping the vowel of the stressed syllable and combining it with the first consonant of the first unstressed syllable of the target word. In the last example, where the target word has a strong-weak-weak (SWW) stress pattern, it seems that the medial syllable is the one retained, not the final one, but this comes from the identity of the vowel of the two weak syllables: it is likely that, in fact, the final “o” is attached to the onset of the first weak syllable, since, as will also be seen below, the final vowel is always maintained due, I argue, to its morphosyntactic status as bearer of the agreement features. So, it seems that, given an adult word, we cannot say with absolute exactness which syllables will be kept and which omitted; we will rather predict that all syllables will be taken as material to be subjected to a restructuring giving as a result a trochaic foot. In the third example in (6) we see that even the preservation of the stressed vowel is a tendency and not a rule: the stressed vowel of oliva is dropped in favour of the first vowel of the word, resulting in the word “òa”. The rule that can be formulated concerns the prosodic structure of the output form, that is always one foot (one trochaic foot
in all the examples considered so far). This observation, based on Gaia’s corpus, about how words take the form of one foot, finds support in early acquisition data from Dutch. Demuth (1996) reports data from Wijnen et al. (1994) showing how Dutch children form trochaic feet. Given a word like *andere*, “other”, with a SWW stress pattern, children will produce a SW disyllabic form, and the weak syllable may be either the medial or the final. See the examples reported in (7):

(7)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ˈiːˈxant]</td>
<td>olifant</td>
<td>“elephant”</td>
</tr>
<tr>
<td>[ˈAnRa] / [ˈAndə]</td>
<td>andere</td>
<td>“other”</td>
</tr>
</tbody>
</table>

These findings show that the constrains that are operating at early stages of production cannot be perceptual constraints. It has been proposed (e.g., Gleitman & Wanner, 1982; Echols & Newport, 1992)\(^{20}\) that children’s omission of unstressed syllables might be due to the low perceptual salience of such elements. However, the data presented above indicate that this is not the case. We have seen examples where two syllables are reduced to one, with parts of each remaining in the resulting syllable form. This shows that the *entire* word is perceived. However, as not all the segments can be accommodated in the structure permitted, the segments are reorganized to form a disyllabic structure. Therefore, I reject, as Demuth does\(^{21}\), an account of omissions based on perceptual constraints. Demuth (1996), beside cases of merging similar to those I have given, provides further reasons why such a proposal should be rejected. First, it has been shown that children understand a discourse better when it includes stressless grammatical function items, than when those items are omitted or substituted with nonsense elements (Demuth refers to Petretic & Tweney, 1977; Shipley, Smith, & Gleitman, 1969). Moreover, the variable appearance of stressless functional items that, as I will show below, characterizes a later stage of prosodic development, clearly shows that the problem is not perceptual, but pertains to production. And it is not an articulatory one, Demuth further argues. If children’s productions were limited to two syllables due to some articulatory constraints, there is no convincing reason why they should not be likewise limited at the babbling stage (that much earlier stage when children produce various succeeding repetitions of the same syllables). All this demonstrates that neither perceptual, nor articulatory explanations can account for the different shape of early words with respect to adult targets.

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\(^{20}\)References in Demuth (1996).

\(^{21}\)See section 5.1.
Chapter 5. The Shape of Early Utterances: Evidence for Prosodic Constraints

It is instead a matter of how children build their prosodic representations, as will be evidenced as the analyses proceed through the various stages.

Now that a precise description has been given of how trochaic feet are formed, I am going to consider the sequences found in Gaia’s corpus that differ from the disyllabic trochaic model shaping the great majority of her utterances at this stage. In (8) I report, for the period under consideration, all the sequences that appear as disyllabic forms with a WS pattern:

\[(8)\]

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child</th>
<th>Filename</th>
</tr>
</thead>
<tbody>
<tr>
<td>gnognò</td>
<td>uòmo [?]</td>
<td>“man”</td>
<td>1;6.29</td>
<td>gaia_18-29.cha</td>
</tr>
<tr>
<td>mammà</td>
<td>videocàmera [?]</td>
<td>“camcorder”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mamà</td>
<td>She refers to a T-shirt (it. magliètta) worn by her Mum (it. màmma)</td>
<td></td>
<td>1;8.8</td>
<td>gaia_20-08.cha</td>
</tr>
<tr>
<td>gnagnà</td>
<td>cagnolònà</td>
<td>“big dog” (fem.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>papà</td>
<td></td>
<td>“Dad”</td>
<td>1;9.16</td>
<td>gaia_21-16.cha</td>
</tr>
</tbody>
</table>

It may be possible that these are indeed iambic feet, so we could conclude that at the first stage Gaia’s utterances take the form of minimal words, i.e. words constituted by one foot, and that feet may have either a trochaic or an iambic stress pattern. This could indicate that the child has not yet set the parameter determining the structure of the foot as head-initial or head-final (see 4.1). Therefore, Gaia may have available to her the following prosodic structures:

\[\text{Figure 5.4}\]

Some similar data have been reported by Demuth (2000), dealing with the early production of Sofia, a Spanish-speaking child, from 1;8 to 1;9 years. These are given in (9):
Demuth, after suggesting the possible availability for Sofia of both types of foot, gives an alternative analysis, which, she shows, is more convincing in the light of the other data she considers: she hypothesizes that the “iambic” forms are actually more prosodically complex structures constituted by a monosyllabic trochaic foot and a preceding unstressed syllable that combines with it at the level of the prosodic word. Such a structure is schematized below:

![Figure 5.5: Structure of a word with one strong syllable preceded by one unfooted syllable](image)

Demuth finds support for such an analysis in the presence, in the same period, of some trisyllabic words with a WSW pattern, so it seems that at that time Sofia has the possibility of inserting an unfooted syllable preceding the foot. However, as Demuth notes, the data she
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examines were not collected from the onset of Sofia’s first words, so the structures she posits might characterize a later stage of prosodic development in the child she studies. The data in Gaia’s corpus lead me to conclude that this is exactly the case. The availability of a position in which to insert an unfooted syllable marks the passage to the second stage of development of Gaia’s prosodic representations. Thus, while here I am illustrating Gaia’s Minimal Word stage, Sofia’s production has already gone beyond the Minimal Word stage when it began to be examined by Demuth. At this early stage it is exactly the impossibility for prosodic words to go beyond the structure of one foot, that can be held responsible for the lack of functional categories in the earliest utterances. Therefore I provide a different explanation for the few so-called “iambic” feet that I find in Gaia’s corpus.

Without totally rejecting the possibility, exposed above, that the child at this stage might not yet have set the relevant parameter, and so we may be really dealing with occurrences of iambic feet, I also give an alternative reading of those data. There are some phenomena that I observe in reading the transcripts and in listening to the videos, that give me a clue to the alternative hypothesis I am going to provide. First of all, consider the occurrence of the first example I have given in (8) above, and that I report directly from the transcript:

(10)
*CHI: &gnognò [= ? gnò gnò]*
%com: vocali allungate
*ROB: cosa?
*CHI: &gnò!
%gls: uomo, probabilmente
*ROB: l’ uomo # con la birra?
*ROB: l’ uomo della birra.
%exp: ciò che sta indicando non è inquadrato, probabilmente è l’ etichetta di una bottiglia di birra.

It is possible that what Gaia is producing is not a disyllabic word, but rather a repetition of a monosyllabic word, as suggested by the succeeding occurrence of “gnò”. I find something similar when Gaia produces onomatopoeic words: sometimes onomatopoeia are repeated twice, giving the effect of a single string, some other times only one syllable is found. See, for example, what she exclaims when throwing a ball:

(11)
@Age of CHI: 1;9.1
*CHI: pampam@o [= ? pam@o pam@o]!
*CHI: pampam@o [= ? pam@o pam@o]!
*CHI: pampam@o [= ? pam@o pam@o]!
If we consider that all of the “iambic” sequences in (8) consist of two identical syllables (unlike trochaic feet that can also be composed of two different syllables), it is not unlikely that these strings are first created as repetitions of the same monosyllabic word. That this may well be the case is suggested above all by Gaia’s production of targetlike monosyllabic words, like “giù”: the child tends to repeat such words twice, and often these repetitions are reiterated, thus creating a kind of sing-song effect. See the examples in (12):

(12)

@Age of CHI: 1;6.29
*CHI: giù, giù!
*CHI: giù, giù!
%exp: vuole scendere dal cavallino a dondolo

@Age of CHI: 1;8.8
*CHI: gnì [: lì], gnì [: lì]!
*CHI: gnì [: lì], gnì [: lì]!
*ROB: cosa?
*CHI: gnagnà [=? gna gna] [: cagnolona], gna +//.  
%com: vocali allungate
*CHI: (l)ì, (l)ì!
%act: indicando prima la cagnolona e poi il cavallino a dondolo

@Age of CHI: 1;9.24
*CHI: giù!
%sit: l’avevo sollevata in aria
*ROB: giù.
%act: la rimetto giù sull’ erba

*CHI: giù, giù # e(t)ba.

This fact, I think, demonstrates that it is licit to provide the same analysis for the sequences in (8) as for such repetitions of monosyllabic adverbs.

There is, moreover, an interesting utterance that can make the hypothesis of the availability of an iambic foot structure somehow problematic. Gaia seems to be unable to utter the adult target word *caffé*, as the following transcriptions seem to indicate:

(13)

@Age of CHI: 1;9.16
*CHI: tè [: caffé].
It is strange that a disyllabic word with iambic pattern should be reduced to a monosyllabic word, if the iambic structure is available. There is an interesting parallel that can be drawn with what Demuth (1996) reports about earliest words in a language with word-final stress, Maya K’iché. In early K’iché words do not take the shape of disyllabic trochaic feet, as happens in all the other languages she studies, nor that of iambic feet, but they are instead reduced to a monosyllabic word, where only the stressed syllable is preserved. In (14) I report some data that Demuth takes from Pye (1992):

(14)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>lom</td>
<td>jolôm</td>
<td>“head”</td>
</tr>
<tr>
<td>met</td>
<td>lemèt</td>
<td>“bottle”</td>
</tr>
<tr>
<td>kop</td>
<td>chikòp</td>
<td>“animal”</td>
</tr>
</tbody>
</table>

This leads me to prefer analysing the sequences in (5) as repetitions of the same monosyllabic words, rather than as feet with an iambic pattern. Anyway, more data are necessary to take a definite position, so I do not want to exclude any possibility; I nonetheless suggest that the alternative explanation I have provided seems to be more convincing.

So, it is likely that what could be seen as a PW consisting in an iambic foot, is actually a sequence of two identical PWs; and the effect of a strongest stress on the second syllable could be due to the fact that in the Italian phonological phrases, prominence is assigned to the rightest element. This would imply that at the first stage Gaia is already able to project a PP level; however, it must be noted that only a PP of this extremely simple kind is produced, namely, a repetition of the the same monosyllabic PW. Later on, as I will show below, there will be an expansion of this, as well as of the other levels of the prosodic structure.

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22It is possible that at a later stage some of these sequences, “born”, as we have seen, as two PWs are then restructured as one PW with final stress. This undoubtedly happens to the word “mamà”, invented by the child to refer to a T-shirt (in Italian maglietta) with her Mum’s perfume. This word appears in the transcripts always as “mamà@f”, because it has been fixed in the lexicon first of Gaia, and second, of the whole family; however, at the beginning it is pronounced with lengthened vowels, and can be seen as a sequence of two PWs, while only later it receives the status of a single word.
At this point, we could wonder whether the entire production of the first stage as has been described so far, can fall into a generalised model; specifically, whether the Minimal Word Constraint, to which I have made reference to account for trochaic feet, can alone be held responsible for the shape of all of Gaia’s earliest utterances. I repeat here in (15), Demuth’s formulation of this constraint:

(15) Minimal Word Constraint (Demuth, 1994): A prosodic word contains a foot.

As I have anticipated in 5.1, Demuth (1996) specifies that a foot is composed of either two syllables, or two moras. A long vowel or a vowel plus coda consonants counts as two moras and constitutes a foot, even though only one syllable is involved. It is significant in this respect that Gaia lengthens considerably the vowels in all the utterances in (8), as well as in monosyllabic adverbs like those exemplified in (12). Feet of that kind constitute minimal words; and according to recent developments in prosodic phonology, as Demuth notes, minimal words defined in these terms constitute the minimal structure that, cross-linguistically, lexical items must contain to be considered legitimate. Words with a semantic content must, in other words, contain sufficient phonological information, so, at least two moras. Monosyllabic English nouns and verbs, like for instance buy, dog, and see are all bimoraic forms that constitute a well-formed foot, thus a minimal word.23 Demuth, drawing from cross-linguistic research on metrical foot structure, schematizes as in Fig. 5.6 the various surface forms by which binary feet can be realized, indicating phonological weight as either heavy (H = 2 moras) or light (L = 1 mora)24.

Demuth notes that there are many moraic systems, where the weight of a syllable plays a critical role in stress assignment. By contrast, in languages with no word-level stress, or with feet that are insensitive to weight (or quantity), feet can be represented simply by two syllables. Such forms will receive a trochaic interpretation by default. This is the case, for

23 In Sesotho, Demuth notes, evidence for the minimal word comes in particular from the behaviour of imperative verbs. These generally take the bare stem form, but, if the stem is monosyllabic, the imperative must affix an extra vowel to make the form disyllabic, or at least bimoraic. See the following examples:

<table>
<thead>
<tr>
<th>Infinitive</th>
<th>Imperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>ho-reka “to buy”</td>
<td>reka “buy!”</td>
</tr>
<tr>
<td>ho-ja “to eat”</td>
<td>eja - jaa “eat!”</td>
</tr>
</tbody>
</table>

example, for Sesotho, where no lexical stress is assigned (but only penultimate lengthening at the end of phrases). In other words, the trochaic syllabic foot is the “default” form used for the construction of feet. Italian feet, as have been defined in 4.1 following Nespor (1993), are quantity-insensitive. However, it seems that weight plays a crucial role in Gaia’s construction of feet. When she utters monosyllabic lexical words like su, giù, lì, she lengthens considerably the vowels, as she does with those apparently “iambic” sequences we have been dealing with. So, it seems that her grammar (and in grammar I include her native prosodic competence) allows her to form a foot with one heavy syllable, thus giving these single syllables the status of minimal words. Therefore, her feet seem to be quantity-sensitive, at least at the beginning, when, it should also be noted, she also tends to lengthen the strong vowel of trochaic feet more than adults do, and only when the syllable has no coda consonant (she doesn’t lengthen the vowel, for instance, in “nonno”, “(at)tento”, “pompa”). So, I think, we could consider the possibility that the parameter that, in languages, defines feet as quantity-sensitive or insensitive, might be initially set for the quantity-sensitive option by default. But I am not going to speculate further on this issue, only leaving it as a hint for further research. Now, taking the scheme in Fig. 5.6 as the relevant pattern, I can characterize Gaia’s earliest words as taking the structures in (d), (e), or (f).

So, the evidence given so far demonstrates that all the utterances that Gaia produces between the ages of 1;7 and 1;10 take a particular, reduced shape that can be accounted for by

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\[25\text{See Demuth (1996, p.177-178).}\]
the Minimal Word Constraint. This means that the child’s innate grammar provides her with the notion of Minimal Word as a binary foot; and that this grammar prescribes a constraint limiting the prosodic structure represented to one foot. So, as observed by Demuth for earliest words in other languages, at the first stage of prosodic development, the Minimal Word is also the *Maximal Word* that is prosodically licenced. This can be captured by an analysis of the earliest prosodic representations as organized in a structure where the Foot level and the Prosodic Word level are collapsed into one indifferented level; see (a) in Fig. 5.7: Demuth, following Fee (1992), suggests that a fuller treatment of this issue might also posit an indifferented syllable/mora level at the bottom of children’s earliest prosodic tree, as in (b).

![Diagram](image)

Figure 5.7: Prosodic levels at the earliest stage of production

The present analysis, by individuating a Minimal Word stage in Gaia’s acquisition, supports what has been observed by Demuth and others for English, Sesotho, Dutch, K’iché; so, data from Italian (a language that, to my knowledge, had never been studied in early stages in a prosodic perspective) contribute to draw a picture of children’s first production, as prosodically constrained to one binary foot (Minimal Word). English, Dutch and Sesotho-speaking children create trochaic feet, through processes of apocope and epenthesis; early words in Maya K’iché (a language with iambic feet) feet are formed by one heavy syllable.

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26 Adapted from Demuth (1996).
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Gaia, an Italian child, also creates trochaic feet, apart from some monosyllabic heavy syllables. This shows that early representations are sensitive both to the properties of Universal Grammar, constraining words to minimal words, and to language-particular instantiations of feet, determining the actual shape of those minimal words. The fact that in a language with head-final feet like K’iché, the earliest words are monosyllabic, and not disyllabic iambic feet, could indicate that the trochaic pattern is the default option provided by UG at the earliest stage of prosodic development, an option which will be later either confirmed or switched to the iambic foot option. Note that, in fact, foot structures (a) and (d) in Fig. 5.6 are identical, and so a foot constituted by a single heavy syllable is compatible both to a language with an iambic stress pattern, and to a preference for trochaic structures.

After characterizing Gaia’s (and probably all children’s) first stage of development as a Minimal Word Stage, it is interesting to consider the issue of why children should conform to a Minimal Word, what is the sense of such a constraint. Demuth (1996) considers two possibilities, that I think are quite convincing in the light of what I have observed about Gaia’s data. In attempting their first words, children may give priority to rhythmic well-formedness, even when this implies sacrificing semantic content; by organizing their utterances in one binary foot they get a simple alternance of strong and weak syllables. That such an alternance is really aimed at by Gaia is also suggested by her tendency to repeat words. It seems that Gaia is indeed trying to produce a rhythmic alternance when she repeats the same word several times, often in groups of two repetitions. This happens not only with monosyllabic words, as has already been shown, but also with disyllabic trochaic words. See, for example, the following transcriptions:

(16)

@Age of CHI: 1:6.29
*CHI: papo [: parco], papo [: parco]!

@Age of CHI: 1:8.8
*CHI: tato [: tabacco] [% si rimette a ballare].
*CHI: tato [: tabacco].
%sit: la canzone ripete <tra noci di cocco, banane e tabacco > [*]
*CHI: tato [: tabacco].
*CHI: tato [: tabacco].

*CHI: +< tata, tata!
%com: è molto concentrata nel pronunciare queste parole

*CHI: tata!
*CHI: tata!
So, a first advantage of organizing words into single binary feet is their simple rhythmic structure. Secondly, the minimal word stage provides children with a constrained learning space, where they can gradually resolve language-particular instantiations of foot structure, including head-direction, stress, and weight (Demuth, 1996). Fee (1992), Fikkert (1994), and Wijnen et al. (1994) observe that, at the minimal word stage, children acquiring Dutch show a growing awareness of the relationship between stress and syllabic weight, and to this they attribute a change in the structure of their minimal words. The CVCV forms replacing target words with one heavy syllable (exemplified above in (3)), gradually leave their place to targetlike bimoraic forms. This is found not only in Dutch, but also in English (Fee, 1992). Thus, the foot provides the right space to try what is being learned about language-particular syllabic structure. Gaia also shows a development in her realization of syllable structure, during the four months of her minimal word stage. In the first two videos she does not produce any closed syllable, and she often adds an initial consonant to syllables consisting in a single vowel. So her syllables tend to conform to the simple model CV (or CVV, as vowels are often lengthened), both through deletion and epenthesis of segments. From the third video on, Gaia produces also syllables with a coda consonant (a nasal) and she shows fewer difficulties to utter syllables with no onset. Of course in languages with more articulated syllabic structures such development is more interesting. Moreover, some development is also to be observed in how syllables are combined to form a foot: the very first feet are mostly composed of two identical syllables: see “papo” for parco, “tata” for acqua, etc. But Gaia soon learns to combine two different syllables into a foot. All this shows that at the first stage children are busy at learning the structure of the lowest prosodic units (syllable and foot), and by limiting words to single feet they can concentrate on this task.

Now, before proceeding to the illustration of the second stage of Gaia’s production, I would like to summarize the picture of Gaia’s first stage that has emerged through this detailed anal-
analysis, by providing a scheme of the prosodic structures permitted at her Minimal Word stage:

![Diagram of prosodic structures]

As we have seen, the structure in (a), a PW consisting in one trochaic foot, is by far the most common in Gaia’s corpus at the first stage. But she also produces PWs with one (heavy) syllable, schematized in (b); and often these monosyllabic words are repeated, with prominence on the second one, thus resulting in prosodic structures like that in (c), where the representation extends to a very simple branching PP.

We see that four levels\(^{29}\) are projected: the Mora level, that is relevant for characterising a syllable as heavy, and thus as constituting a minimal word; the Syllable level; the Foot level that, due to the Minimal Word Constraint, always coincides with the Prosodic Word level; and the Phonological Phrase level, that can group together only two identical monosyllabic PWs (the two syllables have the same index). I would like to note, in fact, that when Gaia pronounces two different words, one next to the other (and this does not happen until the age of 1;9.24) these are not combined, but only juxtaposed, in other words, they do not have a common intonation contour. See the following examples:

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\(^{29}\)Without including the levels above the PP. It must be noted that the inviolable principle of headedness causes every phonological production to be represented at all levels; so, a word in isolation constitutes nonetheless a PP, an IP and an Utt. However, here it was necessary to emphasize that in Gaia’s structures at this early stage there is no combination of units above the PP (and even a branching PP is very rare). So, the representation here starts from the PP level.
It shall be seen in the next paragraph, that Gaia will pass to her second stage through an expansion of these levels. Different PWs will be combined in PPs, and the most significant development, one that will have crucial consequences from the morphosyntactic point of view, will consist in the expansion of the structure of PWs, that will no longer be constrained to contain only one foot. This will allow some functional items, i.e. articles, to be represented in Gaia’s prosodic structure. At the first stage, instead, the lack of functional elements is at all expected, given the Minimal Word constraint and given that those elements have the form of single unstressed syllables (phonological clitics). The Minimal Word constraint leaves no room for functional items to surface, and there is no necessity to postulate a syntactically impoverished grammar at early stages. It has already been shown that Gaia at the first stage always projects the functional node Agr, since she always keeps the final vowels that carry the features of Number and Gender. She does so even at the cost of sacrificing the stressed vowel of a word: when she reduces *cagnolona* (big dog-fem.) to “gnà” and *maglietta* (T-shirt”) to “mà”, she shows that the agreement morpheme is considered even more important than the stressed nucleus, to which she has always shown to be very sensitive. That her native grammar provides her with the Agreement category is evidenced by her correct placing of the morpheme marking number and gender on early quantifiers, even when the noun it refers to is not produced, neither by the child nor by the adult (see 3.2). Moreover, some utterances, like those in (18) seem to indicate that functional categories like verbal agreement and pronoun agreement are part of her native competence, even if at early stages nouns, adverbs and deictic expressions are the most common utterances that are found.
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In consideration of all this, I think that the Minimal Word constraint can alone be held responsible for the surface prosodization of early utterances, independently from other syntactic reasons, which may or may not exist, but which in any case are difficult to be identified at early stages because the syntactic representation is “filtered” by the prosodic representation, and thus results in prosodically constrained sequences.

Thereafter, at the second stage, some constraints will already have been relaxed, namely the Minimal Word constraint and the exhaustivity constraint (which will be dealt with in the next paragraph), and some functional categories are allowed to surface. However, utterances, as will be shown, will still be prosodically constrained, though in a different way. This will account for the variability that is observed in the productions of functional elements, and in
general for the difference between the shape of Gaia’s utterances and adult targets, which is still great.

5.2.2 Second Stage

By the age of 1;11 Gaia’s utterances have gone beyond the Minimal Word shape. In the video recorded when she was 1;10.29 we find the first occurrence of a determiner, the feminine definite article la:

(19)

@Age of CHI: 1;10.29
*ROB: no, no, no, non si tira fuori la macchina fotografica!
*CHI: (l)a Pimpa [: Mirca]!
*CHI: Pimp [:] (l)a Pimpa [: Mirca]!
%exp: Mirca, una mia amica, probabilmente le aveva fatto delle foto poco tempo prima
*ROB: cosa?
*CHI: (l)a Pimpa [: Mirca]!

%act: tirando fuori la macchina fotografica

What is significant about this video, so that it marks the transition to a second stage of prosodic development, is that here the appearance of the earliest articles coincides with the earliest occurrences in Gaia’s corpus of trisyllabic words, as can be seen in the examples in (20) (where, for PWs occurring more than once, I indicate in brackets the number of occurrences).

---

30 Though in standard Italian proper names are not preceded by articles, in the northern Italian variety that Gaia is acquiring, feminine names usually appear with the definite article.

31 In this table, I show the prosodic words that appear in the video just mentioned, in some transcription from the diary, and in the following video; in the latter, though one utterance suggests that at that time Gaia might be starting to pass to her third stage, the great majority of utterances are typical of the stage we are dealing with. Therefore, and for the sake of clarity, I include it in the second stage, which can thus be said to last around one month.
This shows that words are no longer constrained to contain no more than one (trochaic) foot: now an unstressed syllable preceding the foot is allowed to surface in the phonological representation. And the fact that it is exactly in the same period that we find the first appearance of both unstressed syllables at the beginning of lexical words, and articles preceding trochaic words, demonstrates that these sequences are prosodified exactly in the same manner: they are Prosodic Words, and take the following structure:

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>un po'</td>
<td>a Pìmpa (x3)</td>
<td>la Mirca</td>
<td>&quot;a bit&quot; (the) proper name</td>
</tr>
<tr>
<td>caciòtta</td>
<td></td>
<td>gelàto</td>
<td>kind of cheese</td>
</tr>
<tr>
<td>geàtò</td>
<td>ontròna</td>
<td>lontròna</td>
<td>&quot;ice-cream&quot;</td>
</tr>
<tr>
<td>e nòći</td>
<td>le nòći</td>
<td>&quot;the chestnuts&quot;</td>
<td>1:11,12 (DiaryGaia.cha)</td>
</tr>
<tr>
<td>a màmìna</td>
<td>a màmìna</td>
<td>&quot;(th) e Mum&quot;</td>
<td></td>
</tr>
<tr>
<td>soddìnò</td>
<td>soldìnò</td>
<td>&quot;coin&quot;</td>
<td></td>
</tr>
<tr>
<td>soddìnì</td>
<td>soldìnì</td>
<td>&quot;coins&quot;</td>
<td></td>
</tr>
<tr>
<td>i tènò</td>
<td>il trènò</td>
<td>&quot;the train&quot;</td>
<td></td>
</tr>
<tr>
<td>un màmbo</td>
<td>she refers to an animal</td>
<td></td>
<td>1:11,13 (gaia_23-13.cha)</td>
</tr>
<tr>
<td>i tè (x2)</td>
<td>il tè</td>
<td>&quot;(the) tea&quot;</td>
<td></td>
</tr>
<tr>
<td>il dòtò</td>
<td>gli òcchi</td>
<td>&quot;the eyes&quot;</td>
<td></td>
</tr>
<tr>
<td>a nònna</td>
<td>la nònna</td>
<td>&quot;(th) e Grandma&quot;</td>
<td></td>
</tr>
<tr>
<td>i mòmi</td>
<td></td>
<td>&quot;the chocolates&quot;</td>
<td></td>
</tr>
<tr>
<td>a Gàia</td>
<td>la Gàia</td>
<td>&quot;the Grandmas&quot;</td>
<td></td>
</tr>
<tr>
<td>i ùccio (x2)</td>
<td>il ciùccio</td>
<td>&quot;the pacifier&quot;</td>
<td></td>
</tr>
<tr>
<td>i àtte (x2)</td>
<td>il latte</td>
<td>&quot;(th) e milk&quot;</td>
<td></td>
</tr>
<tr>
<td>un pàtto</td>
<td>un piàtto</td>
<td>&quot;a dish&quot;</td>
<td></td>
</tr>
<tr>
<td>a pàppa</td>
<td>la pàppa</td>
<td>&quot;(th) e food&quot;</td>
<td></td>
</tr>
<tr>
<td>a tàta</td>
<td>la tàta</td>
<td>&quot;the little girl&quot;</td>
<td></td>
</tr>
<tr>
<td>i pàtti</td>
<td>i piàtto</td>
<td>&quot;the dishes&quot;</td>
<td></td>
</tr>
<tr>
<td>giócàie</td>
<td>giocàare</td>
<td>&quot;to play&quot;</td>
<td></td>
</tr>
<tr>
<td>cuchìno (x7)</td>
<td>cucchìano</td>
<td>&quot;little spoon&quot;</td>
<td></td>
</tr>
<tr>
<td>atàte</td>
<td>(probably) ciàbàtte</td>
<td>&quot;slippers&quot;</td>
<td></td>
</tr>
<tr>
<td>abàtta or a bàtta</td>
<td>ciàbàtte or la ciàbàtte</td>
<td>&quot;slippers&quot; or “the slipper”</td>
<td></td>
</tr>
<tr>
<td>pupìpo</td>
<td>prùrito</td>
<td>&quot;itch&quot;</td>
<td></td>
</tr>
</tbody>
</table>
A significant example, one that illustrates very well this parallel between lexical words and article-noun sequences, is given below:

(21)

@Age of CHI: 1;11.28

*ROB: e questo cos’è?

*CHI: il (rad)icc(hi)o!

*ROB: cosa?

*CHI: xx [/] (r)a(d)icc(hi)o!

*ROB: radicchio.32

This interesting example shows that the prosodic structure available provides a position preceding the foot, that can be filled either with the determiner or with an unstressed syllable belonging to the noun, and this results in PWs with a WSW stress pattern. Thus, Gaia analyses articles as prosodic clitics that attach to the following lexical words. It is important to note, however, that it seems that Gaia is aware that articles attach to the noun only phonologically, i.e. in prosodic representation, while in morphosyntactic representation they remain distinct. This awareness is evidenced by the presence of paradigms in Gaia’s corpus from this period: the same noun can appear with or without article (e.g., “nonna / (l)a nonna), and also with different articles (e.g., (l)a tata / un tata). Moreover, as can be easily seen from the examples in (20) above, Gaia shows mastery of almost all Italian articles: the indefinite un (masc.), and the definite la (fem. sing.), il (masc. sing.), i (masc. plur.).33

So, at this stage Gaia’s prosodic tree has no longer one prosodic level where the Foot and

---

32 This example occurs in a video recorded when the child has just entered her third stage; however, it may well be referred to here, because, as will be seen in the next paragraph, the structure that PWs take in the third stage is the same as in the second.

33 The seemingly reduced form, in which Gaia’s definite articles appear is due to her incapacity to articulate the [l].
the Prosodic Word formed one and the same constituent, as shown in Fig. 5.7. At the second stage the PW has expanded and forms its own level in prosodic structure. But, significantly, its structure is still constrained. The expansion of the PW is limited to the insertion of one unstressed syllable preceding the foot; it is still impossible for two feet to be combined into the same PW. Quadrisyllabic words are never produced in targetlike form, they are reduced to form a sequence compatible with the structure in Fig. 5.9, as shown in the following examples:

\[(22)\]
\[
\text{@Age of CHI: 1;11.13}
\]
\*ROB: cosa dobbiamo cambiare?
\*CHI: mimo [: pambolino].
\*CHI: cucc(ia)ino [//] cuchina [/] # cucc(ia)ino (*3) ## ggio [: giallo] [/] gaio [: giallo] +...
\*ROB: che cosa vuoi?
\*CHI: gaio [: giallo] ## g(\text{r})ande [% piagnucola].
\*ROB: grande?
\*ROB: ma cosa?
\*CHI: am!
\*ROB: la forchetta?
\*CHI: cucc(ia)ino.
\*CHI: cucc(ia)ino.
\*CHI: cucc(ia)ino.

It is clear that she is unable to utter a prosodic word with two feet. If this is true, we could make a prediction and see if it is falsified or confirmed by the data: if there is a constraint blocking the insertion of one weak foot in a PW, the indefinite feminine article *una* will not be produced, being a disyllabic clitic, thus a foot with secondary stress that precedes the strong foot in the same PW. This is exactly what we observe. The indefinite feminine article will not be produced until the fourth stage, when a PW will be allowed to include two feet. At the stage we are considering, not only does not *una* appear, but there are even errors where this article is required. See the very interesting example in (23):

\[(23)\]
\[
\text{@Age of CHI: 1;11.13}
\]
\*ROB: cosa vede Topolino?
\*CHI: un [/] un tata.

\%sit: nel libro, che leggiamo spesso, è scritto "Topolino vede una bambina"

A similar error is also found in a note from the diary. Such a mistake cannot be imputed to a wrong assignment of gender because, as we have already seen, from the onset of her
production Gaia shows a mastery of the agreement features. Furthermore, *tata* is a very common noun in Gaia’s early speech, and so it would be strange that she could make a gender mistake just on this noun. If we add that the sentence containing the adult target *una* (“una bambina”) was written in a book that we always read together and that she might know it by heart, the fact that she cannot produce the right sequence leads me to account for it by a prosodic constraint; above all, because such an account is consistent with all that has been so far described for the second stage, and all that will be observed for the next stages. I anticipate here that at the fourth stage the appearance of *una* and *uno* will coincide with the production of quadrisyllabic targetlike words; at the third stage, when a PW with two feet is not yet permitted, the feminine indefinite article will not be produced yet, Gaia seems to avoid it, always substituting it with the definite article *la*. In the example above, instead, she could not recur to this strategy, because we were referring to the book, so she was forced to produces an ill-formed article-noun sequence; a sequence that, in any case, by conforming to the prosodic structure available at that stage, is a well formed prosodic unit (this is what seems to matter to children at early times of acquisition!).

So, the second stage of prosodic development, as regards PW structure, can be schematized as follows:

![Figure 5.10: PW structure at Gaia’s second stage](image)

Prosodic Words at this stage consist of one foot optionally preceded by an unfeet syllable; in Gaia’s grammar the Minimal Word Constraint does not hold any more, but there is a constraint that still disallows PWs with two (or more) feet. That the prosodic structure for PWs cannot go beyond that represented in a) above, is confirmed by the absence of articles before trisyllabic nouns with a WSW stress pattern\(^{34}\). This can be seen by looking at the data.

\(^{34}\)It was this finding that first suggested me that the production of articles could be somehow related to phonologic representation, leading me to reanalyse the entire corpus from a prosodic perspective.
These findings about Gaia’s prosodic word structure at this stage, are consistent with what Demuth observes from Sofia’s corpus. At 1;8 Sofia can produce trisyllabic forms, some of which are reported below:

(24)  
<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[manðàna]</td>
<td>/mansàna/</td>
<td>“apple”</td>
</tr>
<tr>
<td>[kaléra]</td>
<td>/eskalèra/</td>
<td>“stairs”</td>
</tr>
<tr>
<td>[maléra]</td>
<td>/mamadèra/</td>
<td>“feeding bottle”</td>
</tr>
</tbody>
</table>

It is clear from these examples that there is a stage in Sofia’s prosodic development when she, like Gaia, can represent prosodic words constituted by one foot preceded by an unstressed syllable, but not by two feet. Note, in fact, that the quadrisyllabic target words in (25) are all reduced to trisyllables, conforming to the maximal PW structure (with WSW stress pattern) that is available at this stage. Article-noun sequences, too, conform to the same structure into which the child organizes her lexical words:

(25)  
<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[namàka]</td>
<td>/una:amàka/</td>
<td>“a hammock”</td>
</tr>
<tr>
<td>[emèka]</td>
<td>/la muñèka/</td>
<td>“the doll”</td>
</tr>
<tr>
<td>[anwèka]</td>
<td>/la muñèka/</td>
<td>“the doll”</td>
</tr>
<tr>
<td>[namòto]</td>
<td>/una mòto/</td>
<td>“a motorbike”</td>
</tr>
</tbody>
</table>

These examples are very interesting, as they show that, for Sofia as for Gaia, it is impossible to insert a definite article if the following trisyllabic noun already fills all the positions allowed in the PW tree; so, Sofia employs a kind of “merging” strategy, similar to that described for Gaia’s minimal words, by which she can reduce article and word-initial syllable to one single weak syllable, thus producing a well-formed prosodic word that can also keep as much grammatical information as possible. The examples of nouns preceded by indefinite articles are also interesting. Feminine indefinite articles (that in Spanish are identical to the Italian ones) are reduced as are those in Gaia’s utterances, though in a different way. Sofia omits the strong syllable of the disyllabic clitic and keeps the weak one, thus maintaining the gender feature, whereas Gaia prefers to keep the initial strong vowel, (thus incurring in a morphosyntactic “mistake”) when she cannot simply avoid to produce the article and substitute it with the definite article. In any case what is produced by both children is a sequence conforming to the PW structure in Fig.5.10 above.
The consistency found in comparing Gaia’s data to Sofia’s indicates that it is licit to hypothesize a parallel prosodic development in Italian and Spanish; a development that is different from the one followed by English and Dutch children, that has been sketched in Fig. 5.1 above following Demuth (2000). In the framework of Optimality Theory, as we have seen, such inter-linguistic differences can be explained in terms of different rankings of the relevant constraints. So, Gaia’s data show that in Italian, as well as in Spanish, the early availability of a PW structure like that in Fig. 5.9 above, results from a relatively low ranking of the exhaustivity constraint. The insertion of an unstressed syllable immediately dominated by PW and not by F, implies systematic violations of exhaustivity. So, when Gaia produces trisyllabic words or nouns preceded by an article, she shows that her grammar allows her to violate this constraint with no particular difficulties at this stage. It is very likely that, in fact, her target language has made her familiar with violations of exhaustivity, given that in Italian there are many trisyllabic words with penultimate stress, and that Italian assigns to articles the prosodic status of proclitics, weak items phonologically attached to the following noun. So, Gaia’s production shows her early awareness of the prosodic organization of her target language with respect to constraint ranking and language-particular prosodization of function words. Such awareness has also been demonstrated, as seen above, in Spanish and German children in Lleò (2000), where it is held responsible for significant differences in the development of articles between the two groups of children. In particular, the higher ranking of exhaustivity in German than in Spanish prevents German children from producing proto-articles of the kind found in the utterances of Spanish children as soon as at the one-word stage (from 1;5). It is interesting to note that similar proto-articles are also attested in Italian, in a study by Cipriani, Chilosi, Bottari and Pfanner (1993), on the acquisition of morphosyntax by six Italian children. Moreover, I find plenty of such “fillers” in the data of Michelangelo, another Italian child, that I have recorded but not yet transcribed and analysed. Given all that, we may well hypothesize that children’s prosodic development, that is responsible for the emergence of functional morphemes, follows a parallel course in Italian and Spanish; the development found in languages like English, German and Dutch differs just at this stage: these languages lack the stage described here as Gaia’s second stage, characterized by the inclusion in PWs of an initial unstressed syllable, so the expansion of PWs in such languages will only take place when the constraint disallowing two feet in the same PW will be demoted.

So far I have characterized Gaia’s second stage only for what concerns the expansion
of prosodic structure at the PW level. But some development also takes place at Gaia’s Phonological Phrase level: while at the first stage the child was unable to combine two different words into a PP (as seen in (17)), now I find utterances where combinations of words are pronounced with a unified intonation contour. However, this seems to happen only with very simple kinds of PWs. One example is given below:

(26)
\[
@\text{Age of CHI: 1;10.29}
\]
*CHI: (l)una o(r)so!
*CHI: (l)una (l)una o(r)so!
%exp: si riferisce ad un cartone animato, ogni episodio del quale termina con un dialogo fra un orso e la luna
*RROB: cosa?
*CHI: (l)una o(r)so!

In sequences such as these, words are not detached from one another, but pronounced as PWs combined in a PP with prominence assigned to the rightest word *orso. This example, I think, is very interesting not only for witnessing a development of PP structure, but also because it sheds light on the way Gaia prosodifies different syntactic elements. By a chance, here the first PW (“una” for the target noun *luna (“moon”)) is composed exactly by the same string of segments as the indefinite article *una; nevertheless, while the sequence “una oso” is possible, *una tata is not. This makes still more evident Gaia’s sensitivity to prosodic organization, her early awareness of the different prosodic status of some functional morphemes (clitics) with respect to lexical elements. It is clear, moreover, that the shape of early utterances is not just a matter of rhythm, because the two sequences above may be said to have the same alternance of strong and weak syllables\(^{35}\); what really counts is prosodic structure, the constraints that operate at the various levels in a given stage of development, and the level at which different grammatical items are prosodified.

If Gaia, at this stage, always prosodifies articles at the PW level, it is not surprising that she has problems in inserting articles not only before trisyllabic nouns, but also before disyllabic nouns with final stress. See the following examples:

(27)
\[
@\text{Age of CHI: 1;10.29}
\]
*RROB: e chi è passato prima, chi è che ci è venuto a trovare?
*CHI: bauban@o [= cane]!

\(^{35}\)The only difference is that “una oso” has two primary stresses, while in *una tata the first foot has a secondary stress.
©Age if CHI: 1;11;12
*CHI: (l)a mamma, (l)ja Gaia, papà.
%sit: guardando le foto tessera che ho nel portafoglio

©Age of CHI: 1;11.13
*ROB: e cos’ hanno in mano?
*CHI: i(l) thè.
*ROB: e il thè è dentro+?
*CHI: tattè [: caffè].

*ROB: e questo che cos’ é?
*CHI: un mambo ≠ mamao@o.
%exp: probabilmente si riferisce a un maialino, che poi le può essere sembrato un gatto

*CHI: tattè [: caffè].
*CHI: tattè [: caffè].
*ROB: vuoi fare il caffè, ho capito

©Age of CHI: 1;11.16
*CHI: un tato, babau.
%sit: c’era un bambino con un cane

Differently from what happened at the Minimal Word stage, when caffè (“coffee”) was reduced to “tè”, at this stage, thanks to the expansion of the PW structure, the initial unstressed syllable is allowed to surface. For the same reason it is now possible for Gaia to restructure sequences of two monosyllabic bimoraic words (like onomatopoeia for animals), into disyllabic nouns: for example “mao mao” now becomes “mamao”, meaning “cat”. However, given the constraint disallowing PWs to go beyond the structure permitted at this stage, Gaia is not able to insert an article before these nouns\(^{36}\). There is, however, one exception, in an utterance occurring at the age of 1;11;13, thus at the end of what I have identified as Gaia’s second stage:

(28)
*ROB: ma hai prurito dappertutto ≠ fammi sentire.
*ROB: ma hai fatto +...
*CHI: ++ pipì // (l)a pipi!

Here, after uttering a PW conforming to the usual pattern, the child corrects herself and

\(^{36}\)These data, by being given in their context, instead of simply being reported in a table like those above, emphasize the difference between these nouns with final stress and the nouns that appear next to them, that, for consisting in trochaic feet, are always preceded by an article.
inserts the article\textsuperscript{37}. It is very unlikely that this sequence results from a further expansion of the PW, given that quadrisyllabic words are always reduced at this stage, and will be reduced even thereafter, being produced in targetlike form no sooner than at the fourth stage, from the age of 2;2. It might rather be possible that Gaia, in this circumstance, recurs to the PP node to find a place in which to insert the article, representing this utterance as in the following prosodic tree:

A position immediately dominated by the PP node is the one that Selkirk assigns to all English articles; and in this same position Gerken inserts articles preceding English nouns with a WS stress pattern. Specifically, Gerken, on the basis of his experiments examining omissions of English object-articles in different prosodic structures, analyses different article-noun sequences as taking the following prosodic structures\textsuperscript{38}:

Figure 5.11 : Prosodic structures assigned by Gerken (1996) to English article+noun sequences

Therefore, it might be that the video in which that utterance appear was recorded at a time when Gaia was starting to pass to a further stage in her prosodic development, characterized

\textsuperscript{37}In Italian this noun often appears with no article, but in the northern variety Gaia speaks it is usually preceded by the article.

\textsuperscript{38}The structure postulated by Gerken for the words in (b) is only slightly different from that posited by McCarthy & Prince (1993): in their analysis the noun \textit{giraffe} constitutes one PW dominated by one more PW hosting the article, dominated in its turn by the PP (this structure implies a violation of nonrecurrivity). In any case, articles preceding a noun with final stress are prosodified at a higher level than those that precede nouns with the usual stress pattern.
by the possibility to prosodify articles (and possibly other functional items) at the level of the phonological phrase. We will see in the next paragraph if and to what extent this prediction is correct.

5.2.3 Third stage

The passage from the second to the third stage is not as radical as the transition from the first to the second, and from the third to the fourth. The development that can be observed at this stage regards only the phonological phrase level, whereas Gaia’s prosodic words are still constrained to conform to the structure in Fig. 5.10a). See the following examples:

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mìmo</td>
<td>motorìno</td>
<td>“motor bicycle”</td>
<td>1;11,22 (DiaryGaia.cha)</td>
</tr>
<tr>
<td>pucàco</td>
<td>pappagàllo</td>
<td>“parrot”</td>
<td>1;11,28 (gaia_23-28.cha)</td>
</tr>
<tr>
<td>caìna</td>
<td>carrozzìna</td>
<td>“pram”</td>
<td></td>
</tr>
<tr>
<td>Popìmo</td>
<td>Topolìno</td>
<td>“Mickey Mouse”</td>
<td></td>
</tr>
<tr>
<td>Giuppìna</td>
<td>Giuseppìna</td>
<td>proper name</td>
<td>2;0,28 (gaia_24-28.cha)</td>
</tr>
</tbody>
</table>

Here we can see that the child is not yet able to produce quadrisyllabic words in target-like form, so she still reduces them to trisyllabic words with the usual WSW stress pattern, or even to a trochaic foot, as in the first example. In other words a PW with two feet is not yet available in Gaia’s grammar.

If this is true, we expect that nouns preceded by the feminine indefinite article will also be disallowed at this stage. Gaia’s data confirm this prediction: the indefinite article appears only in the form “un”, the feminine form una does never occur, while definite articles are produced in masculine/feminine and singular/plural forms (“i(l)”/“(l)a”, “i”, “(gli)i”/“(l)e”). It must be noted that the absence of the feminine indefinite article is not something casual, it does not depend on the lack of contexts for its use. This is particularly evident in the words produced by Gaia when looking at magazines and puericulture catalogues. In these situations Gaia names what she sees (objects, people, animals), uttering nouns preceded by articles, and she uses indifferently definite and indefinite articles (so she seems not to consider semantic notions like new/known, generic/specific). See the paradigms I give in (30), all found in the same video:
What is significant is that no such paradigms are found with feminine nouns, which always appear with the definite article *la*. A striking example is the noun *tata* (“little girl”), which is uttered nine times, always preceded by the definite article. There is no semantic reason for that, as the child is glancing through the magazines and sees different little girls, she is not referring to a specific one. If we did not consider prosodic structure, we would not be able to account for such phenomenon; but once we have identified a constraint disallowing prosodic words with two feet, the late appearance of the disyllabic article *una* in Gaia’s corpus comes up as a natural consequence of all we have been observing so far.

That the constraint on PW structure is still operative, is further evidenced by the absence of articles before multisyllabic nouns; so, as was done when dealing with the second stage, I report for the third stage some examples of such bare nouns:

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>oécche</td>
<td>erécchie</td>
<td>“ears”</td>
<td>1;11,22 (DiaryGaia.cha)</td>
</tr>
<tr>
<td>osètto</td>
<td>orsétto</td>
<td>“little bear”</td>
<td>1;11,28 (gaia_23-28.cha)</td>
</tr>
<tr>
<td>papéio</td>
<td>capéllo</td>
<td>“hair”</td>
<td></td>
</tr>
<tr>
<td>alcco</td>
<td>radicchio</td>
<td>“cichory”</td>
<td></td>
</tr>
<tr>
<td>cappùcco</td>
<td>cappùccio</td>
<td>“hood”</td>
<td></td>
</tr>
<tr>
<td>geàto</td>
<td>gelàto</td>
<td>“ice-cream”</td>
<td></td>
</tr>
<tr>
<td>giàffa</td>
<td>giràffa</td>
<td>“giraffe”</td>
<td></td>
</tr>
<tr>
<td>fochètte</td>
<td>forchètte</td>
<td>“forks”</td>
<td></td>
</tr>
<tr>
<td>dottèe</td>
<td>dottòre</td>
<td>“doctor”</td>
<td></td>
</tr>
<tr>
<td>padógna/paògna</td>
<td>pianòla</td>
<td>“player piano”</td>
<td>2;0,28 (gaia_24-28.cha)</td>
</tr>
<tr>
<td>banàna</td>
<td></td>
<td>“banana”</td>
<td></td>
</tr>
</tbody>
</table>

There are also utterances where a trisyllabic noun is reduced to a trochaic foot, and in that
case the article is inserted: for example “i(l) (rad)icc(hi)o” (“(the) cichory”). So, the PW structure that is available at this stage to represent nouns cannot yet accommodate articles when nouns are more than disyllabic (also note that the quadrisyllabic nouns given above in (29) are not only reduced, but also left bare).

It shall be interesting, now, to consider what happens with disyllabic nouns with final stress. The previous paragraph has in fact left a question open (a question that has been raised just with reference to one example of such nouns): will articles be allowed to be prosodified also at the phonological phrase level, at the third stage? The following examples, therefore, are crucial:

(32)

<table>
<thead>
<tr>
<th>Child</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>il mamào</td>
<td>“the” + onomatopoeia for “cat”</td>
<td>1;11,22 (DiaryGaia.cha)</td>
</tr>
<tr>
<td>i babàu</td>
<td>“the”(pl.) + onomatopoeia for “dog”</td>
<td>1;11,28 (gaia_23-28.cha)</td>
</tr>
<tr>
<td>i papàm</td>
<td>“the”(pl.) + onomatopoeia for “balls”</td>
<td>1;11,28 (gaia_23-28.cha)</td>
</tr>
<tr>
<td>i(l) papà (x2)</td>
<td>“(the) daddy”</td>
<td></td>
</tr>
<tr>
<td>il babàu</td>
<td>“the” + onomatopoeia for “dog”</td>
<td>2;0,28 (gaia_24-28.cha)</td>
</tr>
<tr>
<td>il papà</td>
<td>“(the) daddy”</td>
<td></td>
</tr>
</tbody>
</table>

Here we can see that words that at the second stage appeared with no article (as shown in (27) above) are preceded by articles at the third stage. And this seems not to be due to the possibility of inserting it in the PW, since all the evidence given in (29), (30), and (31) demonstrates that Gaia’s grammar still disallows more than one weak syllable preceding the foot in the PW. So it seems very likely that these articles are prosodified at a higher level.

A phenomenon that can be considered in relation with what has just been observed, is the appearance of prepositions in Gaia’s corpus. Only at the third stage do we find occurrences of prepositions. Consider the following utterances from earlier videos:

(33)

@Age of CHI: 1:6.29
*CHI: papo [: parco]!
*CHI: papo [: parco]!
*CHI: papo [: parco]!
*ROB: al parco ci andiamo domani.
*CHI: papo [: parco]!
*ROB: domani.
*CHI: papo [: parco]!
It is not surprising that in the first two examples Gaia produces no preposition, since they are uttered at her Minimal Word stage, when no unfooted syllable is allowed to surface. At the age of 1;10,29, when Gaia starts producing articles, no prepositions occur yet\(^{39}\). More significant are the omissions found at 1;11,13, when the great majority of disyllabic (trochaic) nouns are preceded by articles. At the same age, however, we find the very first occurrence of a preposition, though in a kind of fixed expression: “a nannà” (“to sleep). This happens in the same video where nouns with WS stress pattern appeared with no article, except for one. So the emergence of prepositions seems to follow a parallel course, starting at that time. This

\(^{39}\)The example reported above is a possible context for prepositions, even if we must always be very cautious when speaking about omissions; in this case, for instance, the child might as well have meant something like “I want Gia”, or “Gia comes, too”. Anyway it is a fact that no prepositions at all occur in that video.
can suggest that the child prosodifies prepositions at the level of the phonological phrase. If this is true we expect more occurrences of prepositions in the video recorded at the age of 1;11,28, when also noun with final stress are preceded by articles. This is confirmed by Gaia’s productions, some of which are given below:

(34)

@Age of CHI: 1;11,28
*ROB: tanti ciucci, amore, sì.
*CHI: in bocca.
*ROB: in bocca si mette.

*MAT: hai la tua maglietta, e cosa serve adesso?
*CHI: il ciuccio!
*CHI: a nanna!
*CHI: a nanna!
*MAT: cosa vuoi andare a fare te?
*CHI: nanna!

@Age of CHI: 2;0,28
%act: lo traino con il cordino
*CHI: da sola!
*ROB: vuoi tirarlo da sola?

*MAT: Minnie [?] [/] di Minnie!
*ROB: il libro di Minnie vuoi, questo delle indicazioni?
*CHI: sì.

*MAT: borsellino.
*CHI: in mano.
*MAT: lo tieni +..?
*CHI: in mano!

*MAT: un momo ti ha dato?
*CHI: in bocca tua [=mia].
*MAT: in bocca tua è andato a finire il momo?

*MAT: e ascolta, questa sera in treno c’erano delle persone che parlavano in modo strano, ti ricordi?
*CHI: <in modo> ≠ [/] in modo st(r)ano.

So, it seems that the third stage is characterized by the possibility for the node PP to accommodate weak function items like articles and prepositions. Moreover, at this stage, phonological phrases group together different PWs, and not only very simple ones, as happened in the second stage (see (26) above); more articulated PWs are now combined into the same PP and thus pronounced with a single intonation contour, as shown in the examples in (35):

---

40When separated by commas, utterances include more than one PP.
Chapter 5. The Shape of Early Utterances: Evidence for Prosodic Constraints

(35)
@Age of CHI: 1;11.28
*CHI: bimbi ≠ un tanto [: altro] tato, un tanto [: altro] ta +//.

*CHI: +< nanna, un ciuccio dansie [: grande], a tanta [///] tanti ciucci.

*CHI: tanti o(r)setti!
*CHI: tanti [///] due o(r)setti +/.

@Age of CHI: 2;0.28
*CHI: ap(r)i (l)a po(r)ta!

*CHI: (l)a tata Giu(se)ppina!

*CHI: (l)a nonna (L)i(s)etta.

CHI: (l)e (s)igno(r)e <un tan> [/] <un tanta (l)ing(u)a> [: un’ altra lingua].

However, the PP node seems to be still unable to host a disyllabic clitic, or two unfooted syllables: prepositions followed by or combined with an article are not yet produced. Summarizing what has been observed so far, I can represent the prosodic structure that Gaia has available at the third stage, in the following trees:

![Figure 5.12: PP and PW structure at Gaia’s third stage](image)

There is still one question, though, that must be raised: if by now the PP node is available to host even articles, why is it not always exploited? Specifically, why are not trisyllabic words preceded by an article, if there is the possibility of inserting it beyond the boundaries of the constrained PW? First of all, it must be noted that in fact there are two exceptions to the strong tendency shown in (31) above:

Anyway, there might also be some morphosyntactic reason for that, so I shall not further analyse the phenomenon here.
However, these seem to be marked cases. In general, at this stage, Gaia still shows a reluctance to produce article-noun sequences that go beyond the PW boundaries. She seems to conform to a kind of principle of uniformity, that leads her to prefer to prosodify articles always at the level of the PW\textsuperscript{42}. The prosodization of articles at a different level seems to be an operation to which the child recurs only in particular circumstances. If we consider again the example in (28) above (the earliest utterance that can be analysed as having the article in the PP), and those in (32), we notice that they have something in common. Apart from differing from most Italian words for having final stress, they have another characteristic that makes them different: they do not end in a vowel marking the gender/number agreement\textsuperscript{43}. Thus, it is only by the insertion of an article that the morphosyntactic information about agreement can be provided. Note that leaving the noun bare would also lead to an ambiguity in the second example in (36): signore in Italian can be a feminine plural noun, meaning “ladies”, as well as a masculine singular noun, meaning in that case “gentleman” (or, more generally, “man”); only by inserting the article le does the word definitely take the right interpretation. Therefore it might be possible that in those cases a morphosyntactic requirement triggers a development in prosodic organization.

5.2.4 Fourth Stage

A crucial development takes place in Gaia’s prosodic structure from the age of 2;2 the shape of her prosodic words and phonological phrases finally witnesses the relaxation of the constraints

\textsuperscript{42}It can also be noted that the insertion of a weak syllable immediately dominated by the PP node violates exhaustivity twice. However, it is difficult to say whether this has an influence or not, because, as we have seen, Italian easily tolerates violations of exhaustivity.

\textsuperscript{43}Generally, Italian nouns end in -\textit{o} when they are masculine singular, in -\textit{a} when feminine singular; -\textit{i} and -\textit{e} are the plural endings for masculine and feminine nouns respectively (few masculine and feminine singular nouns end in -\textit{e}, too).
Prosodic words are now allowed to extend beyond the structure in Fig. 5.10a. The clearest evidence is given by Gaia’s production of words with four (or more) syllables:

\[(37)\]

<table>
<thead>
<tr>
<th>Child</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>best(i)o(l)ìna (x4)</td>
<td>“little animal”</td>
<td>2;2,1 (gaia_26-01.cha)</td>
</tr>
<tr>
<td>bí(s)cottìno (x2)</td>
<td>“little biscuit”</td>
<td></td>
</tr>
<tr>
<td>(s)pasemàti (dialect word)</td>
<td>“agitated”</td>
<td></td>
</tr>
<tr>
<td>ve(r)amènte</td>
<td>“really, in reality”</td>
<td></td>
</tr>
<tr>
<td>ciocco(l)àto</td>
<td>“chocolate”</td>
<td></td>
</tr>
<tr>
<td>Ciccio(bé)llo</td>
<td>name for a doll</td>
<td></td>
</tr>
<tr>
<td>cucc(hì)jano</td>
<td>“teaspoon”</td>
<td></td>
</tr>
<tr>
<td>tetta(r)èlla (x 2)</td>
<td>“teat”</td>
<td>2;2,28 (gaia_26-28.cha)</td>
</tr>
<tr>
<td>picco(l)ìni (x 2)</td>
<td>“little(-dim.pl.)”</td>
<td></td>
</tr>
<tr>
<td>(f)ina(l)mènte (x2)</td>
<td>“finally”</td>
<td></td>
</tr>
<tr>
<td>bo(ll)ìcìne (x 7)</td>
<td>“little bubbles”</td>
<td></td>
</tr>
<tr>
<td>pove(r)ìno</td>
<td>“poor thing!”</td>
<td></td>
</tr>
<tr>
<td>indige(s)tiòne</td>
<td>“indigestion”</td>
<td></td>
</tr>
<tr>
<td>goiogètto (for golosètto)</td>
<td>“greedy”</td>
<td></td>
</tr>
<tr>
<td>bi(gl)i(e)ttìno</td>
<td>“little card”</td>
<td></td>
</tr>
<tr>
<td>topo(l)ìno, topo(l)ìna</td>
<td>“little mouse”</td>
<td>2;4,0 (gaia_28-00.cha)</td>
</tr>
<tr>
<td>uccellìno (x2)</td>
<td>“little bird”</td>
<td></td>
</tr>
<tr>
<td>lette(r)ìna</td>
<td>“letter(-dim)”</td>
<td></td>
</tr>
<tr>
<td>a(rr)abb(i)àta (x3)</td>
<td>“angry”</td>
<td></td>
</tr>
<tr>
<td>buiocàcào (for burrocàcào) (x3)</td>
<td>“lipsalve”</td>
<td></td>
</tr>
<tr>
<td>mutandìna</td>
<td>“pants”</td>
<td></td>
</tr>
<tr>
<td>att(r)ave(r)sàno</td>
<td>“(they) cross”</td>
<td></td>
</tr>
<tr>
<td>Pape(r)ìno</td>
<td>“Donald Duck”</td>
<td></td>
</tr>
<tr>
<td>appendìamo</td>
<td>“(we) hang”</td>
<td></td>
</tr>
</tbody>
</table>

The number of quadrisyllabic words produced is impressive, if we consider that in earlier videos not even one single target word was uttered in full form when composed of more than three syllables. Such production of multisyllabic words, emerging all at once, really points to the breaking of a bound: prosodic words, which were constrained to include no more than one foot preceded by a weak syllable, are now allowed to take their targetlike structure even when this includes two feet. The prosodic tree for PWs that has became available is given below:
The parallel prosodization of lexical words and article-noun sequences that has been observed in all the earlier stages lead us to expect that nothing shall now prevent Gaia from using the feminine form of the indefinite article. And, if we look in the first video recorded in the fourth stage, we shall find that *una* punctually comes:

(38)

*CHI: una pe(r)nacchia!

So, paradigms with definite/indefinite article + noun, which before appeared only with masculine nouns, can be now found with feminine nouns, as well. See the following examples:

(39)

*CHI: un ciuccio g(r)a \ QPainter: 0x558750c02b50 \ QPainter: 0x5587526031c0 \ QPainter: 0x558751080f70 \ QPainter: 0x558751080970 |\] una tetta(r)ella g(r)and \ [/\] un ciuccio g(r)ande de(l) tato!

*CHI: (l)a tetta(r)ella (s)po(r)ca!

*CHI: ++ (l)a va(l)igia.

*CHI: abb(i)amo fatto una va(l)igia!

That articles can take the form of a disyllabic clitic now is further evidenced by another phenomenon that can be observed in Gaia’s corpus: from this time, the child starts alternating the form “uno” to the standard form “un” for masculine indefinite articles. This phenomenon is widely attested in Gaia’s diary and also appears in the videos. A couple of examples are given below:

(40)

*CHI: uno Babbo Natale.
The indefinite article had never appeared in the form *uno* before. Without the prosodic approach taken here, it would be difficult to account for that, to explain why Gaia should incur in this kind of morphological mistake at this time, and nor before. It must be noted that in fact Gaia’s target language provides her with the disyllabic form, but *uno* in Italian occurs only in particular contexts, that do not correspond to those in which she inserts it. To what purpose she should replace the “correct” form *un* with the disyllabic form, is not entirely clear. It may just be that Gaia generalizes to masculine indefinite articles the insertion of a final vowel marking gender (that she now uses for feminine articles); however, there are two other possible explanations, which will be examined below. Here, as we are dealing with how prosodic structure develops in the fourth stage, we just need to note that the production of such a form, together with the feminine article, is now possible thanks to the expansion of structure that has taken place at this stage. As we might expect, at the fourth stage, Gaia seems no longer to have particular difficulties in producing articles before trisyllabic nouns with WSW stress pattern:

<table>
<thead>
<tr>
<th>Child</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i(l) sacchëtto</td>
<td>“the bag”</td>
<td>2;1,3 (DiaryGaia.cha)</td>
</tr>
<tr>
<td>i(l) cu(l)ètto</td>
<td>“the bottle”</td>
<td>2;2,1 (gaia_26-01.cha)</td>
</tr>
<tr>
<td>(gl)i o(r)setti i gattini</td>
<td>“the teddy-bears”</td>
<td>2;2,28 (gaia_26-28.cha)</td>
</tr>
<tr>
<td>(l)a va(l)igia</td>
<td>“the kittens”</td>
<td></td>
</tr>
<tr>
<td>i mamài (=gattini)</td>
<td>“the suitcase”</td>
<td></td>
</tr>
<tr>
<td>un ge(l)àto</td>
<td>“an ice-cream”</td>
<td></td>
</tr>
<tr>
<td>un do(l)cétto</td>
<td>“a sweet”</td>
<td></td>
</tr>
<tr>
<td>i(l) (l)èone</td>
<td>“the lion”</td>
<td>2;4,0 (gaia_28-00.cha)</td>
</tr>
<tr>
<td>(l)a Befàna</td>
<td>“(the) Befana”</td>
<td></td>
</tr>
<tr>
<td>i conìghi (for <em>conigli</em>)</td>
<td>“the rabbits”</td>
<td></td>
</tr>
<tr>
<td>la signo(r)a</td>
<td>“the lady”</td>
<td></td>
</tr>
<tr>
<td>i(l) ditìno)</td>
<td>“the finger(-dim.)”</td>
<td></td>
</tr>
<tr>
<td>un ovètto</td>
<td>“an egg(-dim.)”</td>
<td></td>
</tr>
</tbody>
</table>
Gaia likewise produces articles with quadrisyllabic nouns. In (37) above, where I showed that quadrisyllabic words no longer need to be reduced, articles have not been reported, as we were considering the shape of lexical words. But it should be noted that many of the nouns appearing there were preceded by articles. Now that the prosodic word structure has expanded it is possible that Gaia prosodifies articles preceding such long words at the PW level, but she might also use the PP node for this task.

The level of the phonological phrase, too, is subject to some development at the fourth stage. As we have seen, so far the PP node could dominate PWs and single weak syllables (like prepositions, or, in particular circumstances, articles); it could not host, instead, more than one unfooted syllable, or a weak foot (a foot not constituting a PW). At this stage, even this constraint on PPs seems to have relaxed. From the age of 2;1,3 we find in Gaia’s corpus many occurrences of preposition-article sequences; as in her target language, these elements can appear both as combined into a single disyllabic word, and as two monosyllabic items. Some examples are given below:

(43)

@Age of CHI: 2;1,3
*CHI: quello grande nella bocca della mamma.
%sit: mangiando prosciutto

*CHI: due forchette: una per la Gaia, una per Titti.

@Age of CHI: 2;1,21
*CHI: botte allo fazzoletto!

@Age of CHI: 2;2,10
*CHI: un tato con la sua mamma.
*CHI: che ciuccia le poppe della sua mamma.

*CHI: le cose per il tato che mangia la pappa.
%sit: guardando in un catalogo piattini e posatine
*CHI: i piattini del tato che mangia la pappa.

*CHI: dall’ altra parte.
%sit: il papà le grattava la schiena

@Age of CHI: 2;2,28
*CHI: (l)e pate [: scarpe] [:?] de(l) tato e della sua mamma.

*MAT: l’ acqua col bibo vuoi?
*CHI: [% si lamenta] co(n) (l)e bo(ll)icine!
It is clear from these examples that the PP structure is no longer constrained. Not only: even by a quick look at Gaia’s data from this period, we realize that the development taking place at this stage involves the entire prosodic structure. Gaia can now combine different Phonological Phrases into Intonational Phrases, and even Intonational Phrases into Phonological Utterances. Below I give some more examples that demonstrate that Gaia is able to represent the entire prosodic tree, which can now branch from the top to the bottom levels.

\[ \text{(44)} \]

\( \text{@Age of CHI: 2;2.1} \)

*CHI: che occhi che ha Tutter!

\( \text{@Age of CHI: 2;2.28} \)

*CHI: i bibi nuovi con (gl)jì [=? i] o(r)getti, che belli!

*ROB: come mai era caduto, perché?

*CHI: pe(r)ché l’ hai [= ho] buttato pe(r) teia [: terra] li.

Given all that, we can describe Gaia’s fourth stage of prosodic development as one characterized by an expansion of prosodic structure at various different levels, or, better, by the relaxation of the constraints that limited, in previous stages, the structure of the prosodic constituents into which the child’s production was organized. Now Gaia’s words and sentences can finally be produced in targetlike shape, since the units into which they are phonologically arranged can finally take targetlike prosodic structures. This seems to hold for all of the units (apart from the topmost levels, which, having “fluid” boundaries even in adult language, need not be examined in details): we have seen the development that involves the PW and the PP units. We should also consider that the basic unit, too (the syllable), undergoes a development in the course of the various stages. The gradual reorganization of syllabic structure has been described when dealing with the first stage, when different transformations can be best identified; anyway the development of syllabic structure is not completed until the fourth stage, while before the child does not give up manipulating syllabic form. For example, it is only at this final stage that \textit{acqua} (“water”) is produced more often in targetlike form than in the form “ata/atta”, and it is only at the age of 2;2,28 that \textit{paura} (“fear”) no longer takes the form “pattuia”. One constituent that seems to maintain always the same structure since the earliest productions is the foot; more specifically, since the first stage Gaia’s feet have consisted in either one bimoraic syllable, or a disyllabic trochee; and at the fourth stage (at least for the first two months) it is still very difficult for Gaia to produce a foot that goes beyond the
trochaic structure. Therefore the dactyl, a ternary foot with SWW pattern, that according to Nespor (1993) is represented in the prosodic organization of Italian words, seems not to be available in Gaia’s inventory of prosodic structures, at least as late as at the beginning of the fourth stage. While multisyllabic words with penultimate stress are entirely produced, Gaia shows a strong tendency to reduce words with stress on the third-last syllable, as shown in the following examples:

(45)

<table>
<thead>
<tr>
<th>Child</th>
<th>Adult target</th>
<th>Gloss</th>
<th>Age of child (and Filename)</th>
</tr>
</thead>
<tbody>
<tr>
<td>àbo</td>
<td>álbero</td>
<td>“tree”</td>
<td>2;2,1 (gaia_26-01.cha)</td>
</tr>
<tr>
<td>pùnco</td>
<td>pùzzola</td>
<td>“polecat”</td>
<td>2;2,1 (gaia_26-01.cha)</td>
</tr>
<tr>
<td>pùzza</td>
<td>pùzzola</td>
<td>“polecat”</td>
<td>2;2,28 (gaia_26-28.cha)</td>
</tr>
<tr>
<td>bèvo</td>
<td>bèvono</td>
<td>“(they) drink”</td>
<td>2;2,28 (gaia_26-28.cha)</td>
</tr>
<tr>
<td>prènde</td>
<td>prèndere</td>
<td>“to take”</td>
<td>2;2,28 (gaia_26-28.cha)</td>
</tr>
</tbody>
</table>

So, it might be that in Gaia’s prosodic organization feet are always binary, and that in the rare cases in which she is able to utter a SWW sequence, this is actually prosodified as a trochaic foot followed by an unfooted syllable. Alternatively, we could describe the dactyl as a highly marked foot structure in Gaia’s grammar. What is interesting to be noted, with reference to the examples just given, is that the last two words, if not seen in the framework of the present prosodic analysis, could be taken as verbs lacking functional morphemes, so as evidence for an absence of functional categories. By looking at them from a prosodic perspective we can avoid being thus misled.

Of course, the risk of underestimating the child’s grammatical competence was greater for the earlier stages, than for the stage we are here considering. At that time the constraints operating on PW and PP structure prevented various functional items from surfacing. At the fourth stage, instead, the loosening of those constraints opens the way to the emergence of all weak grammatical elements. Therefore, we now find utterances where weak monosyllabic pronouns, conjunctions, negation, as well as articles, prepositions, possessives, are produced with no difficulty, even one after another. Some of these utterances are given below:

(46)

@Age of CHI: 2;2.1
%act: mette l’ orsetto sul seggiolone
*CHI: che mangia la pappa # xxx # e ti do (l)a pappa.

@Age of CHI: 2;2.15
So, the availability of a wide range of prosodic structures makes it no longer necessary for Gaia to recur to omissions, as she had to do before, when her productions had to conform to constrained prosodic units. After the fourth stage we can only note very rare omissions, that are probably to be ascribed to the child’s need for metrical well-formedness. Consider the following utterances:

(47)

When uttering the title of the first story, *Molli la mucca* (“Molli the cow”), Gaia correctly inserts the article, while she omits it when uttering the second title *Betta la capretta* (“Betta the little goat”), even though the correct sequence has just been produced by the adult. It would be difficult to find the reason why Gaia should deal differently with the two phrases, unless we consider their metrical structure. See how the two rhythmic sequences are represented in their respective metrical grids (where marks represent the relative prominence of syllables at the various levels):

---

44For an overview of metrical theory and metrical representations, see Dresher (1996) and Nespor (1993).
As can be seen, (b) has a string of three weak syllables, while (a) has only two adjacent weak syllables. The phonology of all natural languages tends to alternate strong and weak syllables; three adjacent weak positions sound as ill-formed, so a kind of restructuring intervenes to remedy to such stress lapses (as these successions of weak elements are termed), especially when the speech rate is low. The remedy that is found consists in assigning a secondary stress to one weak syllable, thus interrupting the arhythmic sequence with a mark at a higher level. However, it seems that Gaia is reluctant to assign foot-stress to the article and so she opts for a different kind of remedy: she simply omits the article, producing two identical rhythmic grids for both phrases. The other article omissions found in this relatively late period of Gaia’s acquisition, likewise appear as a remedy for stress lapses. See the following utterances, produced in the same video as those reported in (47) above:

(49)

*CHI: vuoi [= voglio] (l)egge(r)e (l)eone []// i(l) (l)eone!
%act: sfoglia per trovare una parte che le piaccia
*CHI: que(s)to.
%sit: ha trovato la pagina col cane
*CHI: i(l) cane sì, mi piace ≠ legge(r)e cane.

*CHI: mi piace (l)egge(r)e l’ eio [: aereo]!

Note that in the last sentence the article forms a syllable with the initial stressed vowel of the following noun, and so there are only two adjacent weak syllables, which do not constitute a stress lapse; so, there is no need to omit it.

It is likewise possible to appeal to metrical reasons to find an explanation for Gaia’s use of the indefinite article uno instead of the form un in certain contexts (a phenomenon already introduced above). We should consider that, while un is an unfooted syllable, uno forms a foot that, though being weak, is endowed with a secondary stress. So, choosing to use one form or the other has some implications for metrical structure. Consider the two sentences in
It might be that Gaia is more prone to attach an unfooted clitic to a foot with primary stress than to one with secondary stress, preferring in the latter case to produce a clitic with its own secondary stress. That Gaia may be using such kind of strategy is also suggested by other occurrences, like “uno bi(s)cottino”, “uno elefante”, as opposed to “un ciuccio”, “un bel grissinetto”, “un tato”, “un tanto [ altro] bacino”. The examples given in (51), however, seem to suggest that the child may also exploit the difference between *uno* and *un* for semantic reasons, as well:

(51)

@Age of CHI: 2;02,05
*CHI: uno tato.
%act: disegnando

@Age of CHI: 2;02,08
*CHI: un tato.
*ROB: no, era una tata, una femminuccia come la Gaia.
*CHI: femminuccia.
*ROB: eh sì, e Michelangelo invece cos’è?
*CHI: un femminuccio.

Gaia may prefer to use “uno” as a numeral, meaning “one”, when she wants to emphasize that she is referring to one single item; she always produces “un” when the information about quantity is not salient. In this way she may exploit the opportunity to use the two forms to convey more information than her target language does: the numeral *uno*, in Italian, becomes *un* when preceding a noun (so, for example *one child* in Italian can only be translated as *un bambino*, the same as for *a child*); Gaia may be trying to keep most of the semantic information involved in her speech. Note, finally, that the two explanations proposed for the use of *uno* in non-target contexts are not mutually exclusive; it might be that Gaia is in fact exploiting the possibility of using such allomorph for metrical, as well as for semantic reasons, according

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45Note that this happens only at a late stage (when *uno* and *una* appear), while at early stages articles do not seem to convey semantic information).
to which of those needs is the uppermost in a particular circumstance.

To sum up, we have seen that from the age of 2;2 the expanded shape of Gaia’s utterances with respect to earlier productions evidences the final relaxation of the constraints that had been limiting the structure of her prosodic words and phonological phrases for so long. PWs, which were constrained to include no more than one unfooted syllable preceding a trochaic foot, are now allowed to include one (or possibly even more than one) weak foot. This allows multisyllabic words to appear in their full form and the indefinite feminine article to be finally produced. Definite articles can now appear before nouns independently from their prosodic structure. PPs have likewise expanded and can now dominate weak feet (like preposition-noun strings), beside PWs and single weak syllables.

Anyway, phonological factors still seem to have some influence on Gaia’s utterances, since she shows sensitivity to the metrical properties of sentences.

5.2.5 Concluding Discussion

In the light of what we have been observing in the present chapter, we can proceed to a further discussion of the data about Gaia’s nominal projections.

The prosodic approach provides a unified account for different phenomena.

The detailed analysis of Gaia’s early utterances given above, shows that by appealing to phonological factors, a unified account can be provided for a number of phenomena:

a) the reduced shape of lexical elements;

b) the omission of definite articles before multisyllabic nouns and nouns with final stress;

c) the omission of prepositions;

d) the particular behaviour of the indefinite article in Gaia’s early nominals (use of the masculine form *un* before a feminine noun, the much later appearance of the feminine form *una* and its substitution with the definite article *la*)

It is important to emphasize that by viewing early productions as limited by prosodic constraints that force utterances to conform to restricted structures, we can explain the difference between the child’s utterances and their corresponding adult targets, not only with reference to omissions of functional categories, but also with respect to the shape of lexical words;
the prosodic approach taken here captures such parallel, which is often disregarded, when analysing corpora only from a syntactic point of view.

A characterization of the functional structure of Gaia’s nominal projections

The data in Gaia’s corpus show that from the onset of her production, she is able to project at least one functional node, namely Agr. As already seen in Chapter 3, she always realizes correct agreement for number and gender on quantifiers, demonstratives and adjectives, even in isolation. The child’s sensitivity to the inflectional properties of nouns has also been observed (in Section 5.2): when she reduces the phonological shape of lexical nouns, even when the reduction is radical, resulting in words of only one foot, she always keeps the final vowel of nouns, which bears the agreement features, even at the cost of sacrificing the vowel bearing primary stress. So, at least some functional structure is projected since the beginning of her acquisition.

As for the projection of the D node, it must be noted that the omissions of articles that have been observed in Gaia’s first period (3.1.1), in the light of what we have seen about the prosodic constraints operating on the child’s utterances, need not be necessarily imputed to an initial lack of the functional head D. Subsequently, when articles are produced, they immediately appear as instantiations of D, as they are productively used in various forms, with paradigms being realized for given nouns (as shown in 3.3). So, they are not to be taken as “impostors”, i.e. as unanalysed forms, simply attached to the nouns they precede. It is also important to remember the observations made in 5.2.2 and 5.2.3, where it has been shown that the need to mark a noun with inflectional morphology leads Gaia to insert the definite article before nouns that, due to their phonological shape, would otherwise be left bare. In those cases, it has been shown, a syntactic need can be seen even as triggering a development in prosodic representations. These examples best show that the definite article can be considered as part of the inflectional morphology of the noun, so as displaying a typical property of functional categories. Finally, the article omissions that can be observed in alternation to realization of such element, need not cast doubts as to the status of this determiner in the child’s grammar, since, as we have seen, she recurs to omissions because of prosodic (or later even metrical) needs.
The prosodic analysis of Gaia’s data confirms the different categorial status of determiners.

It is important to note that, by examining the way Gaia prosodifies the different so-called determiners, we can have some further indications as to the status that her early grammar attributes to them. It should be remembered in fact that, as explained in section 4.3, words belonging to functional categories display phonological properties that are different from those of lexical words.

As we have seen, articles are prosodified as clitics attached to the following noun, with which they form a prosodic word. On the contrary, demonstratives always have the independent status of PWs, and are produced in isolation. See the following examples:

(52)

@Age of CHI: 1;11.13
*ROB: ascolta Gaia # vuoi che guardiamo insieme un libretto?
*CHI: q(u)ello.
*ROB: quale?
*CHI: q(u)e(s)to.
*ROB: questo?
*ROB: prendilo!
*CHI: no.
%act: si sposta indicando altri libri
*CHI: q(u)e(s)ti.

*ROB: vuoi portare qualcosa in bagno con noi?
*CHI: no ## q(u)e(s)ta ## [/] q(u)e(s)te!

@Age of CHI: 1;11.28
*CHI: (l)eggo q(u)e(s)ta [% vuole che io legga]!

@Age of CHI: 2;0.28
*CHI: paogna [: pianola].
*CHI: q(u)e(s)ta.
%act: indicandola

Crucially, if demonstratives were analysed like articles as clitics, they could be produced in reduced form and attached to the following noun, in expressions like ‘sto libro (“this book”), ‘sta pianola (“this pianola”), which, it should be noted, are used by adults. However, Gaia never produces such utterances.

As for quantifiers, at the first stage they appear in isolation, as shown in the examples in (53) below, displaying the same prosodization as all the other lexical categories, namely that of a PW; and from the third stage they are combined with nouns in PPs, as shown in (54):
Note that at the third stage the indefinite article *una* is still avoided by Gaia, she never produces it; if she could give it the same status as that of quantifiers, she could prosodify it as an independent PW and combine it with the noun in a PP. If she, instead, can only prosodify articles as clitics, it may well be that the phonological dependency of articles to the noun they precede is a mark of their status as functional heads, a status that is not shared by other prenominal elements.
Chapter 6

Conclusions

6.1 Main Results of the Work

The examination of Gaia’s early production of nominal phrases from a perspective that combines syntactic and phonological analysis, has allowed us to characterize the child’s representation of nominal projections, and to confirm our expectations about the different categorial status of “determiners” in her initial grammar (see 5.2.5).

A crucial result has been arrived at by the detailed analysis of the prosodic characteristics of Gaia’s early utterances given in Chapter 5.2 (Section 2): such analysis evidences that her speech is distinctly organized into prosodic units. At the earliest stages of development all the utterances produced, be they single lexical words or combinations of lexical and functional words, are subject to prosodic constraints that limit the structure that they can assume. This, it has been shown, has significant repercussions on the phonological realization of weak syllables, thus of functional categories such as articles.

This result, based on Gaia’s data, finds cross-linguistic support in some past analyses of children’s productions in English, Dutch, Spanish, Sesotho, Maya K’ichè, examined in similar phonological perspectives. However, it should be emphasized, the first postulation of a basic phonological organization for Gaia’s utterances has been independently made in this study, and only afterwards confirmed in the light of the previous researches taking a similar approach. The possibility that prosodic constraints might be responsible for the shape of early speech was not at all taken into consideration when the present work was conceived, it just emerged from a preliminary analysis of the data, imposing on our attention to be further examined and formalized.

If the same argument is put forward independently in different studies and, moreover, for
different languages, it of course receives much strength; so it is licit to conclude that any analysis of children’s early productions having as its goal the investigation of their initial grammar should consider that the surface form of such productions might be first of all organized into prosodically constrained units. In other words, what the present work suggests is that syntactic representations (at S-structure) are not fully reflected in children’s early speech: we may view them as an input that is “filtered”, mediated, by a prosodic organization that gives as output a phonologically constrained unit.

This indicates that children’s early grammars might be much richer and more fully developed than their early productions might suggest. Therefore, the results of this work are, in principle, consistent with a Full Competence hypothesis. What these findings clearly show is that we must be very cautious when investigating syntactic structure from early acquisition data, because we run the risk of underestimating children’s grammatical knowledge. If the presence of prosodic constraints explains the reduced shape of children’s speech, providing a unified account for different phenomena involving both functional and lexical categories, it is not necessary to appeal to an absence or an underspecification of functional categories at the initial state.

6.2 Issues for Further Research

The results that have been found on the basis of Gaia’s data should be tested over other Italian children; this will allow to assess whether the developmental path of the prosodic representations of early utterances illustrated here can be extended to larger groups of children, and, therefore, be considered as characterizing the acquisition of Italian in general\footnote{It might be possible, as also suggested by Demuth (2000), that slight differences could be observed in the prosodic shape of one child’s speech with respect to another; in any case, however, once the constraints to which utterances are subject for a given child in a given period have been identified, it will be possible to predict whether certain grammatical morphemes are likely to appear or not, and test the consistency of the findings to such predictions.}. A first step in this direction could be the analysis of a corpus of data that I have already collected and so is ready to be transcribed and examined: such corpus consists of video-recordings of the spontaneous production of Michelangelo from his one-word stage, to the age of three-and-a-half years.

The proposal argued for here, that views early speech as basically shaped by prosodic factors will of course need to find further cross-linguistic support, so we may hope that acquisition
data of different languages\textsuperscript{2} will be examined from a prosodic perspective. In particular, the analysis of data of languages with final stress, or in general of languages with different prosodic characteristics would be very welcome in that it might help to address the issue of what kinds of early prosodic structures may be seen as determined by universal properties of UG, and which may instead result from the interaction of universal constraints with language-specific prosodic features.

The prosodic approach, moreover, will significantly contribute to the debate on continuity, especially if applied to the analyses of acquisition data of languages with enclitic articles, such as for example Rumanian. If articles appear at the end of a noun, in fact, even at the minimal word stage of acquisition (when utterances are constrained to consist of only one binary foot), nothing would in principle prevent such elements to surface. It is not so, instead, in languages like Italian and English, where the prosodization of articles as unfooted syllables hosted by the following noun prevents such functional elements to surface at the earliest stage. Therefore, it would be interesting to see whether in languages with enclitic articles such items are or not inserted as the weak syllable of the foot unit\textsuperscript{3}.

Finally, as there seems to be evidence for a basically prosodic organization of early utterances, another important issue that research could address concerns the analysis of the prosodic characteristics of the speech of children with linguistic delay\textsuperscript{4}, in order to see whether it displays less developed prosodic structures; if it should be so, such a finding would be useful for an early identification of linguistic delay.

\textsuperscript{2}Beside those of English, Sesotho, Dutch, Spanish, and K’iché, analysed in the works reviewed in 5.1.
\textsuperscript{3}Some evidence for the correctness of this hypothesis comes from the analysis of acquisition data of a Swedish child by Bohnacker (1996).
\textsuperscript{4}This is also suggested by Demuth (2000).
Appendix A

CHAT Symbols for Transcriptions

Obligatory headers

@Begin  marks the beginning of a file
@End    marks the end of the file
@ID:    code for a larger database
@Participants: lists actors in a file

Constant Headers

@Age of XXX: marks a speaker’s age
@Birth of XXX: shows date of birth of speaker
@Coder: people doing transcription and coding

Changeable Headers

@Date: date of the interaction
@Location: geographical location of the interaction
@New Episode: point at which a new episode begins and old one ends
@Situation: general atmosphere of the interaction

Words

@ special form markers
xxx unintelligible speech, not treated as a word
xx unintelligible speech, treated as a word
www untranscribed material
& phonological fragment
[?] best guess
text(text)text noncompletion of a word
Appendix A. CHAT Symbols for Transcriptions

Special Utterance Terminators

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+...</td>
<td>trailing off</td>
</tr>
<tr>
<td>+..?</td>
<td>trailing off of a question</td>
</tr>
<tr>
<td>+/-</td>
<td>interruption</td>
</tr>
<tr>
<td>+/?</td>
<td>interruption of a question</td>
</tr>
<tr>
<td>+//</td>
<td>self-interruption</td>
</tr>
<tr>
<td>+//?</td>
<td>self-interruption of a question</td>
</tr>
<tr>
<td>+/-</td>
<td>quotation follows on next line</td>
</tr>
<tr>
<td>+</td>
<td>quotation precedes</td>
</tr>
<tr>
<td>+&lt;</td>
<td>quoted utterance follows</td>
</tr>
<tr>
<td>+</td>
<td>lazy overlap marking</td>
</tr>
</tbody>
</table>

Scoped Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[=! text]</td>
<td>paralinguistics, prosodics</td>
</tr>
<tr>
<td>[!]</td>
<td>stressing</td>
</tr>
<tr>
<td>[!!]</td>
<td>contrastive stressing</td>
</tr>
<tr>
<td>[</td>
<td></td>
</tr>
<tr>
<td>[= text]</td>
<td>explanation</td>
</tr>
<tr>
<td>[: text]</td>
<td>replacement</td>
</tr>
<tr>
<td>[0 text]</td>
<td>omission</td>
</tr>
<tr>
<td>[=x text]</td>
<td>translation</td>
</tr>
<tr>
<td>[=? text]</td>
<td>alternative transcription</td>
</tr>
<tr>
<td>[%xxx: text]</td>
<td>dependent tier on main line</td>
</tr>
<tr>
<td>[% text]</td>
<td>comment on main line</td>
</tr>
<tr>
<td>[$text]</td>
<td>code on main tier</td>
</tr>
<tr>
<td>[?]</td>
<td>best guess</td>
</tr>
<tr>
<td>[&gt;]</td>
<td>overlap follows</td>
</tr>
<tr>
<td>[&lt;]</td>
<td>overlap precedes</td>
</tr>
<tr>
<td>&lt;text&gt; [&lt;&gt;]</td>
<td>overlap follows and precedes</td>
</tr>
<tr>
<td>[&gt;number][&lt;number]</td>
<td>overlap enumeration</td>
</tr>
<tr>
<td>[/]</td>
<td>retracing without correction</td>
</tr>
<tr>
<td>/[]</td>
<td>retracing with correction</td>
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<tr>
<td>[///]</td>
<td>retracing with reformulation</td>
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Dependent Tiers

<table>
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<tr>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>%act:</td>
<td>actions</td>
</tr>
<tr>
<td>%add:</td>
<td>addressee</td>
</tr>
<tr>
<td>%alt:</td>
<td>alternative transcription</td>
</tr>
<tr>
<td>%com:</td>
<td>comments by investigator</td>
</tr>
<tr>
<td>%exp:</td>
<td>explanation</td>
</tr>
<tr>
<td>%gls:</td>
<td>target language gloss for unclear utterance</td>
</tr>
<tr>
<td>%sit:</td>
<td>situation</td>
</tr>
</tbody>
</table>
Dependent Tiers Special Codes

\(<\text{bef}>\) occurence before an utterance
\(<\text{aft}>\) occurence after an utterance
Bibliography


