Production of Articles and Monosyllabic Prepositions in Early Child English:
a Prosodic Account

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Abstract

Children tend to omit functional categories in early language. The present thesis considers the production of such function words as articles and monosyllabic prepositions in child English. The analysis is conducted within a framework of the prosodic account. The development of early articles has received a lot of attention in the literature, while monosyllabic prepositions have not been discussed in detail in previous studies of child English. To examine the issues, spontaneous speech productions of one English child are investigated from the age of 1;10.06 to 2;6.04. The data are drawn from the Manchester corpus in CHILDES. The study reveals that the child's early articles in footed contexts are realized at a higher rate than those in unfooted contexts. The footed contexts for the following article present a Sw trochaic foot where the article constitutes a weak syllable, while in the unfooted contexts the article falls outside a Sw trochaic pattern typical for English. The results also show that monosyllabic prepositions in nonfinal sentence positions appear to constitute a stressed syllable in the child's speech. That is supported by the following. In an indirect analysis of article realization in PPs with monosyllabic prepositions, the latter was compared to the realization of articles in straightforward footed and unfooted contexts. The production of articles in the contexts with monosyllabic prepositions showed similar development as that in the other footed contexts. The production of monosyllabic prepositions investigated on their own reveals a high proportion of realizations of the latter in both footed and unfooted contexts. The current study presents evidence for the influence of phonological factors on the production of articles and monosyllabic prepositions in child English, thereby supporting the prosodic account of acquisition of functional categories in early language.

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1. INTRODUCTION

Development of functional categories in child language has received a lot of attention in the literature since Brown's (1973) influential work on the "telegraphic quality" of early speech. Children tend not to realize function words such as determiners, prepositions, pronouns or inflectional endings in early language. Several accounts of children's early production of functional categories have been proposed. Some researchers assume that children fail to surface functional categories due to the immature character of early syntax (e.g., Radford 1990; Guilfoyle and Noonan 1992). Other studies argue that early production of function words can be explained in terms of processing factors such as sentence length (e.g.,Valian 1991). However, some scholars provide evidence that children have knowledge of functional categories even though the latter generally fail to be realized in early speech until a certain age (e.g., Demuth 1992; Hyams 1992). It has also been proposed that prosody can explain children's early production of functional categories occurring in particular phonological contexts (e.g., Gerken 1991, Lleó and Demuth 1999; Demuth and McCullough 2009).

The present thesis attempts to consider the prosodic account of the production of such functional categories as articles and monosyllabic prepositions in child English. The prosodic account of children's article development has been presented in some previous studies of early English. However, it has only been assumed in the previous research that monosyllabic prepositions appear in the strong form in the speech of young English learners. Since early monosyllabic prepositions have not been considered in detail so far, it is interesting to examine them more thoroughly in the current study.

The purpose of the present thesis is to investigate whether articles in footed contexts are realized more frequently in comparison to unfooted contexts in early child English. In addition, the aim is also to analyze the status of monosyllabic prepositions in children's early speech. The footed contexts for the following article present a Sw trochaic foot where the article constitutes a weak syllable, while in the unfooted contexts the article falls outside a Sw trochaic pattern typical for English. Being an unstressed functional category in adult English, monosyllabic prepositions such as *at, in, on, etc.* tend to be reduced in certain sentence positions. This leads to the fact that

monosyllabic prepositions can be susceptible to omission in early child language. The present thesis investigates a developmental path and the prosodic character of monosyllabic prepositions in child English.

The study has revealed that, indeed, a larger amount of the child's early articles is realized in footed contexts as opposed to unfooted ones. The findings in the present thesis also provide evidence for the fact that monosyllabic prepositions receive the status of being a stressed syllable in early child language. That is supported by the following. The realization of articles in PPs with monosyllabic prepositions has shown a similar development as that in the footed contexts. The production of monosyllabic prepositions investigated on their own reveals a high proportion of realizations of the latter in both footed and unfooted contexts.

The data for the present thesis are drawn from CHILDES (Child Language Data Exchange System; MacWhinney and Snow 1990). Spontaneous speech productions of an English child, Warren, from the Manchester corpus are analyzed from the age of 1;10.06 to 2;6.04. The child's utterances are coded with respect to phonological contexts where articles and monosyllabic prepositions are either realized or omitted. In order to account for whether the child treats monosyllabic prepositions as footed or unfooted contexts for the following article an indirect analysis is conducted. The realization of articles in straightforward footed and unfooted contexts is compared to the production of articles in PPs with monosyllabic prepositions. The realization of articles in the PPs with monosyllabic prepositions has shown a similar development as that in the footed contexts.

The thesis is organized as follows. Chapter 2 presents an overview of the theoretical background where the central aspects of Prosodic Phonology are fundamental in the prosodic account of the production of early function words. Chapter 3 discusses previous studies on the prosodic account of children's article production in English and cross-linguistically. Chapter 4 is concerned with the issues of data and methodology for the present investigation. In chapter 5, the data will be examined and the findings from the current study will be presented. The theoretical discussion of the results is offered in chapter 6. Finally, the thesis ends with a brief summary and conclusion in chapter 7.
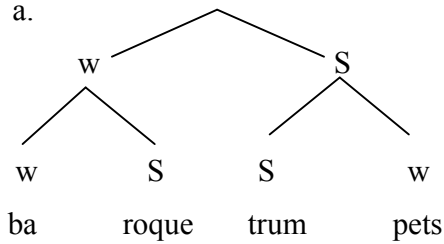
2. THEORETICAL BACKGROUND

The aspects of Prosodic Phonology are presented in this chapter. The essential proposal of Prosodic Phonology is to organize prosodic constituents in a hierarchy. The current representation of the Prosodic Hierarchy (PH) that was originally developed in the work of Selkirk (1981) is outlined in section 2.2. The Strict Layer Hypothesis (SLH) that imposes restrictions on the PH is discussed in the same section. The constraints on prosodic structure defined in terms of the PH are introduced in section 2.3. Section 2.4 considers the prosodification of function words. The focus is made on the discussion of the structure of nonfinal function words in English. Section 2.5. provides some evidence from English prosody with respect to stress patterns in the language. The chapter ends with a brief summary.

2.1. Prosodic Phonology

Prosodic Phonology provides a view of prosodic structure that is represented as a hierarchy of prosodic constituents. This line of research was developed by Selkirk (1981). The proposal was further extended by Nespor and Vogel (1986) and Hayes (1989). Nespor and Vogel (1986: 6) claim that "Prosodic Phonology is a theory of phonological domains. That is, a theory that organizes a given string of language into a series of hierarchically arranged phonological constituents that in turn form the contexts within which phonological rules apply."

The first tendency towards the development of Prosodic Phonology appears in Liberman (1975) and Liberman and Prince (1977), when it was realized that phonological domains have a hierarchical organization. Being a property of syllables, stress also presents a hierarchically arranged structure that organizes syllables, words and syntactic phrases in a sentence. The metrical theory deals with the assignment of prominence on phonological constituents. Prominence can be represented by a tree (1a) or a grid (1b). According to Liberman and Prince (1977), every branching node in (1a) dominates one element that is strong (S) and others are weak (w). The current prosodic representation of weak and strong syllables in a sentence is illustrated in section 2.2. In the grid representation (1b), prominence in the phonological constituents is shown by the height of marks. The examples are as follows (Dresher, 1996: 48):

(1) a.

```
              /\
          w  /  \  S
         /\      /\
        w  S    S  w
       ba roque trum pets
```

b.

```
                        *
              *         *
              *         *
        *     *    *    *
       ba  roque  trum pets
```
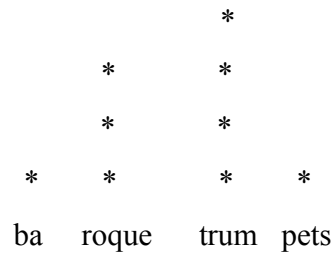
As an elaboration to the theory of Liberman (1975) and Liberman and Prince (1977), Selkirk (1981) develops a theory of phonological representation arguing that an utterance has a suprasegmental hierarchical organization. This hierarchical organization is referred to as the prosodic structure where prosodic categories represent the nodes of the tree. These prosodic categories are the syllable, the foot, the prosodic word, the phonological phrase, the intonational phrase and the utterance. The prosodic categories above form the Prosodic Hierarchy (Selkirk 1980, 1981; Nespor and Vogel 1986; Hayes 1989). The next section provides an insight of the structure of the Prosodic Hierarchy.

2.2. The structure of the Prosodic Hierarchy

As it was mentioned in the previous section, there is a hierarchy of prosodic categories, so that lower constituents are dominated by higher constituents. For instance, the syllable is dominated by the foot, which, in turn, is dominated by the prosodic word and so on. The terms for higher constituents can be used interchangeably such as in "phonological word" and "prosodic word" (cf. Gussenhoven and Jacobs 1998). Consider the current representation of the Prosodic Hierarchy given in Itô and Mester (in press), where the abbreviations are adapted from Selkirk (1996: 190) in the present study:

(2)   ʋ   Utterance (Utt)

        |

        ɩ   Intonational phrase (IP)

        |

        Φ   Phonological phrase (PPh)

        |

        ω   Prosodic word (PWd)

        |

        F   Foot (Ft)

        |

        σ   Syllable (σ)
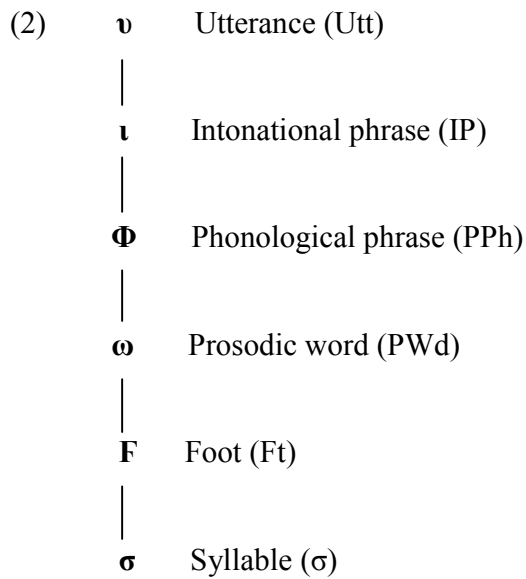
The prosodic categories outlined above can be reviewed in the following way. The <u>utterance</u> represents the highest unit in the prosodic structure. Several intonational phrases can be dominated by one utterance. The <u>intonational phrase</u> is a category that consists of a sequence of words or phrases and provides a sentence with an intonational contour or melody. The next prosodic constituent that is immediately contained within the intonational phrase is the <u>phonological phrase</u>. The latter consists of one or more words. The phonological phrase, in a stressed-timed language such as English, has an influence on rhythmic structuring and pauses in the sentence (cf. Selkirk 1981, 1984).

The <u>prosodic word</u> immediately dominates the foot. The syllable, the foot and the prosodic word represent the simple stem in English. With respect to the prosodic word, <u>clitics</u> tend to present a problematic issue in phonology. Some researchers (Hayes 1989; Nespor and Vogel 1986) suggest that the clitic group (CG) should be included in the Prosodic Hierarchy, between the phonological phrase and the prosodic word. Consequently, this leads to the fact that clitics are stressed while their main feature is being an unstressed element (Jensen 1993). Regarding the fact that prosodic words contain feet which always consist of a stressed syllable, it follows that the clitic group should bear stress as well. But this is not the case with clitics. In this respect, the clitic group is tempted to be eliminated from the Prosodic Hierarchy. One more reason to the fact that the CG is

excluded from the hierarchy is a redundant character of this constituent. The CG can directly mirror the lower prosodic word level, as in (3) (Vogel, 2009: 65):

(3)　CG　　CG　　CG　　CG　　CG
　　　|　　　|　　　|　　　|　　　|
　　　PWd　PWd　PWd　PWd　PWd
　　　Large　green　ideas　sleep　fast
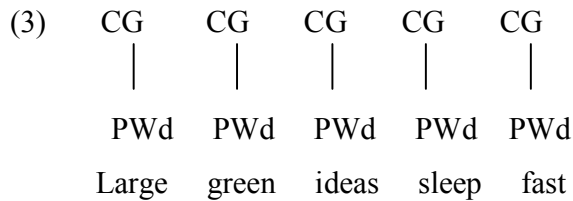
In the current study, the representation of the Prosodic Hierarchy does not include the clitic group. A variety of prosodic clitic structures of function words in English will be discussed later in section 2.4.

The <u>foot</u> is the prosodic unit that immediately precedes the syllable. Feet can be of two basic types – monosyllabic (4a) and bisyllabic (4b). The two syllables of the bisyllabic foot are always in a Sw pattern in English (Selkirk, 1980: 570):

(4) a.　F　　　　　b.　　F
　　　　|　　　　　　　╱╲
　　　　σ　　　　　　σ$_S$　　σ$_w$
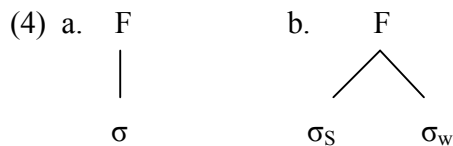
In English, as a stressed-timed language, stressed syllables occur at equal time intervals. Assuming that, the foot seems to receive a significant status in the prosodic structure of English (see Griegerich 1992). The weak syllable of the foot is called a stressless syllable (4b). The strong syllable of the bisyllabic foot (4b) and the syllable of the monosyllabic foot in (4a) are supposed to be stressed syllables. Feet can be divided into two groups with respect to the position of the head, i.e., the stressed element, inside the foot. Iambs are those feet where the final syllable is stressed (the foot is right-headed). Trochees are feet where the initial syllable is stressed (the foot is left-headed). Hayes (1995: 80) proposes the *Iambic/ Trochaic Law*:

(5)　a. "Elements contrasting in intensity naturally form groupings with initial prominence.
　　　b. Elements contrasting in duration naturally form groupings with final prominence."

The <u>syllable</u> is the basic unit in the prosodic hierarchy. Certain phonological rules are applied at the level of the syllable depending on whether the latter occurs in a final or initial position. The syllable has its own internal hierarchical structure (cf. Selkirk 1981, 1984). The syllable node first branches into the onset and the rime where the latter is further divided into the nucleus and the coda. The obligatory constituents in the syllable are the rime and the nucleus. The syllable structure is illustrated below (Zec, 2007: 177):

(6)

```
              σ
            /   \
        Onset    Rime
                /    \
           Nucleus    Coda
```
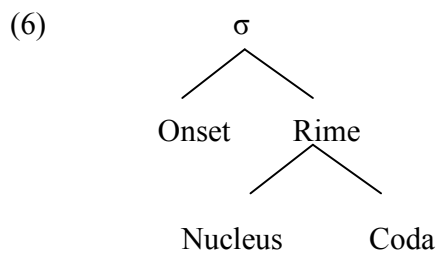
Syllables are often classed as light or heavy. In heavy syllables, the rimes contain a long nucleus (e.g., [iː] in *increase*), a diphthong (e.g., [aɪ] in *reply*) or a coda (e.g., [n] in *agenda*, [n] in *recommend*). Neither a long syllable nor a coda is present in the light syllables (e.g., [gre] in *aggregate*) (see the examples in Roca and Johnson, 1999: 353). Syllable weight is expressed by moras. Two moras define a heavy syllable, which is also called a bimoraic syllable (7b), and one mora characterizes a light syllable, also known as a monomoraic syllable (7a). The examples in (7) show the syllable structures of *gre* in *aggregate* and *gen* in *agenda* (Roca and Johnson, 1999: 363):

(7) a. σ   b.   σ

         R   R

         N   N

         μ   μ   μ

       g   r   e   g   e   n
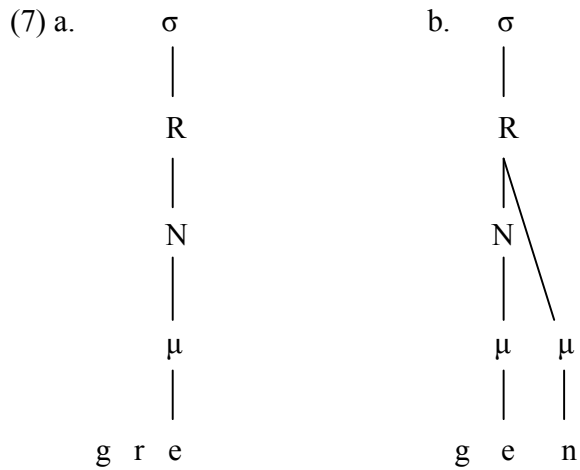
In (8), there is an example of an English sentence that has been parsed into the prosodic constituents described above. The example is taken from Gussenhoven and Jacobs (1998: 217) who give an illustration of the utterance (υ), the intonational phrase (ι), the phonological phrase (Φ) and the prosodic word (ω). In the present study, the example is further constructed to two lower constituents that are the foot (F) and the syllable (σ).

(8)

			Utterance
υ			
ι		ι	Intonational phrase
Φ	Φ	Φ	Phonological phrase
ω ω	ω	ω	Prosodic word
F F	F	F	Foot
σ σ σ σ	σ σ	σ σ σ	Syllable
Ma ny pu pils	were slow	to res pond	
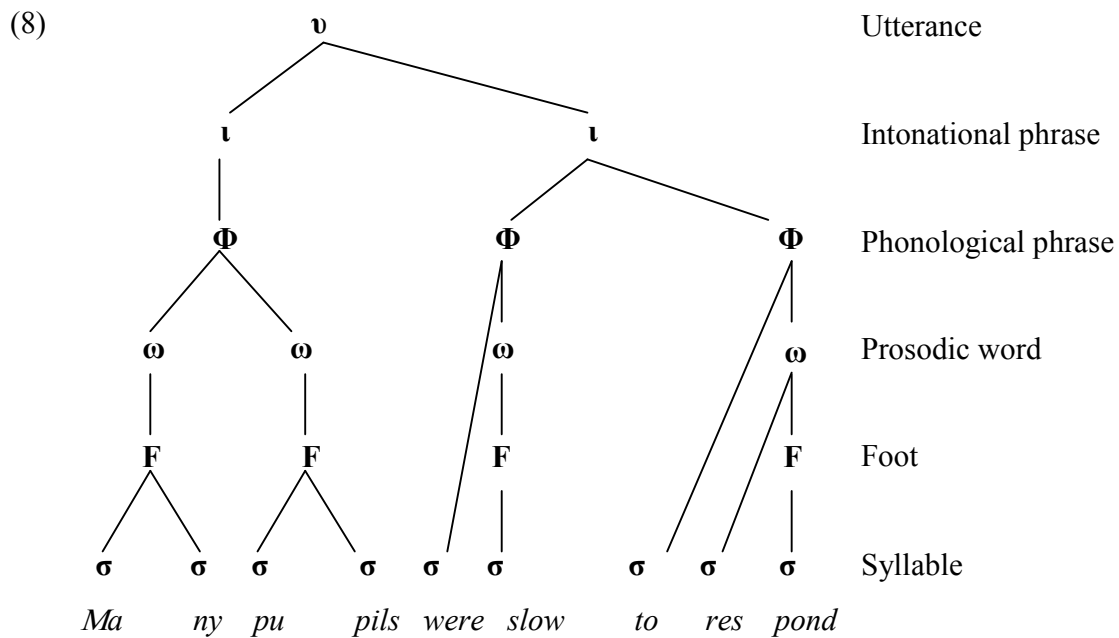
The function words *were* and *to* are immediately dominated by the phonological phrase (Φ) according to the prosodic representation of non-phrase-final function words in English given in

Selkirk (1996). The prosodification of function words in English will be further discussed in section 2.4. In comparison to the foot representation in Liberman and Prince (1977) (section 2.1.), the weak syllable of *respond* in (7) is not integrated in the foot and is, therefore, attached directly to the prosodic word (ω) under the current view.

The constituents in the Prosodic Hierarchy are supposed to obey the **Strict Layer Hypothesis (SLH)**. Selkirk (1984: 26) formulates the principle as follows."*A category of level **i** in the hierarchy immediately dominates a (sequence of) categories of level **i-1**. (Assuming syllable to be level 1, the others will be levels 2, ..., n).*" The original view of the SLH has been challenged in the current literature (e.g., Vogel 2009). The fact will be further discussed in section 2.3. The hierarchy of prosodic categories has given rise to the development of phonological constraints on prosodic structure. These constraints are defined in the following section.

2.3. Constraints on prosodic structure

Prosodic Phonology assumes the properties of constraints on representation defined in Optimality Theory (McCarthy and Prince, 1993). Optimality theory (OT) is a constraints-based approach that plays a central role in the understanding of phonological processes. The main idea of OT is that constraints are ranked in a hierarchy of relevance. Constraints that are ranked lower can be violated in order to satisfy the constraints that have a higher ranking. But this violation should be minimal. Interlinguistic variation in the ranking of constraints depends on the grammars of particular languages. The best candidate from the candidate set produced by the function Gen is considered according to a general understanding of structural well-formedness in a certain language. Regarding the principles of constraint interaction in OT, certain fundamental constraints on prosodic domination are defined in terms of the Prosodic Hierarchy (Selkirk, 1996: 190):

(9) *Constraints on Prosodic Domination*

    (where C^n = some prosodic category)

(i) *Layeredness*   No C^i dominates C^j, j > i,

   e.g., "No σ dominates a Ft."

(ii) *Headedness*   Any C^i must dominate a C^{i-1} (except if C^i = σ),

   e.g., "A PWd must dominate a Ft."

(iii) *Exhaustivity*   No C^i immediately dominates a constituent C^j, j < i -1,

   e.g., "No PWd immediately dominates a σ."

(iv) *Nonrecursivity*   No C^i dominates C^j, j = i,

    e.g., "No Ft dominates a Ft."

The constraints on prosodic domination describe the prosodic nature with respect to the Strict Layer Hypothesis (Selkirk 1984, section 2.2.). As mentioned in the previous section, the SLH can be challenged. According to the SLH, the structures in (10a) are well-formed, but those in (10b) are not (Vogel, 2009: 68):

(10)   a. *Well-formed structure*   b. *Ill-formed structures*
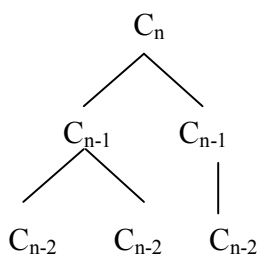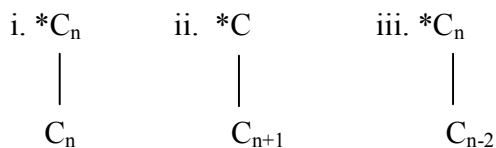
Such constraints as *Layeredness* and *Headedness* seem to be inviolable across languages, thereby presenting the essence of the SLH. In contrast, it has been observed that *Exhaustivity* and *Nonrecursivity* can be violated (cf. Selkirk 1996; Vogel 2009). The examples in (10bi) and

10

(10bii) present recursive structures. The structure in (10bi), where a constituent is contained within another constituent of the same level, is registered in some phonological representations. It has been proposed that such structures should be allowed by the SLH (cf. Peperkamp 1997; Ladd 1996). The structure in (10biii), where a constituent dominates a constituent that is two levels lower, was also proposed to be permitted by the SLH (e.g., Kabak and Vogel 2001). The description of the prosodic structure of function words in English gives additional evidence for the fact that Exhaustivity and Nonrecursivity are constraints that can be violated (see Selkirk 1996). It will be discussed more in the next section. Based on the findings that violation of Exhaustivity and Nonrecursivity has been attested in some phonological representations, Vogel (2009: 69) proposes some changes to the SLH: "*Prosodic constituents may dominate items more than one level lower in the hierarchy.*" This universal is suggested in order to solve the problems with the original view of the SLH (section 2.2.) at the same preserving the main insights of the latter.

The constraints on prosodic domination presented above refer to one class of the constraints on prosodic structure. There is another set of constraints that are called alignment constraints. The latter can capture the relation between the syntactic and prosodic structures. The constraints on alignment of edges of constituents require that the right (left) edge of the syntactic word coincides with the right (left) edge of the prosodic word. Consider the edge-based theory of the syntax-prosody interface in Selkirk (1996: 191):

(11) Right/ Left edge of α $\longrightarrow$ edge of β,

    α is a syntactic category, β is a prosodic category

The constraints on alignment of constituent edges can describe differences in the syntactic and prosodic structures in the target language. In the present thesis, both the constraints on prosodic domination and edge-alignment constraints will be mentioned in the discussion of articles and monosyllabic prepositions in child English.

2.4. The prosodic structure of function words

The discussion of the prosodic structure of function words in this section is based on Selkirk (1996). Function words such as prepositions, articles, personal pronouns have different qualities in comparison to lexical words. The former can appear in either a stressed or a stressless/ reduced form depending on the position in the sentence, while the latter always occur as a stressed form. The representation of function words as clitic structures will be discussed in subsection 2.4.1. In subsection 2.4.2., more focus is made of the prosodification of function words in nonfinal positions in English.

2.4.1. Prosodic clitic structures

It has been claimed that a sentence consisting of lexical words in a syntactic structure has the same representation of prosodic words in a phonological structure. Consider this in the examples below (Selkirk, 1996: 188):

(12) a. *Syntactic structure* [Lex Lex]

b. *Prosodic structure* $((lex)_{PWd}$ $(lex)_{PWd})_{PPh}$

In contrast, the prosodification of function words in English is not so straightforward. They can be prosodified as a prosodic word or one of the three types of prosodic clitics. Presenting a prosodic word, the function word appears in a stressed unreduced form and, therefore, has the status of a head of a foot. Unstressed function words have properties of weak forms. Hence, they cannot be prosodified as prosodic words and present unstressed prosodic clitics. The prosodic organizations of function words are illustrated below (Selkirk, 1996: 188):

(13) **Prosodic Word:** $(\ (fnc)_{PWd} (lex)_{PWd}\ )_{PPh}$

   Prosodic Clitics:

  (a). *free clitic* $(fnc\ (lex)_{PWd}\ )_{PPh}$

  (b). *internal clitic* $((fnc\ lex)_{PWd}\ )_{PPh}$

  (c). *affixal clitic* $((fnc\ (lex)_{PWd}\ )_{PWd}\ )_{PPh}$

The representations in (13) can be schematized as follows (Selkirk, 1996: 196):

(14)   a. *free clitic*   b. *internal clitic*   c. *affixal clitic*   d. *prosodic word*

Φ   Φ   Φ   Φ

σ   ω   ω   ω   ω   ω

fnc   lex   σ   σ   ω   σ

                fnc   lex   fnc   lex   fnc   lex
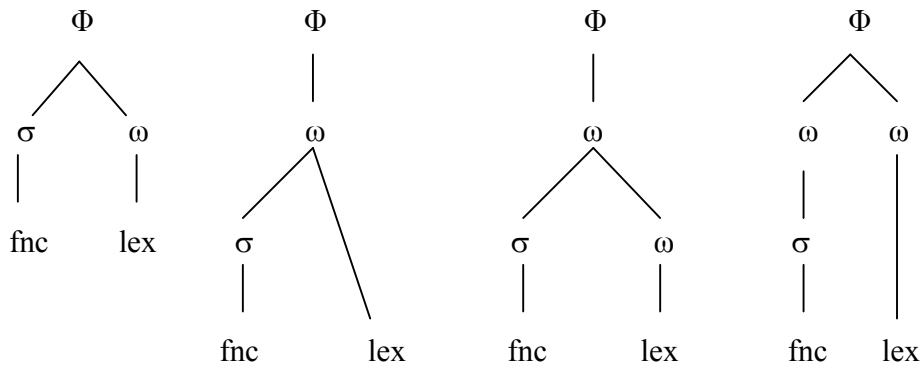
The four types of function word representation illustrated above result from different input structures. Function words in English present *strong forms* and have similar properties as lexical items appearing in the following contexts (Selkirk, 1996: 193 – 194):

- *In isolation* (e.g., for [fər], at [æt], can [kæn])
- *Focused* (e.g., Bettina CAN speak, but refuses to.)
- *Phrase-final* (e.g., I can eat more than Sara *cán.*)

Function words appear as *weak forms* in the following contexts (ibid.: 194):

- *Nonfocused* (e.g., fõr [fr] - for Timothy; ăt [ət] – at home)
- *Nonfinal* (e.g., Diana *căn* paint *hĕr* portrait *ŏf* Timothy *ăt* home.)
- *When phrase-final but object of a verb or preposition* (e.g., need him [im], [m].)

As shown above, there are different prosodic structures in which a function word may appear. In the present study, the focus is particularly made on Selkirk's description of the prosodic structure of nonfinal weak function words in English.

2.4.2. The structure of nonfinal function words in English

Function words that appear in nonfinal sentence positions constitute weak syllables. The example in (15) illustrates an English sentence where function words present unstressed forms (Selkirk, 1996: 195):

(15) *Bŭt shĕ* found *thăt thĕ* weather *wăs* too hot *fŏr* painting.

The syntactic structure consisting of function and lexical words is shown in (16) (Selkirk, 1996: 196):

(16)
```
            DP
          /    \
        /        NP
      /          |
    Det          N
     |           |
    fnc         lex
    the       weather
```
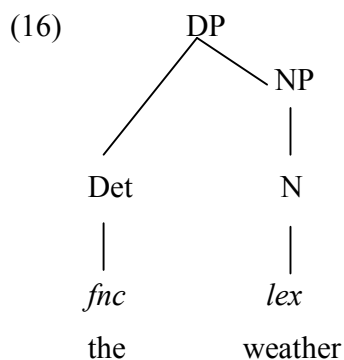
As discussed earlier in subsection 2.4.1., function words in weak forms are prosodified as clitics. Considering the types of clitics in (14), the optimal way to prosodify nonfinal function words in English is *free clitics*. In this case, function words are immediately dominated by the phonological phrase as in (17) (Selkirk 1996: 198):

(17)
```
        Φ
      /   \
    σ       ω
    |       |
    to    London
    a     massage
    her   portrait
```
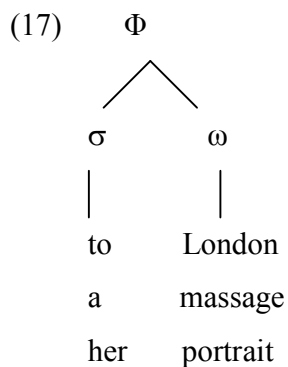
The *prosodic word* (14d) cannot represent nonfinal function words in English. That is due to the fact that it violates the headedness constraint (section 2.3.), where a prosodic word must dominate a foot. Occurring in a nonfinal sentence position, function words are unstressed and cannot constitute a head of a foot. *Affixal clitics* in (14c) imply that function words must initiate a prosodic word which is not the case for the English language. *Internal clitics* in (14b) give no possible representation of English nonfinal monosyllabic function words. According to the structure of internal clitics, both a function and lexical word are dominated by the same prosodic word. That leads to the fact that this combination should demonstrate the same phonological qualities as the lexical word used independently. This is not the case for adult English (cf. Selkirk 1996). However, nonfinal function words in child English tend to be prosodified as internal clitics (e.g., Demuth 2007). This fact will be more discussed in chapter 3.

Constraints on prosodic structure attempt to explain why free clitics are optimal representations of nonfinal function words in English. According to the optimality theory (section 2.3.), constraints are violable but the violation should be minimal. All representations in (13 a-d) seem to violate some constraint. The free clitic violates only the Exhaustivity constraint by attaching directly to the phonological word compared to, for example, the affixal clitic which violates two constraints. Specifically, the latter violates Nonrecursivity, where a prosodic word dominates another prosodic word, and the exhaustivity constraint, where a syllable is directly attached to the prosodic word (cf. Selkirk 1996). To sum up, the prosodic representation of nonfinal function words in English is that of free clitics.

2.5. English prosody

There is a variety of word stress patterns in English. Words are characterized with a main and secondary stress. Regarding the assignment of the main word stress on English nouns and suffixed adjectives, the following algorithm can be used. The last element of the noun should be made extrametrical. That is, the last element is supposed to be excluded from the computations in the metrical grid. The next step is to build a left-headed foot at the right edge. As a result, the main word stress on English nouns tends to be assigned correctly (cf. Roca and Johnson 2004). Consider the example in (18) that illustrates the steps described above (ibid.: 323):

(18)
```
                                         *
    *  * * *        *  * *<*>       * (* *)<*>
    asparagus ──→ asparagus ──→ asparagus
```

As shown in (18), the last extrametrical syllable is not taken into account. All the syllables are marked with a certain prominence. Building a left-headed foot at the right edge, the syllable *pa* constitutes a strong syllable of the Sw trochaic foot in English. This syllable gets the most prominence in the word and is supposed to be the main stress in the given noun.

The pattern of the main stress assignment illustrated above fails to hold for verbs and unsuffixed adjectives in English. In order to get the correct result in this case, extrametricality should be ignored. That is, the last element of the word is supposed to be included in the computations in the metrical grid. Otherwise, the assignment of the main word stress in verbs and unsuffixed adjectives should follow the same steps as described for nouns and suffixed adjectives. Consider the example below (see Roca and Johnson, 2004: 334):

(19)
```
                         *
    *  * *        *  (* *)
    implicit ──→ implicit
```

Secondary stresses, i.e., additional peaks of prominence, apply to multisyllabic words such as *hamamelidanthemum, pelargonium, hippopotamus, etc*. In the procedure of a secondary stress assignment, the last extrametrical syllable is excluded from the computations. According to English rhythm, an alternation of Strong and weak elements occurs repeatedly in words. Hence, the left-headed foot is built not just at the right edge but throughout the whole multisyllabic word from right to left. In example (20), the syllables *hi* and *po* present Strong syllables, thereby supporting foot heads. In keeping with End Stress which enhances the right-most element in the metrical grid in English, the syllable *po* receives more prominence than *hi*. Thus, the former receives the main stress, while the latter is assigned a secondary stress in the word (see Roca and Johnson, 2004: 336):

16

(20)
```
                                                *
                               *             *    *
        *  *  *  *< *>      *   *(* *)<*>    (* *)(* *)<*>
     hippopotamus  ──→   hippopotamus  ──→   hippopotamus
```

Different patterns of stress alternation can appear in a rhythmic organization of speech. The phenomenon of stress shift seems to be quite frequent in English. This phenomenon is sometimes referred to as the Rhythm Rule (see Liberman 1975; Liberman and Prince 1977). The latter occurs only when two stressed syllables of the same stress level are adjacent, thereby presenting a so-called stress clash. Consider the following examples (Selkirk, 1984: 46):

(21) Dúndèe mármalàde

ánaphòric reference

The proper noun *Dùndée* has a different stress pattern in isolation. That is, the main stress falls on the final syllable of the proper noun in isolation, whereas in the collocation with another word the main stress shifts backward to the initial syllable as shown in (21). The adjective *ànaphóric* has the main stress on the syllable *pho* when pronounced in isolation. In the context with another word as that in (21), the main stress retracts to the initial syllable. By shifting the stress that is adjacent to another stress of the same level backward, the stress clash is avoided (see Selkirk 1984).

English tends to resist a stress clash as much as it avoids a rhythmic lapse. The latter involves a sort of arhythmicity where a sequence of weak syllables is not punctuated by any Strong syllable. In order to avoid lapses, the rhythmic organization of a language introduces secondary word stresses which give a regular alternation pattern to the speech (cf. Selkirk 1984).

2.6. Summary

The chapter has presented an outline of the issues in Prosodic Phonology. The constituents in the prosodic structure are organized in the Prosodic Hierarchy, as shown in section 2.2. In terms of this hierarchy of prosodic units, certain essential constraints on prosodic structure are defined in section 2.3. The constituents in the PH as well as the constraints on prosodic structure are

supposed to obey the Strict Layer Hypothesis (section 2.2.). In comparison to the original representation of the Strict Layer Hypothesis (cf. Selkirk 1984), Vogel (2009) proposes a slightly weakened version of the SLH. The latter proposes that prosodic units may dominate other prosodic units that are more than one level lower in the Prosodic Hierarchy. Section 2.4. has discussed a variety of prosodic structures of function words depending on different input structures. The prosodification of nonfinal function words in English will be important when discussing the results in the present thesis. Section 2.5. has given an outline of English prosody.

The typology of Prosodic Phonology is fundamental in the prosodic account of the production of function words in child language. The next chapter is primarily concerned with evidence from the prosodic explanation of article production in child language both in English and cross-linguistically.

3. PREVIOUS ACCOUNTS OF CHILDREN'S ARTICLE PRODUCTION

Chapter 3 discusses previous prosodic accounts of the production of determiners in children's language. The structure of the chapter is as follows. Section 3.1. introduces the research based on *rhythmic constraints* on production of early determiners. Under this proposal the determiners that form part of a Sw trochaic foot are more likely to be produced in early child language, while the determiners outside the foot are subjected to omission. The approach mentioned above seems to account primarily for data in stress-timed languages like, for example, English. On the other hand, the approach based on *prosodic constraints* provides an opportunity to consider the development of early articles in morphologically rich languages such as Spanish as well as cross-linguistically. This account appeals to higher levels of the Prosodic Hierarchy and examines how early children's utterances can be prosodically constrained (section 3.2. and 3.3.). Section 3.3. also provides an outline of recent research on article production in early child language. The focus is particularly made on the use of footed and unfooted articles in child English. The former present part of a Sw trochaic foot, while the latter occur outside the Sw trochaic pattern typical for the English language.

3.1. Rhythmic constraints on production

The first studies on the prosodic account of children's article production appeared in Gerken (1991), Gerken and McIntosh (1993) and Demuth (1994). The research was primarily aimed at explaining how certain stress patterns in English can account for the variability found in the child language.

English-speaking children tend to include stressed syllables in their speech production, while they are more likely to omit certain unstressed syllables. Demuth (1994: 127) schematizes four conditions with strong-weak and weak-strong stress patterns (S=strong, w=weak) and gives corresponding English examples in (1) below. The unstressed syllables susceptible to omission are underlined and a binary-branching foot is shown in the brackets.

(1) Stressed monosyllabic foot   [S]   ball

    Trochaic foot   [S w]   dolly

    Iambic foot   [<u>w</u> S]   <u>the</u> ball

    Trochaic foot + pre-tonic syllable   <u>w</u> [S w]   <u>the</u> dolly

These patterns demonstrate that determiners mostly represent weak syllables that tend to be omitted in early speech. In case determiners constitute the weak syllable of a trochaic foot, they are more likely to surface in children's speech. Under the current approach the notion of iambic feet is not used in describing the prosodic structure of a language with a Sw trochaic pattern. What is called a pre-tonic syllable and a weak syllable of the iambic foot in (1) is defined as unfooted syllables in the current view, i.e., the syllables outside a Sw trochaic foot. The weak syllable inside the Sw trochaic foot in (1) is called a footed one.

In order to account for omissions and variability in children's early production of functional categories, a Metrical Model of Production was introduced. It makes certain predictions about which syllables children will be most likely to produce in early speech, and which syllables are most likely to be deleted in children's early language. The outline of the model (Demuth 1994: 131) is shown in (3) below:

(2) a." The stressed syllables of a word are most likely to be retained

    b. The unstressed syllables of a prosodic word are most likely to be omitted or reduced

    c. The unstressed syllables that fall within a foot are more likely to be retained than extrametrical syllables."

The influence of certain positions of weak syllables on early speech production was investigated in children's subjectless sentences (Gerken 1991). While both subject and object pronouns are unstressed, only the former fail to surface in children's early utterances. Using the terminology as that in (1), the fact was explained in the following way. The pronominal subjects tend to be weak syllables of iambic feet and therefore are more frequently subjected to omission than objects. The same pattern applies to article production in early speech. That is, children are prone to omit

articles that constitute a weak syllable in the iambic foot. The fact just mentioned is demonstrated in the examples in (3). Children are more likely to omit articles from weak syllables in iambic feet (such as the object (3a) and subject articles (3b)) than from weak syllables in trochaic feet (such as in (3c)) (Gerken, 1991: 437):

(3) a. she KISSED + the DOG
   b. the DOG + KISSED her
   c. PETE + KISSED the + DOG

The foot structure is identified differently today. In example (3a), the object article is expected to be included in the foot, while the subject pronoun is unfooted. It should be noted that the previous view (Gerken 1991; Demuth 1994) made a wrong prediction with respect to the article production in (3a) above. Since the article in (3a) is a footed one, it is more likely to be realized in child English. In (3b), the subject article in is unfooted and is more likely to be omitted. The object article in (3c) is footed and tends to be produced in children's speech.

The observations of prosodic effects in early English were expanded in Gerken (1996). Children tend to omit object articles that are unfooted in prosodic structures. Young children's omissions of the determiner *the* from the object position are illustrated in (4) below. The findings reveal that children omit more articles following a syllabically inflected verb (4b) than a monosyllabic verb (4a) (Gerken, 1996: 688):

(4) a. he KICKS the PIG   b. he CATCHEes the PIG
      | | | | | | | | |
       *   S -------w S-(w)   *   S ------w   * S-(w)

As it can be seen from the examples, in (4b) the verb inflection forms a foot with the verb leaving the following article unfooted. On the other hand, in (4a) the article prosodifies to the verb, thereby achieving the status of being footed. The data presented above illustrate that children are more likely to omit syllables that do not belong to feet in English. These findings will be important for the discussion later in the present thesis.

Santelmann (1998) examines the effects of prosodic structure in another Germanic language, namely Swedish. There are two kinds of determiners in this language, suffixal and prenominal (5), whereas in English only prenomenal determiners are possible. Since Swedish has a Sw trochaic pattern as in English, the production of determiners in the former can be similar to that in the latter. Prenominal determiners in Swedish (5b) falling outside the Sw trochaic foot are expected to be omitted in child speech. On the other hand, suffixal determiners (5a) are more likely to surface in early child Swedish presenting a weak element in the Sw foot (Santelmann, 1998: 652):

(5) a. bil-en   b. en bil

    car-the   a car

It was revealed in the investigations that the percentages of Swedish suffixal determiners produced in the children's speech remained the same during the earlier and the later sessions. This was not the case with prenominal determiners. In the early sessions, very few prenominal determiners were realized in subject positions and there was a large amount of bare nouns. In the later sessions however, this distribution became reversed. Thus, a higher degree of articles production in the later sessions is due to the increase in the production of prenominal determiners (cf. Santelmann 1998).

Unstressed prenominal determiners in utterances with the so-called double definiteness in early Swedish behave in the same way as described in the findings above. In early sessions, a large amount of nouns are produced without the obligatory prenominal determiner. However, the percentage of the prenominal determiners such as in the structures in (6) increases in the later sessions (Santelmann, 1998: 656):

(6) den stora bil-en

    the big   car- the

As illustrated above, the development of Swedish articles can also be interpreted in terms of the Sw production template. Swedish children mostly fail to realize prenominal determiners falling

outside the Sw trochaic foot, while suffixal determiners are produced being the weak syllable of the Sw foot.

The research described in this section gives support for the importance of stressed syllables and feet in the understanding of early omissions. It therefore provides evidence for the prosodic account of children's early omissions. But note that the Sw production template is used to account for languages where binary-branching feet constitute the maximal setting at early stages of phonological development. In the next section, it will be shown that in some languages the maximum amount of structure permitted is more than just a binary foot. It will be demonstrated that the Sw production template fails to explain the development of early determiners in Romance languages such as Spanish.

3.2. Prosodification in the target language

Several studies have reported that determiner production in morphologically rich languages such as Spanish differs from that in Germanic languages (Lleó and Demuth 1999; Demuth 2001; Lleó 2001). Spanish data exhibit 3-syllable productions (wSw) at a very early stage. The language permits the incorporation of early determiners at higher levels of the Prosodic Hierarchy (section 2.2.) much earlier than it is possible in child English. Obviously, the wSw structure of early determiners in Spanish cannot be expected by the Sw production pattern discussed in the foregoing section. On the other hand, the prosodic constraints on production of early articles can explain the wSw development in Spanish.

Quadrasyllabic forms in Spanish consist of two types. It can be either a trisyllabic lexical item plus a determiner (e.g., /la muñéka/ "the doll"), or a disyllabic lexical item plus a disyllabic determiner (e.g., /una amáka/ "a hammock"). These quadrasyllabic forms are supposed to be prosodified as SwSw at the level of the phonological phrase in Spanish. Based on the results in the previous section, the quadrasyllabic forms above are expected to be fully produced in the early language. However, it is not the case found in the actual speech of Spanish children. The data from a child Sofia learning Argentinean Spanish, between the age of 1;8 and 1;9 were examined with respect to syllable omission and the emergence of grammatical morphology in early Spanish (see Demuth 2001). The pattern that tends to be realized in early Spanish is a

trisyllabic wSw form. Furthermore, it is argued that the wSw structure is predicted by the *prosodic constraint account.* The examples of utterances containing the wSw pattern are illustrated below (Demuth, 2001: 12):

(7) *Child*   *Adult Target*

a. [namáka]   /una:amáka/   "a hammock"   (1;8)

b. [amwéka]   /la muɲéka/   "the doll"   (1;9)

In (7a) the indefinite article /una/ is used, while the initial vowel/ syllable is deleted. In contrast, the vowel of the definite article is maintained in (7b) but one syllable from the trisyllabic word /muɲéka/ "doll" is omitted. Applying a typology for prosodic realization of functional words proposed in Selkirk (1996) (section 2.4.), Demuth (2001) claims that Sofia's determiners can take the form of one syllable resulting in the structure that present a foot preceded by a syllable. The representation of the structure in (7b) is shown in (8). *Cl* refers to a prosodic clitic, equivalent to Selkirk's *fnc*:

(8)   ω
          ⟋ ⟍
       Cl   F
        | ⟋⟍
        σ   'σ   σ
       am   *wé*   *ka*
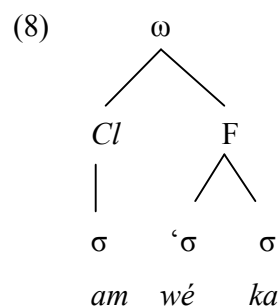
Spanish children seem to have access not only to the level of the prosodic word but also to the phonological phrase. The evidence comes from the structures involving either verbs and their complements or prepositions and their complements. Consider the examples below (Demuth, 2001: 13):

(9) *Child*   *Adult Target*

   a. [elakása]   /en la kása/   'in the house'

   b. [akaása]   /a la kása/   'to the house'

The structures in (9) operate at the level of the phonological phrase. The example of prosodic representation of (9a) is shown below:

(10)

```
                    Φ
                   / \
                  /   \
                Cl     ω
                |     / \
                |    /   \
                |   /     F
                |  |     / \
                σ (σ)  'σ   σ
                e  la  ká   sa
```
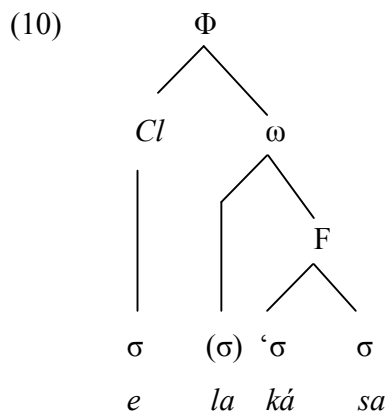
The determiner *la* is a prosodic clitic which prosodifies with the following noun *kása* as part of the prosodic word. The preposition *e* is also prosodified. These examples provide evidence that Spanish children seem to be sensitive to the hierarchical nature of the prosodic representation and have access to higher-level phonological phrases at a very early age.

Lleó and Demuth (1999) compare variation in the development of determiners in Spanish and German in terms of prosodic constraints. Speech productions of Spanish- and German-speaking children were examined at the age of 1;4 to 2;3 years. The essential difference found in the analysis is that the development of determiners in early German tends to be almost half a year later than that in early Spanish. At the age of 1;4 and 1;5 young speakers of Germanic languages produce nouns without a determiner. In contrast, Spanish and Italian (cf. Bottari, Cipriani and Chilosi 1993/ 94) children produce nouns preceded by a "filler" syllable that holds a place for the article, or proto-article (see Lleó 1997). At the one word stage, a high proportion of articles and proto-articles with single nouns are surfaced in the speech of children acquiring a Romance language. At the same time, early Germanic languages are characterized by a few cases of proto-

articles that occur in restricted contexts. German children are more likely to include articles within sentences or longer utterances (cf. Lleó 2001). Reaching the age of about 2;3, articles are produced in a target-like manner irrespective of a language type.

As mentioned previously, Spanish determiners are characterized by an unstressed syllable preceding the lexical word and prosodically cliticized to it. For example, a disyllabic noun preceded by a determiner prosodically represents a trisyllabic word. Thus, the determiner fails to constitute an unfooted syllable in such cases. A *proclitic* nature of determiners in Spanish could be the reason to their early appearance in the language. It can be compared to German where determiners either represent a foot, being produced in full, or they are reduced and are *enclitic* on the preceding word. The examples of proclitic structures in Spanish and enclitic ones in German are illustrated below (Lleó and Demuth, 1999: 414 - 415).

(11) a. [el [`pero]$_{Ft}$]$_{PWd}$ b. [[der]$_{Ft}$]$_{PWd}$ [[Mann]$_{Ft}$]$_{PWd}$

   [la [`pala]$_{Ft}$]$_{PWd}$ [[[noch]$_{Ft}$]$_{PWd}$ [[ein]$_{Ft}$]$_{PWd}$ [[Kipper]$_{Ft}$]$_{PWd}$]$_{PPh}$

                                           [[[noch] n]$_{Ft}$]$_{PWd}$ [[Kipper]$_{Ft}$]$_{PWd}$]$_{PPh}$

As shown above, Spanish children operate at higher levels of the Prosodic Hierarchy such as the prosodic word and phonological phrase. This fact involves a violation of the exhaustivity constraint (section 2.3.) which initially tends to be highly ranked in children's speech. However, Spanish children can produce articles by violating this constraint (cf. Demuth 2001; Lleó and Demuth 1999; Lleó 2001). German children perceive this constraint at a higher ranking and it therefore cannot be violated in their child language. That is the reason to the fact that early speech of German children fails to produce trisyllabic words or nouns with determiners. The same pattern applies to English as well. Violation of the exhaustivity constraint begins at the level of the lexical word and it is gradually transferred to the determiner production (Lleó 2001). The distribution of word-shapes in languages can possibly explain the development of determiners. Thus, there is a high frequency of polysyllabic words in the input that children receive from adult Spanish. In this way, young speakers of Spanish can possibly get an early understanding of the exhaustivity constraint violation. This knowledge seems to extend to the production of functional categories in early speech (see Demuth 2001, Lleó 2001). On the other

hand, English children typically hear monosyllabic words in adult speech because of a large set of monosyllabic words in the language (cf. Roark and Demuth 2000). Hence, their early speech is unfamiliar with the violation of the exhaustivity constraint and is restricted to a frequent omission of determiners in certain contexts.

The research shown above demonstrates how the development differs in the Romance and Germanic languages. The understanding of prosodic constraints operating in early child speech as well as prosodification of functional morphemes in the target language can predict the development of functional categories in a certain language.

3.3. Problems and recent research

The recent research provides more evidence that some of the variability found in the production of functional categories in early speech is due to prosodic reasons. The appearance of grammatical function items in children's speech tends to be predictable and systematic. The Prosodic Licensing Hypothesis (Demuth 2007) provides a framework to make expectations about which contexts the functional categories are most likely to surface in children's early speech productions. In other words, the development of early speech is *prosodically licensed.* That is, the first cases of realization of functional categories seem to appear in phonologically unmarked contexts, or contexts phonologically natural and available in child language. In the process of acquisition children gradually begin to produce functional categories in phonologically marked contexts. The Prosodic Licensing Hypothesis accounts for the development of grammatical function morphemes in English as well as cross-linguistically.

The development of early determiners in English is prosodically licensed. English-speaking children are more likely to realize determiners that constitute part of a Sw trochaic foot, typical for the language. Children would show earlier use of articles in footed contexts, i.e., the contexts where the article forms a foot with the preceding word, as opposed to unfooted contexts, i.e., the contexts where the article occurs outside the Sw trochaic foot (Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009). Hence, English early articles first emerge in prosodically unmarked contexts, that is, footed contexts. The target-like article use in phonologically marked unfooted contexts develops gradually over time.

It was registered such cases where early determiners were produced with the same accuracy both in prosodically marked and prosodically unmarked contexts. In the investigation of spontaneous speech productions of English children from the Providence Corpus, one child (Lily) ignored the effects of prosodic contexts on article production (Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009). She produced nearly the same proportion of articles both in footed and unfooted contexts. In the beginning, the child had a reversed pattern early producing more determiners in unfooted contexts than in footed ones. At the age of 2;0.11 the child's production of articles in footed contexts increases and the difference between the two contexts becomes more straightforward. It can be explained in terms of the fact that this child Lily initially perceives her articles as separate prosodic units. Her so-called footed articles do not prosodify to the left in order to form a foot with the preceding word. On the basis of the acoustic analysis it was found that at the age of 2 the child has undergone prosodic reorganization or incorporation of footed determiners. It is the time when Lily begins to produce articles in footed contexts at a higher rate than those in unfooted contexts. The status of unfooted determiners as separate prosodic units remains unchanged in the child's speech (see Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009).
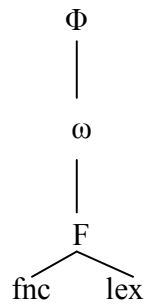
The prosodic character of footed articles in English presents a question. In order to form a foot with the preceding monosyllabic word English early determiners cliticize to the left. The fact creates a mismatch between two representations: the prosodic and syntactic one. For example, the article cliticizes to a monosyllabic verb in the prosodic structure (Verb + Det) at the same time presenting part of a DP in the syntactic structure (Det + Noun). The mismatch can probably to a certain degree explain a difficulty in producing early articles (see Demuth and McCullough 2009).

English early determiners are prosodically represented as *internal clitics* (cf. Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009). In adult English determiners become prosodified at higher levels of the Prosodic Hierarchy, namely, the phonological phrase (cf. Selkirk 1996). Using a typology for prosodic representation of function words (cf. Selkirk 1996, section 2.4.), the structures of internal clitics in child English and free clitics in adult English are illustrated below:

(12) a. Free clitic   b. Internal clitic

```
        Φ                                    Φ
       / \                                   |
      fnc  ω                                  ω
           |                                  |
          lex                                 F
                                             / \
                                           fnc  lex
```
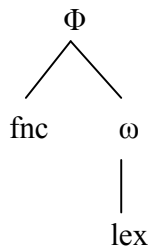
The prosodic licensing of determiners can operate in a language until the age of 2;3 – 2;6 and provide an explanation of variability in article production found in early speech. The fact that early grammatical categories are prosodified as internal clitics holds both in English as well as in other languages, for example, in French (Tremblay and Demuth 2007; Demuth 2007) and probably in earliest Spanish (Demuth 2007). By 1,8 Spanish-speaking children have access to prosodification of determiners as affixal clitics.

As mentioned above, early determiners in French are prosodically licensed appearing first as part of a binary foot and only later as the prosodic word and phonological phrase (see Tremblay and Demuth 2007, Demuth 2007). French has a right-headed iambic foot structure (wS). Being prosodically licensed, early articles in French tend to be initially realized as the first syllable of the iambic foot followed by a noun. The pattern that holds for French is that determiners preceding monosyllabic nouns are realized more frequently than those preceding multisyllabic nouns. The division into footed and unfooted determiners in French is illustrated in (13) (Tremblay and Demuth, 2007: 426):

(13) a. Il attrape (le chat).   b. Il attrape le (chapeau).
       'He catches the cat.'   'He catches the   hat.'

It has been argued that there is no alternative interpretation for the data discussed above. Such a non-linguistic explanation as a word-length effect fails to provide an account for the development of articles in early languages. It can probably be supposed that a large proportion of French determiners realized with monosyllabic nouns is due to the difficulty in producing longer

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utterances in early speech. The non-linguistic explanation completely fails to account for the English data. As mentioned above, determiners in child English prosodify to the left forming a foot with the preceding word. That means that the utterances with footed articles (14a) can be longer to produce than those with unfoooted articles (14b):

(14) a. *Footed articles (Verb + Det +Noun)*   b. *Unfooted articles (Det + Noun)*

     I (got a) (cup of) (tea).   A (cup of) (tea).

Non-linguistic factors do not seem to provide a reasonable explanation for the development of early determiners cross-linguistically (see Demuth 2007; Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009).

The research made on the prosodic licensing of early articles is important in several ways. First of all, the findings described above suggest that variability in the production of early functional categories is systematic and predictable. The production of determiners can be explained in terms of prosodic constraints not only in English but also cross-linguistically. The fact that the Prosodic Licensing Hypothesis holds for many prosodically different languages suggests that the phenomenon should be robust. It confirms the prosodic account of children's early article development.

3.4. Summary

In summary, the chapter has introduced an analysis of the previous research on children's early article production. The development of articles in Germanic languages such as English and Swedish can be interpreted in terms of the Sw production pattern. The early phonological development in these languages is restricted to a binary foot. Thus, determiners falling outside the Sw trochaic foot are subjected to omission. The explanation of early article production given for stress-timed languages like English does not hold for morphologically rich languages as, for example, Spanish. Spanish children seem to be sensitive to the hierarchical nature of the prosodic representations. They begin to produce determiners at a very early stage exhibiting a wSw trisyllabic patterns in speech productions. In order to account for this fact, the interaction of prosodic constraints (Selkirk 1996; section 2.3.) is applied to the explanation. Spanish children

can violate the exhaustivity constraint (section 2.3.) which is highly ranked in child languages. By doing so, Spanish early speech has access to higher levels of the Prosodic Hierarchy (section 2.2.) as the prosodic word and phonological phrase. On the whole, it has been shown that children acquiring a Romance language begin to produce determiners sooner than children acquiring a Germanic language. This fact can be due to the prosodic characteristics of the target language. The high frequency of polysyllabic words in Spanish influences the production of more complex prosodic word structures at an earlier stage of development than in English, Dutch and German.

The recent research presented in the current study has primarily outlined the acquisition of articles in English. The Prosodic Licensing Hypothesis predicts that language learners are more likely to produce articles in prosodically licensed or phonologically unmarked contexts. Footed articles in English represent unmarked contexts that are more likely to surface in early speech than unfooted articles that represent marked contexts. That is, articles that constitute part of a disyllabic Sw foot are produced at higher rates than articles that fall outside the trochaic foot in child English. The prosodic representation of early articles is that of internal clitics. It holds both for English and other languages, such as French and probably earliest Spanish. The overall results have provided support for the fact that early article production may be understood in terms of the prosodic account. The research on the production of English determiners will be essential in discussing results of the investigation in the current thesis.

4. DATA AND METHODOLOGY

This chapter is concerned with data and methodology in the present investigation. Section 4.1. provides a brief presentation of the Manchester corpus used in the current study. Coding of the data is discussed in section 4.2. In the process of coding the production of articles in the child's speech was first examined. The analysis of the child's utterances was made with respect to phonological contexts where *a* or *the* was realized or omitted. The present investigation was broadened by examining the production of monosyllabic prepositions in the child's speech. Some utterances produced by the given child were excluded from the analysis. This is illustrated in 4.2.1. Subsections 4.2.2. and 4.2.3 are concerned with coding of articles in DPs and PPs. Coding of monosyllabic prepositions is carried out in 4.2.4. The chapter ends with a brief summary.

4.1. The corpus

The data examined in the present study are drawn from CHILDES (Child Language Data Exchange System; MacWhinney and Snow 1990). The database provides an opportunity of analyzing spontaneous speech productions of children. The data are taken from the Manchester corpus that consists of recordings from a longitudinal study of 12 English-speaking children between the age of approximately 2 and 3 years. The transcripts used in the present analysis contain the speech of one English child. Warren is a monolingual child that was audiotaped in his home while having normal play activities with toys. The child was recorded from the age of 1;10.06 to 2;9.20. The following format was used for the age: years;months.days as in 1;10.06 for 1 year, 10 months and 6 days. There are 34 files containing Warren's speech in the Manchester corpus. The present study includes 9 files with the following age range of the child:

Warren 1a: age 1;10.06   Warren 15a: age 2;3.02

Warren 4a: age 1;11.04   Warren 18a: age 2;4

Warren 6a: age 2;0.03   Warren 21a: age 2;5.13

Warren 9a: age 2;1.01   Warren 24a: age 2;6.04

Warren 11a: age 2;1.28

4.2. Coding of the data

4.2.1. Exclusions

 To begin with, all the utterances that require a determiner in the adult grammar of English were extracted from the data. The child's sentences where an article is not appropriate in adult-like forms were excluded from the investigation because they provide no useful information for testing the theory in question (e.g., *build towers*; *in bed*; Warren, 1;10.06).

There were some other exclusions made from the analysis of Warren's utterances. The child's utterances that contain ambiguous nouns in the way that they can be interpreted as proper names were not included in the investigation (e.g., *Fat Controller* Warren, 1;10.06; *Old Bear,* Warren 2;5.13). Also excluded were utterances that represent unclear or ungrammatical cases (e.g., *all brick,* Warren 1;10.06; *make a bumpy roads,* Warren 2;1.28; *Mummy monkey,* Warren 2;0.03). The kinship address forms, such as *Mummy, Granddad* were not taken for the analysis. The child's utterances with a missing part preceding a noun and marked as "unknown" in the file were excluded in order to avoid the ambiguity in determining a context (e.g., ***xxx** baby tiger,* Warren 2;4; *got **xxx** hot tea*, Warren 2;3.02; ***xxx** the **xxx** lights go,* Warren 2;5.13). The words that have the same form for both a noun and a verb were not taken to the analysis to avoid the ambiguity regarding the part of speech (e.g. *turn,* Warren 1;11.04; *want drink,* Warren 2;3.02; *bump,* Warren 2;6.04). Incomplete sentences where the mother begins an utterance and the child continues it were not included, for example:

 MOT: *he flies across the room and lands on the +…*
CHI : *curtain.*
MOT: *yes*. (Warren, 2;5.13)

When determining a context, utterances such as ***and** the vehicles stopped* (Warren, 2;5.13) seem to present ambiguous cases. From the transcript it is unclear whether the child stress the conjunction ***and*** or not. That is why such utterances were excluded from the investigation. Pauses and lengthening between words tend to make an impact on deciding the right phonological context in which the article occurs. In the current files containing Warren's speech there were no pauses represented with respect to articles and monosyllabic prepositions.

4.2.2. Articles in DPs

Coding of articles that occur in DPs was first examined. The child's self-repetitions of a single word or a group of words produced in a row were counted only once (e.g., *plane; plane; plane* Warren, 1;10.06*)*. If the repetitions were interrupted by other people's speech, the child's repeated utterance was considered a new one. In the utterances such as ***look (*a) cat, look*** *a light* (Warren, 2;1.01) and ***oh (*a) nice teddy*** (Warren, 2;3.02), ***oh*** *the train's crash* (Warren, 2;1.28), the interactional markers were treated as separate units that have no influence on determining a context for the article.

Coding of the data appropriate for the analysis was carried out as follows. Based on the fact that a Strong–weak trochaic pattern (Sw) is typical for English, all the utterances produced by the given child were divided in Sw feet. The articles that formed part of a Strong-weak foot were marked as footed articles or the articles occurring in footed contexts. On the other hand, the articles that were outside the trochaic foot were counted as unfooted articles or the articles in unfooted contexts. In the process of coding, the actual realization and omission of the articles in the child's speech were counted both in footed and unfooted contexts respectively. The child's production of articles mostly represented a clear case of either a footed or unfooted context. In Table 1 and 2 possible footed and unfooted contexts expected for articles in adult English are shown. The examples are taken from the mother's speech in the files used in the present study.

Table 1.

Possible footed contexts predicted for articles in English

Contexts	Examples
V(1 syllable) + Art (+Adj) + N	(a). where shall we put the lion? (in 2;0.03)
	(b). you make the picture all by yourself. (in 2;1.01)
	(c). shall we take the poorly monkey to hospital? (in 1;11.04)
	(d). have you found the baby tiger? (in 2;3.02)

All + Art + N	(e). did you see all the cogs and pistons moving? (in 2;1.01)
	(f). all the sides are the same length. (in 2;0.03)
There's, where's, here's, it's, etc. + Art + N	(g). where's the plane? (in 1;10.06)
	(h). that's a red triangle. (in 1;11.04)

Table 2.

Possible unfooted contexts predicted for articles in English

Contexts	Examples
Art + N	(a). a boy and a girl. (in 1;10.06)
	(b). the trailer for that one? (in 1;11.04)
Art + Adj (N) + N	(c). a broken car. (in 1;11.04)
	(d). a big tunnel like this? (in 2;4)
	(e). the police car will come. (in 2;5.13)
Art + N + V	(f). the taxi will fit. (in 2;5.13)
	(g). the rhino's back again. (in 2;6.04)
V (2 syllables) + Art + N	(h). Mummy's building a tower, look. (in 1;10.06)
	(i). well, shall we find something to carry the broken car away on? (in 1;11.04)
There is, it is, etc. + Art (+ Adj) + N	(j). it is the spare wheel. (in 2;4)

The child's utterances that represent examples of footed and unfooted contexts where the article is either realized or omitted can be seen below:

Examples of footed contexts where the article is realized in the child's speech:
1. I (want the) digger. 1;10.06
2. (make a) bumpy road 2;1.28
3. it's (called the) engine. 2;6.04
4. (where's the) plane? 1;10.06
5. (there's a) tractor. 2;3.02
6. (here's a) driver. 2;4
7. (all the) toys. 2;1.28

Examples of footed contexts where the article is omitted in the child's speech:
8. Warren (put *the) slippers on. 1;10.06
9. Anna (have *a) cup of tea. 2;3.02
10. (want *a) yellow one. 1;10.06
11. (where's *a) baby tiger? 2;4

Examples of unfooted contexts where the article is realized in the child's speech:
12. the (digger) 1;10.06
13. a (horse) 2;0.03
14. a (broken) car 1;11.04
15. the (van) might fit under. 2;5.13
16. (looking) the trailer gone. 1;10.06
17. it (broken) the trailer. 1;11.04

Examples of unfooted contexts where the article is omitted in the child's speech:
18. *a (plane) 1;10.06
19. *a (toy) scoop 1;11.04
20. *the (picture's) gone. 1;10.06
21. (making) *a cow. 2;0.03

In several cases the child's utterances represented a context that needed further consideration. The verbal particles ***up*** and ***down*** seem to be stressed in the sentence. They were therefore counted as footed contexts for the following article. The examples are the following:

22. there's a dumper truck coming (up the) road. 2;5.13
23. maybe go right (down the) bridge. 2;6.04

The evaluation of contexts for articles in prepositional phrases was conducted more thoroughly below.

4.2.3. Articles in PPs

First, all the utterances containing ***monosyllabic*** prepositions ***in, on, to, at, of, for, off*** were examined. As it was mentioned earlier in the paper (section 2.4.), prepositions belong to the class of functional categories. Thus, the monosyllabic prepositions tend to be unstressed and can be subjected to reduction. It was therefore unclear whether the child treats prepositional phrases (PPs) with the monosyllabic prepositions as footed or unfooted contexts. The question was examined indirectly by comparing the article production in clear footed and unfooted contexts with the article production in PPs with monosyllabic prepositions. The article use in these PPs turned out to be very similar to the footed contexts. So, all the PPs with monosyllabic prepositions were considered as footed contexts for the following article.

The analysis was conducted in the following way. The prepositional phrases which are appropriate without an article in adult English were excluded from the investigation (e.g., *I want the bus* <u>*in front*</u>*;* Warren 2;5.13; *I like a jelly* <u>*on top*</u>*;* Warren 2;6.04). The final set of the PPs with monosyllabic prepositions presented the patterns below:

a. Preposition + Article
b. Preposition + ~~Article~~
c. ~~Preposition~~ + Article
d. ~~Preposition~~ + ~~Article~~

*Examples of the structure in **a**:*

    24. go (in the) digger. 1;10.06

    25. look (at the) pictures. 2;4

*Examples of the structure in **b**:*

    26. (in *the) car 1;10.06

    27. Warren look (at *the) elephants. 1;11.04

*Examples of the structure in **c**:*

    28. he's (going) *off the park later torow. 2;3.02

    29. and have a little (scoop) *at the back. 2;5.13

*Examples of the structure in **d**:*

    30. (go) *to *the cows. 1;11.04

    31. just (looking) *for *a man. 2;3.02

The context for the article in the examples that represent the structure in **c** and **d** was judged by the context of the preceding word. The utterances with the structure in **a** and **b** were counted separately with respect to the production of articles in the PPs with monosyllabic prepositions. The numbers were then compared to the footed and unfooted contexts.

Coding of PPs that contain **disyllabic** prepositions was carried out as follows. The child's utterances with the disyllabic prepositions **over** and **under** were identified as unfooted contexts. Since the stress falls on the first syllable of these prepositions, the following article does not seem to be inside the foot with a Sw trochaic pattern and can be omitted in child language. The examples are shown below:

    32. (under) *the balloon 2;1.28

    33. (over) the mountain. 2;3.02

The PPs with the disyllabic prepositions ***around, about, across*** and such monosyllabic prepositions as ***round, with, past, like*** and ***down*** tend to represent footed contexts for the articles because they are either stressed on the second syllable (***around, about, across***) or do not seem to be reduced though in an unstressed position (***with, past, like, down***). The examples are given below:

34. fire-engine come (cross the) road. 2;5.13
35. (down a) really big bridge. 2;6.04

In the PPs where the preposition was missing, the context for the article was considered by the context of the preceding word:

36. (book) *about a pig. 2;0.03
37. Warren's (play) *with the money. 2;3.02

4.2.4. Monosyllabic prepositions

Coding of monosyllabic prepositions was carried out as follows. All the sentences that contain a monosyllabic preposition were taken from the transcripts for analysis. Regarding the fact that English uses a Strong-weak trochaic pattern (Sw), the utterances with monosyllabic prepositions were divided in Sw feet. The monosyllabic prepositions that formed part of a Strong-weak foot with the preceding word were marked as prepositions in footed contexts or footed prepositions. When occurring in unfooted contexts, i.e., outside the Sw foot, the monosyllabic prepositions were marked as unfooted prepositions. Possible footed and unfooted contexts for the following monosyllabic prepositions are similar to those predicted for articles in DPs in subsection 4.2.2. The child's utterances containing examples with monosyllabic prepositions where the latter were either realized or omitted in footed and unfooted contexts are outlined below:

Examples of footed contexts where the preposition is realized in the child's speech:
38. (go in) the fridge. 2;1.28
39. it's (bumped in) the car. 2;5.13

Examples of footed contexts where the preposition is omitted in the child's speech:

40. digger (go *on) *the track. 1;11.04
41. Land Rover *has got a little (wheel *at) the back. 2;5.13

Examples of unfooted contexts where the preposition is realized in the child's speech:

42. on the (chair). 1;11.04
43. (going) on the dump truck. 2;4

Examples of unfooted contexts where the preposition is omitted in the child's speech:

44. just (looking) *for *a man. 2;3.02
45. *off *the (park) torow. 2;3.02

4.3. Summary

To sum up, the data in the present study are drawn from the Manchester corpus in CHILDES (Child Language Data Exchange System; MacWhinney and Snow 1990). The transcripts used in the current investigation contain the speech of one English child Warren at the age of 1;10.06 to 2;6.04. In the process of coding certain utterances inappropriate for the analysis were first excluded. Regarding footed and unfooted contexts, the rest of the data were coded with respect to the production of articles in DPs and PPs as well as the production of monosyllabic prepositions by the given child.

Considering the production of articles, the DPs predominantly represent footed and unfooted contexts where the article was either realized or omitted in the child's speech. As for articles in PPs, disyllabic prepositions with the stress on the first syllable (e.g., *over, under*) are coded as unfooted contexts and those with the stress on the second syllable (e.g., *around, about, across*) are considered as footed contexts for the following article. Such monosyllabic prepositions as *round, past, down* were coded as footed contexts for the article because they do not seem to be reduced though in an unstressed position. In all the PPs where either a monosyllabic or disyllabic preposition was missing the context for the article was considered by the context of the preceding word. The verbal particles *up* and *down* seem to be stressed in the sentence. They were therefore counted as footed contexts for the following article. All the contexts for the following article

described above present straightforward footed or unfooted contexts in the present analysis. In contrast, it is not so clear whether PPs with monosyllabic prepositions, such as *in, on, to, at, of, etc.*, present footed or unfooted contexts for the following article in the child's speech. The coding procedure of PPs with monosyllabic prepositions is demonstrated in section 4.2.3. A thorough analysis of the latter will be presented in the results in chapter 5.

Judging by the preceding word, the production of monosyllabic prepositions alone was coded with respect to their occurrence either in footed or unfooted contexts. Coding of the monosyllabic prepositions as well as coding of articles in clear footed and unfooted contexts and articles in PPs with monosyllabic prepositions is essential for revealing the results of the present analysis in the next chapter.

5. RESULTS

The chapter investigates the production of articles (section 5.1.) and monosyllabic prepositions (section 5.2.) in the speech of the given child. The realization of early articles irrespective of the contexts they occur in the given files is demonstrated in subsection 5.1.1. The production of articles in footed and unfooted contexts excluding article production in PPs with monosyllabic prepositions is investigated in 5.1.2. The amount of articles realized in the PPs with monosyllabic prepositions is examined in subsection 5.1.3. Finally, the overall results of article realization in footed and unfooted contexts are presented in 5.1.4. Regarding the production of monosyllabic prepositions in early speech, the results of the investigation are illustrated in section 5.2. The chapter ends with a brief summary.

5.1. Production of articles in child English

5.1.1. Article realization irrespective of the preceding context

The starting point in the investigation is to examine the rate of article realization in early speech irrespective of the contexts the articles occur in.

Table 1.

The overall realization of articles irrespective of the contexts

Age	Realization
1;10.06	31% (16/ 52)
1;11.04	39% (33/ 84)
2;0.03	38% (35/ 93)
2;1.01	37% (20/ 54)
2;1.28	64% (37/ 58)
2;3.02	81% (67/ 83)
2;4	68% (38/ 56)
2;5.13	84% (82/ 98)
2;6.04	88% (73/ 83)
Total	61% (401/ 661)

Table 1 provides the number of article realization in all footed, unfooted contexts (subsection 4.2.2. and 4.2.3.) and in the PPs with monosyllabic prepositions (subsection 4.2.3.) calculated together. The data clearly show a steady progression in the development of article production in Warren's speech. Namely, the child begins to realize 31% of obligatory determiners at the age of 1;10.06 and reaches 88% at the age of 2;6.04.

Figure 1 below illustrates Warren's percent realization of articles irrespective of the contexts they occur in. It has to be noted that the use of articles slightly decreases from 39% at 1;11.04 to 37% at the age of 2;1.01. However, immediately after that, the data show a steep rise in the production of articles from 64% to 81% at the age of 2;1.28 and 2;3.02 respectively. There is a point in Figure 1 that involves a significant regression in the child's early article realization. More specifically, the child realizes only 68% of obligatory articles at 2;4 compared to 81% and 84% of article realization at the preceding (2;3.02) and the following (2;5.13) age range respectively. The reason to the differences described above could be that the context representation at each age range is not large in the current analysis.

Figure 1.

Realization of articles irrespective of the contexts
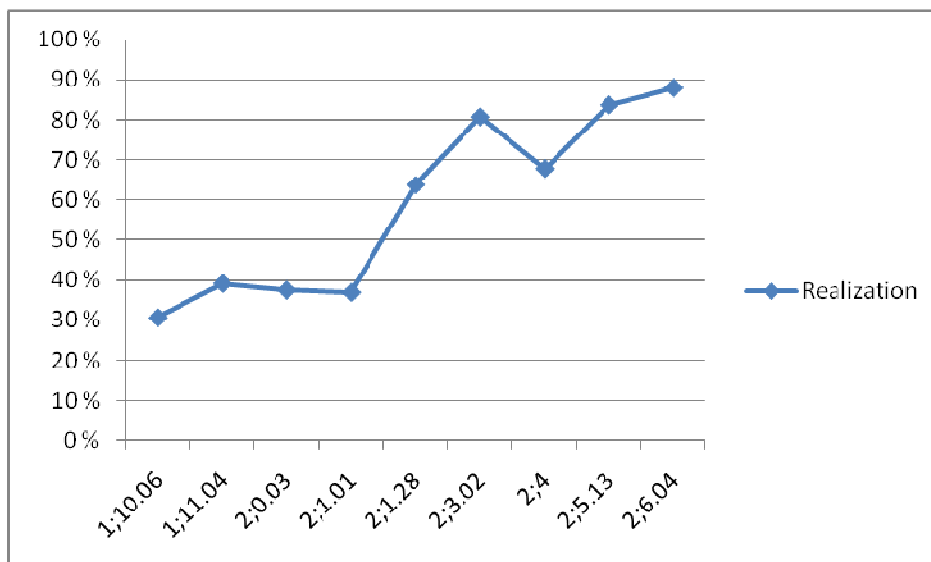
On the whole, as it can be seen from the results above, the child's speech shows a gradual increase in the realization of articles. Based on this fact, the next question to consider is how the child's production of articles depends on the context the article occurs in. That is, whether the child realizes more articles in footed or unfooted contexts.
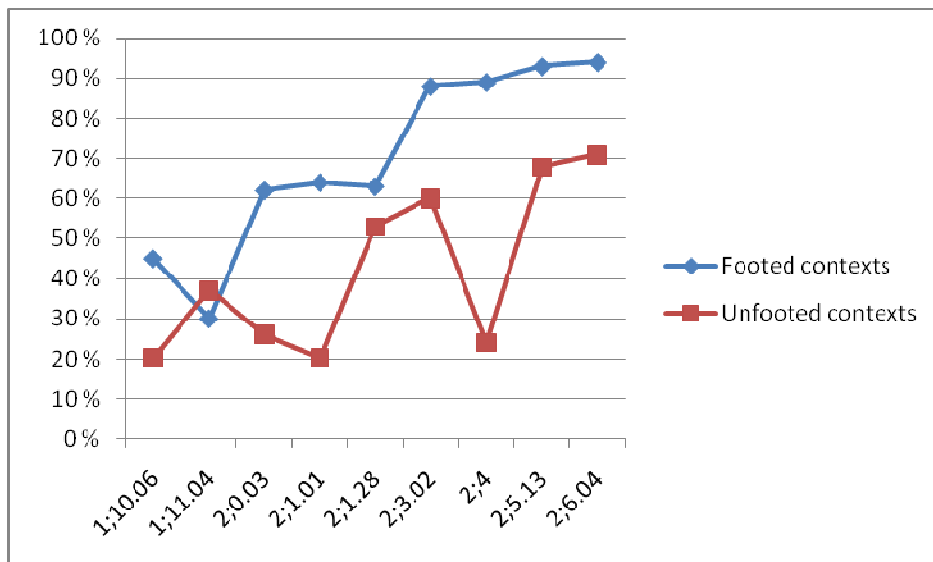
5.1.2. Articles in footed and unfooted contexts

To examine this issue, articles were first investigated in all the footed and unfooted contexts that did not include PPs with monosyllabic prepositions. Recall that these two contexts represent clear footed or unfooted contexts (subsection 4.2.2. and 4.2.3.) which predominantly consist of articles in DPs. The calculation was carried out with respect to all exclusions described in subsection 4.2.1. The division of utterances into Sw trochaic feet and types of the preceding contexts described in 4.2.2. were strictly followed in the counting process. The realization of articles in footed contexts versus unfooted contexts in the child's early speech is presented in Table 2:

Table 2.

Percentage (number) of article realization in footed versus unfooted contexts

Age	Footed contexts	Unfooted contexts
1;10.06	45% (5/ 11)	20% (7/ 35)
1;11.04	30% (7/ 23)	37% (20/ 54)
2;0.03	62% (18/ 29)	26% (16/ 62)
2;1.01	64% (9/ 14)	20% (7/ 35)
2;1.28	63% (5/ 8)	53% (18/ 34)
2;3.02	88% (29/ 33)	60% (18/ 30)
2;4	89% (24/ 27)	24% (4/ 17)
2;5.13	93% (43/ 46)	68% (19/ 28)
2;6.04	94% (30/ 32)	71% (12/ 17)
Total	**76% (170/ 223)**	**39% (122/ 312)**

As it can be seen in Table 2, the total results indicate that the child produces a higher percentage of articles in footed (76%) as opposed to unfooted (39%) contexts. Similarly, the developmental pattern for each age range differs in the two contexts: the proportion of footed articles realization tends to be larger than that of unfooted articles. However, at the age of 1;11.04 the articles are realized somewhat more frequently in unfooted contexts (37%) compared to the footed ones (30%). Interestingly, the curve in Figure 2 exhibits a steep fall in unfooted contexts: the child produces only 20% of required determiners at 2;1.01 and 24% at the age of 2;4. On the basis of the differences described above, it would also be possible to explain the patterns with a relatively small amount of the contexts presented at each range. It has to be noted, though, that the production of articles in the PPs with monosyllabic prepositions should be considered first. It is yet unclear whether the child treats the latter as footed or unfooted contexts. Obviously, the results of the data analysis in the PPs with monosyllabic prepositions will present an impact on the overall result of the present investigation. The final results are discussed later in this chapter.

Figure 2.

Realization of articles in footed versus unfooted contexts

5.1.3. Articles in PPs with monosyllabic prepositions

The important point to consider in this section is whether the child treats monosyllabic prepositions, such as *in, on, to, at, of, etc.* as footed or unfooted contexts for the following article. As it was discussed in section 2.4., the monosyllabic prepositions are functional categories in the same way as articles. Consistent with Selkirk (1996), nonfinal monosyllabic prepositions tend to be reduced and are therefore susceptible to omission in children's early speech production. In this respect, the monosyllabic prepositions can present unfooted contexts where the articles do not constitute part of a disyllabic Sw foot. It is essential to examine whether the given child considers the monosyllabic prepositions as footed or unfooted contexts for the following article. To establish this issue, an indirect analysis is conducted as follows. The realization of articles is first counted only in the context with the monosyllabic prepositions. The data are then compared to the realization of articles in clear footed and unfooted contexts discussed in the previous section. The counting procedure was carried out as defined in subsection 4.2.3. The results are shown in Table 3 below.
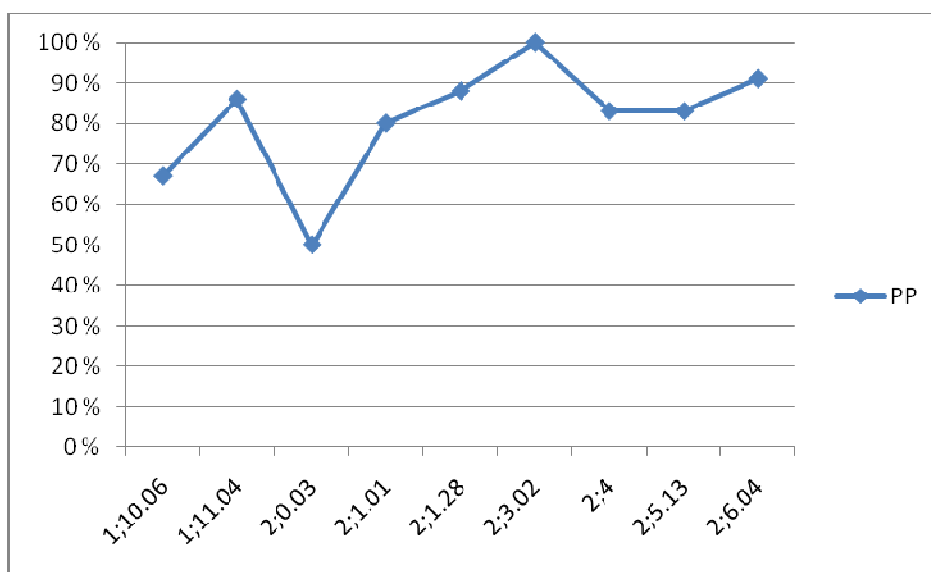
Table 3.

Percentage (number) of article realization in PPs with monosyllabic prepositions

Age	Article realization in PP
1;10.06	67% (4/ 6)
1;11.04	86% (6/ 7)
2;0.03	50% (1/ 2)
2;1.01	80% (4/ 5)
2;1.28	88% (14/ 16)
2;3.02	100% (20/ 20)
2;4	83% (10/ 12)
2;5.13	83% (20/ 24)
2;6.04	91% (31/ 34)
Total	**87% (110/ 126)**

According to the results presented in Table 3, the percentages indicate a constant growth of article realization in the contexts with monosyllabic prepositions. The total amount of article production in the child's speech is 87%. The curve in Figure 3 summarizes the results in a graphic way.

Figure 3.

Realization of articles in PP that include prepositions *in, on, to, at, of, for, off*

After a steep increase from 1;10.06 to 1;11.04, the data in Figure 3 illustrate a sharp fall at the age of 2;0.03 with only 50% of article realization. Judging by the raw numbers in Table 3, the reason to this decrease could be a low number of overall possible contexts at the age of 2;0.03. The result of 50% consists of one case of article realization out of two possible contexts. As illustrated in Figure 3, the developmental curve reaches 100 % at 2;3.02 and slightly reduces to the point of 83% at 2;4 and 2;5.13, then showing an increase of 91% at 2;6.04. Again, this fact can be explained by a relatively small amount of contexts at each age in the current investigation.

Turning now to the comparison of article realization in clear footed and unfooted contexts (section 5.1.2.) versus article realization in the PPs with monosyllabic prepositions, the results are provided in Table 4 below. Considering the total amount of article production in each of the three

contexts, the monosyllabic prepositions (87%) are clearly closer related to the footed contexts (76%) than the unfooted ones (39%). It is interesting to notice that articles are realized even more frequently in the PPs than in the footed contexts. This pattern holds with respect to the individual data for each age range as well as the total results.
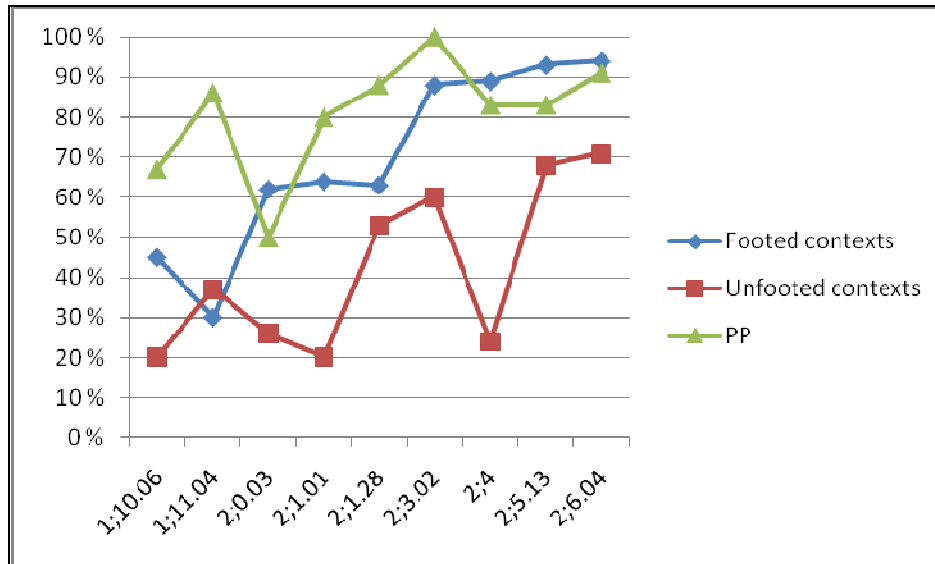
Table 4.

Percentage (number) of article realization in footed and unfooted contexts versus PPs with monosyllabic prepositions

Age	Footed contexts	Unfooted contexts	PPs
1;10.06	45% (5/ 11)	20% (7/ 35)	67% (4/ 6)
1;11.04	30% (7/ 23)	37% (20/ 54)	86% (6/ 7)
2;0.03	62% (18/ 29)	26% (16/ 62)	50% (1/ 2)
2;1.01	64% (9/ 14)	20% (7/ 35)	80% (4/ 5)
2;1.28	63% (5/ 8)	53% (18/ 34)	88% (14/ 16)
2;3.02	88% (29/ 33)	60% (18/ 30)	100% (20/ 20)
2;4	89% (24/ 27)	24% (4/ 17)	83% (10/ 12)
2;5.13	93% (43/ 46)	68% (19/ 28)	83% (20/ 24)
2;6.04	94% (30/ 32)	71% (12/ 17)	91% (31/ 34)
Total	**76% (170/ 223)**	**39% (122/ 312)**	**87% (110/ 126)**

Figure 4 illustrates the differences in article production that arise from the comparison of footed, unfooted contexts and prepositional phrases. The graphic representation obviously shows that article realization in the PPs with monosyllabic prepositions is more identical to that of the footed contexts.

Figure 4.

Realization of articles in footed and unfooted contexts versus article realization in PP

Based on the results described above, it can be assumed that the given child tends to treat the contexts with monosyllabic prepositions more like footed contexts for the following article. Thus, it is reasonable to sum up the data from the two contexts and apply these to the discussion of the overall results in the next section.

5.1.4. The overall results of article production in child English

In this section, the child's overall production of articles in footed and unfooted contexts is examined. Recall that in the previous section the developmental comparison of article realization in these two contexts as well as in the PPs with monosyllabic prepositions was conducted. The child showed a similar trend in article realization in the footed contexts and these PPs. On the basis of this fact, the number of article realization in the footed contexts is calculated together with the article realization in the prepositional phrases with monosyllabic prepositions. Table 5 below shows the total amount of footed contexts in the current investigation.

Table 5.

Percentage (number) of the total amount of article realization in footed contexts and PPs with monosyllabic prepositions

Age	Article realization in footed contexts and PPs
1;10.06	53% (9/ 17)
1;11.04	43% (13/ 30)
2;0.03	61% (19/ 31)
2;1.01	68% (13/ 19)
2;1.28	79% (19/ 24)
2;3.02	92% (49/ 53)
2;4	87% (34/ 39)
2;5.13	90% (63/ 70)
2;6.04	92% (61/ 66)
Total	**80% (280/ 349)**

As it can be seen from the table above, the overall amount of footed articles surfaced in the child's speech is 80%. A final important analysis is to compare the amount of article realization in the total number of footed contexts versus unfooted contexts in early child English. The results are presented in Table 6 below. These data show that there is a significant difference in the production of determiners in the two contexts. Namely, the total amount of early articles is realized in 80% of cases in the footed contexts, compared to only 39% in the unfooted contexts. In the present study, these findings provide the answer to the question presented in the investigation. That is, articles are realized more frequently in footed contexts as opposed to unfooted contexts in early speech.

Table 6.

**The overall percentage (number) of article realization in footed versus unfooted contexts**

Age	Footed contexts	Unfooted contexts
1;10.06	53% (9/ 17)	20% (7/ 35)
1;11.04	43% (13/ 30)	37% (20/ 54)
2;0.03	61% (19/ 31)	26% (16/ 62)
2;1.01	68% (13/ 19)	20% (7/ 35)
2;1.28	79% (19/ 24)	53% (18/ 34)
2;3.02	92% (49/ 53)	60% (18/ 30)
2;4	87% (34/ 39)	24% (4/ 17)
2;5.13	90% (63/ 70)	68% (19/ 28)
2;6.04	92% (61/ 66)	71% (12/ 17)
Total	**80% (280/ 349)**	**39% (122/ 312)**

Figure 6 below graphically exhibits the results presented in Table 6. Both contexts tend to rise in a steady way. However, there are differences in the direction of the developmental pattern at some age range. As it is shown in Figure 6, the curve for the footed contexts illustrates a sharp decrease at 1;11.04. Concretely, the distinction between article production in the two contexts is minimal. The determiners are surfaced in 43% of all cases in the footed contexts and 37% in the unfooted contexts. Note that in the investigation of articles in Table 2 (section 5.1.2.) the development of determiners at 1;11.04 also presented a question. Footed articles occurred at a lower rate that unfooted ones in the child's speech, 30% versus 37% respectively. It has to be mentioned, though, that the production of determiners in the PPs with monosyllabic prepositions presented 86% at the age of 1;11.04 (see Table 3, section 5.1.3.). Since the results of article production from the footed contexts and these PPs were summed up, the new data constituted 43% of cases where the determiner was surfaced in the footed context opposed to 37% in the unfooted ones. Thus, the problem presented in section 5.1.2. is eliminated. A steep fall in footed article production at 1;11.04 could possibly be explained by individual differences of the child's

speech at the time he was audiotaped. The fact can also be interpreted in terms of a relatively small representation of utterances at the given age in the analysis.

Figure 6.

The overall number of article realization in footed versus unfooted contexts (with the PP included)
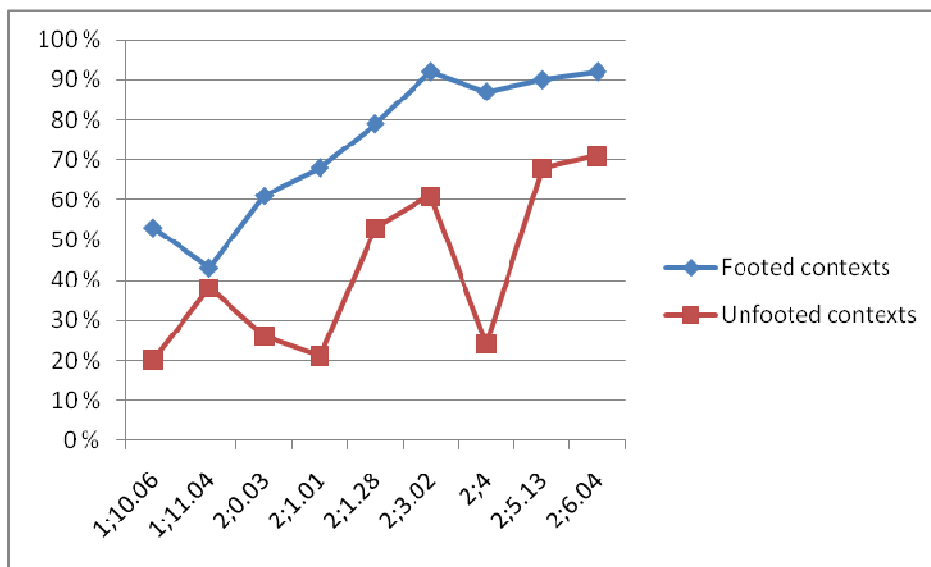
As discussed previously in section 5.1.3., the data received from the PPs with monosyllabic prepositions (Table 3) exhibited a decrease with only 50% of article realization at the age of 2;0.03. A low rate of the overall performance of possible contexts was supposed to be the reason to the fact just mentioned. This question seems no longer to present a difficulty in the current analysis. Treating the PPs with monosyllabic prepositions as footed contexts for the following articles, the new developmental pattern found is a steady rise in footed determiners production at the age of 2;0.03.

Regarding the developmental path in the unfooted contexts, the data in Table 6 and the graphic line in Figure 6 show different directions in the amount of article production by the given child. It should be taken into account that the results in the unfooted contexts remained the same as they were presented in section 5.1.2. Thus, it can be mentioned again that two points with a steep fall

in the realization of unfooted articles at 2;1.01 and 2;4. are due to a relatively low rate of the overall performance of possible contexts in the child's early speech production.

Irrespective of individual differences in the two contexts at a particular age range of the given child, the following conclusion can be made. Overall, the data from the findings presented above confirm that articles tend to be more frequently realized in footed than unfooted contexts in early speech production. Moreover, monosyllabic prepositions constitute footed contexts for the following article, thereby presenting a stressed element in a Sw trochaic foot.

5.2. Production of monosyllabic prepositions in child English

An examination of monosyllabic prepositions in footed and unfooted contexts can provide additional evidence for considering the status of monosyllabic prepositions in child language. To explore this issue, the production of monosyllabic prepositions in the child's early speech was investigated with respect to the calculation pattern in subsection 4.2.4. The results are demonstrated in Table 7.

Table 7.

Realization of prepositions in footed versus unfooted contexts

Age	Footed contexts	Unfooted contexts
1;10.06	100% (1/ 1)	100% (5/ 5)
1;11.04	43% (3/ 7)	100% (4/ 4)
2;0.03	100% (1/ 1)	100% (1/ 1)
2;1.01	60% (3/ 5)	100% (2/ 2)
2;1.28	100% (13/ 13)	100% (3/ 3)
2;3.02	86% (12/ 14)	64% (7/ 11)
2;4	100% (7/ 7)	83% (5/ 6)
2;5.13	81% (17/ 21)	100% (7/ 7)
2;6.04	91% (20/ 22)	100% (11/ 11)
Total	**84% (76/ 90)**	**90% (44/ 49)**

Interestingly, a relatively high proportion of monosyllabic prepositions tend to be maintained in both cases in the child's speech. Considering the total results (Table 7) for the footed and unfooted contexts, the monosyllabic prepositions occur in: 84% versus 90% respectively. The number of realizations in the footed contexts is even slightly lower than that in the unfooted contexts.

Note that in section 5.1.3., it was found that the child tends to treat the PPs with monosyllabic prepositions as footed contexts for the following article. In other words, in the speech of the given child the monosyllabic prepositions seem to be stressed and present a strong element of a Sw trochaic foot. It can therefore be supposed that the high rate of the overall realization of monosyllabic prepositions in the two contexts is due to the stressed position of these monosyllabic prepositions in the early child's speech. The findings from the monosyllabic prepositions in the present section can, in turn, provide support for the decision to consider the PPs with monosyllabic prepositions as footed contexts for the following determiner in section 5.1.3.

As shown in Table 7, the developmental pattern at each age range in both contexts is relatively constant. Consider the data given, for example, at 1;10.06 or 2;0.03 in Table 7. The cases presenting 100% of realization of monosyllabic prepositions can possibly be explained with a low rate of raw figures that indicate the total amount of utterances produced at a given age.

5.3. Summary

In summary, the overall realization of articles irrespective of the contexts they occur in has been examined first. The results have shown that there is a steady rise in the development of article production in Warren's speech. The child begins to realize 31% of obligatory determiners at the age of 1;10.06 and reaches 88% at the age of 2;6.04. Subsequently, the realization of articles has been investigated in clear footed and unfooted contexts that do not include the production of articles in PPs with monosyllabic prepositions. The findings from the clear footed and unfooted contexts have indicated that the child produces a higher percentage of articles in footed (76%) as opposed to unfooted (39%) contexts.

The results have shown that the total amount of article realization in PPs with monosyllabic prepositions (87%) are closer related to the footed contexts (76%) than the unfooted ones (39%). Hence, it has been assumed that the given child treats the contexts with monosyllabic prepositions as footed contexts for the following article. That leads to the fact that monosyllabic prepositions constitute stressed elements in the speech of the given child. The number of article realization in the footed contexts and the PPs with monosyllabic prepositions was calculated together and applied to the discussion of the overall results in the present study. The overall results of article production in early speech have revealed that more articles are realized in footed contexts (80%) as opposed to unfooted contexts (39%).

The development of monosyllabic prepositions has shown that a relatively high proportion of monosyllabic prepositions tend to be realized in both footed (84%) and unfooted (90%) contexts in the child's speech. The fact can suggest that in the speech of the given child the monosyllabic prepositions seem to be stressed and present a strong element of a Sw trochaic foot. In the next chapter, a more thorough discussion of the results in the current study will be presented.

6. DISCUSSION

In this chapter, the results presented in chapter 5 will be analyzed. The realization of articles (section 6.1.) and monosyllabic prepositions (section 6.2.) will also be discussed with respect to the theoretical background and previous prosodic accounts of functional categories production in child English.

6.1. Articles in child English

In the present thesis, the realization of English early articles in footed and unfooted contexts has been examined. The overall results described in chapter 5 have shown that the given child surfaces more footed articles than unfooted ones in his speech. This confirms the question under investigation, that is, in children's early speech articles are realized more frequently in footed as opposed to unfooted contexts.

The data shown in Table 6 (subsection 5.1.4.) indicate that there is a significant difference in the production of determiners in the two contexts. The proportion of early article realization presents 80% in the footed contexts compared to only 39% in the unfooted ones. Recall that the overall results (section 5.1.4.) consist of the amount of article realization both in clear footed and unfooted contexts as well as in PPs with monosyllabic prepositions. As described previously in section 5.1.3. and 5.1.4., the latter were considered as footed contexts for the following article and added to the amount of articles realized in obvious footed and unfooted contexts. It should be noted, though, that the fact just mentioned did not change the overall developmental pattern for footed and unfooted articles. The initial data shown for articles in the clear footed and unfooted contexts alone illustrate that the child realizes more footed (76%) than unfooted articles (39%) in his speech (section 5.1.2, Table 2).

The findings in the current thesis are consistent with the results from English data in the research demonstrated in chapter 3. As mentioned above, the amount of footed articles realization in the present analysis constitutes nearly twice as much the amount of unfooted articles realization, 80% versus 39% respectively. Similar results are found in Gerken (1996), where English children produced object articles more frequently following a monosyllabic verb than following a syllabically inflected verb. In other words, the former context presents a footed context for the

following article and the latter constitutes an unfooted one. In addition to the analysis of article production in the type of contexts mentioned in Gerken (1996), the present study has investigated several other types of possible footed and unfooted contexts for the following article (see section 4.2.).

The data from the current investigation are comparable to those in Demuth, McCullough and Adamo (2007) as well as Demuth and McCullough (2009). The scholars also claim that for English children it seems to be easier to produce articles that constitute part of a disyllabic foot, i.e., footed articles, than articles that occur outside the Sw trochaic foot, i.e., unfooted articles. Footed articles are therefore produced more often and at a higher rate than unfooted articles in early speech of English. In keeping with the Prosodic Licensing Hypothesis (Demuth 2007), the production of articles by the child in the current study is prosodically licensed. That is, the given child is prone to realize a larger proportion of articles that appear in prosodically unmarked or footed contexts. The analysis of the child's speech in the current thesis provides more support for the already existing studies on article development in child English.

As discussed in section 3.3., early articles in English are restricted to a binary foot. Practically, two opportunities exist in early English speech. That is, articles can be either attached to the preceding word forming part of a disyllabic foot with it or remain unfooted. In both cases the exhaustivity constraint which is ranked high in child English is not violated. It states that each unit in the Prosodic Hierarchy should be dominated by the immediately higher unit (section 2.3.). Due to the exhaustivity constraint, early articles in the speech of the given child fail to be integrated at higher levels of the Prosodic Hierarchy (section 2.2.) such as the prosodic word and the phonological phrase (see e.g., Demuth 2007; Lleó and Demuth 1999 for similar ideas). Unfooted articles in early English do not seem to be incorporated even at the level of foot. This could be the reason to the fact that the child's article realization in unfooted contexts turns out to be lower than in footed ones. There are examples below that illustrate percentages of article realization in the footed and unfooted contexts produced by the given child (see subsection 4.2.2.):

(1) a. *Footed contexts* (80%)   b. *Unfooted contexts* (39%)

    I (want <u>the</u>) digger. 1;10.06   (having) <u>a</u> sip. 2;3.02

    (there's a) tractor. 2;3.02   a (horse) 2;0.03

   it's (called the) engine. 2;6.04   it (broken) the trailer. 1;11.04

The production of articles in child English is restricted by the prosodic constraints until the age of about 2;6 (Demuth 2007, section 3.3.). Children gradually get access to the level of the prosodic word and phonological phrase where articles are represented in adult English (cf. Selkirk 1996, section 2.4.1). According to Selkirk (1996), nonfinal function words in English are prosodified as free clitics at the level of the phonological phrase. The situation appears to be different in child English where functional categories, namely, articles are prosodified as internal clitics (see Demuth 2007; Demuth, McCullough and Adamo 2007; Demuth and McCullough 2009). Consider the two prosodic structures for nonfinal articles in (2) that were previously mentioned in subsection 2.4.2. The examples illustrate an utterance used in the speech of the given child (2b) and the same utterance in adult English (2a).
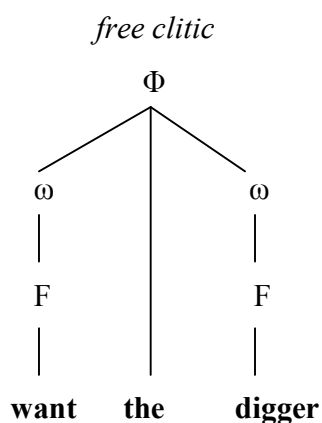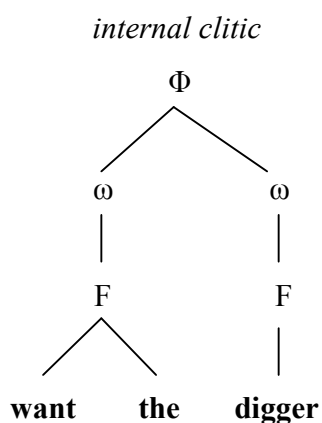
(2) a. *Adult*   b. *Child*

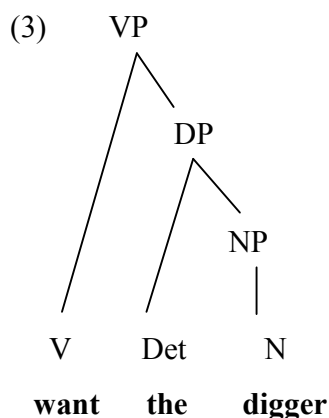   I want the digger.   I (want the) digger. (1;10.06)

It should be noted that the prosodic structure of the adult utterance in (2a) coincide with the syntactic structure of the sentence. Consider the latter in the example below:

(3) VP
        DP
            NP
V   Det   N
want   the   digger

On the other hand, the child's utterance in (2b) presents a mismatch between the prosodic and syntactic representations (cf. Demuth and McCullough 2009). The division into syntactic and prosodic structures for the child's utterance in (2b) is illustrated below:

(4) a. *Prosodic structure*: I [(want <u>the</u>)$_{Ft}$]$_{PWd}$ [(digger)$_{Ft}$]$_{PWd}$

   b. *Syntactic structure:* I (want)$_{VP}$ (<u>the</u> digger)$_{DP}$

In (4a) determiner *the* prosodifies to the left to form part of a disyllabic foot with the monosyllabic verb *want.* On the other hand, in (4b) the same determiner constitutes part of the DP with the noun *digger.* Compare the two representations of the prosodic structure in (2b) and the syntactic one in (3) in the child's speech.

The mismatch in the sentences with footed articles discussed above could probably be the reason to the fact that footed articles fail to be realized in 100% of all the cases in the given child's utterances. Recall that the child surfaces 80% of footed articles in his early speech. Consequently, another 20% of cases present omissions in the footed contexts (see section 5.1.4., Table 6).

As discussed earlier in this section, unfooted articles seem to be susceptible to omission in early child English. This fact clearly holds for most of the cases presented in the results of the current study. The data show though that there are still 39% of realizations of articles in unfooted contexts (section 5.1.4., Table 6). It can partly be interpreted in terms of input the child receives from an adult. It can be supposed that the child repeated after his mother, thereby producing

unfooted articles in the early speech. The reason could also be that the child gradually develops the target pattern of article use in English. Judging by the percentages of unfooted articles realization in each range age (section 5.1.4., Table 6), the child begins to surface only 20% of unfooted articles at 1;10.06 reaching the amount of 71% at the age of 2;6.04.

Despite the patterns discussed above, the article production in footed and unfooted contexts generally has a clear developmental path. That is, article realization in footed contexts occurs more frequently than that in unfooted contexts in the speech of the given child. Hence, this fact provides support for the prosodic explanation of article use in early child English argued for in the present study.

6.2. Monosyllabic prepositions in child English

The investigation of monosyllabic prepositions in the child's speech is a question to consider in the current study. Being functional categories, monosyllabic prepositions such as *in, on, to, at, etc.* are stressless and susceptible to reduction in the flow of speech. It should be noted, though, that based on Selkirk (1996), not all monosyllabic prepositions get reduced. As shown in subsection 2.4.1., function words preserve their phonological qualities if they occur in isolation, in a focused or a phrase-final position. However, in case when function words are phrase-final but object of a verb or preposition, they are subjected to reduction. The same situation applies to function words that appear in a nonfocused or nonfinal position. In the current study, monosyllabic prepositions that represent a functional category in a nonfinal position are of an essential interest. Since monosyllabic prepositions in nonfinal positions get reduced, they are prone to omission in the child's speech. It was therefore unclear whether the given child treats monosyllabic prepositions as footed or unfooted contexts for the following article. The production of monosyllabic prepositions alone was another important point to investigate in order to find out how the latter were realized in footed and unfooted contexts.

The results have shown that the development of articles in PPs with monosyllabic prepositions is closer related to that in the footed contexts (5.1.3.). Comparing the percentages, the child produced 87% of articles after the monosyllabic prepositions and 76% in the footed contexts opposed to 39% in the unfooted ones. The finding above is consistent with Demuth and

McCullough (2009) who coded monosyllabic prepositions as footed ones in the investigation of spontaneous speech production of English children. The difference in the performance of articles after monosyllabic prepositions and in the other footed contexts will be accounted for later in this section.

The results from the investigation of monosyllabic prepositions alone, besides the production of articles in PPs, have shown the realization of 84% footed and 90% unfooted monosyllabic prepositions in the speech of the given child (section 5.2.). Interestingly, the percentages of cases where these prepositions surface in early speech are high in both contexts. This can be due to the fact that the child stresses prepositions. Hence, the latter have a high proportion of realization nearly equally represented in footed and unfooted contexts.
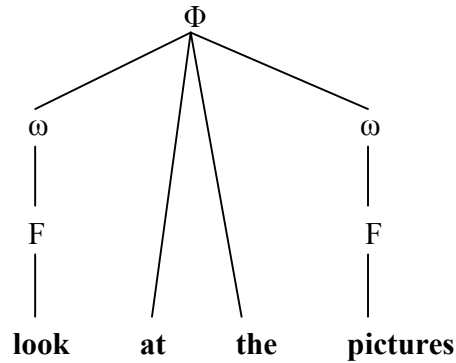
Considering the results from the two investigations discussed above, it can be concluded that monosyllabic prepositions such as *in, on, to, at, etc.* receive a status of stressed elements in child language. The monosyllabic prepositions tend therefore to be realized in nearly all utterances produced by the given child. The analysis of monosyllabic prepositions could provide further support for the prosodic account to the production of functional categories in early child language.

The facts just mentioned present an interesting fact: children tend to stress monosyllabic prepositions in nonfinal positions, while adults never do that unless monosyllabic prepositions are focused or in isolation (cf. Selkirk 1996). Furthermore, children seem to show a selective approach to the treatment of functional categories. That is, they put prominence on monosyllabic prepositions making the latter stressed, while articles remain without stress in early child speech.

The prosodic structure of utterances with nonfinal monosyllabic prepositions in adult English can be illustrated as that in (5):

(5) *Adult*

Look at the pictures.

```
                         Φ
            ┌───────────┼───────────┐
            ω           │           ω
            │           │           │
            F           │           F
            │           │           │
          look    at   the    pictures
```

As it can be seen in (5) above, functional categories such as monosyllabic prepositions and articles have access to higher levels of the Prosodic Hierarchy (section 2.2.), thereby being represented as free clitics in adult English (cf. Selkirk 1996, subsection 2.4.2.).

The situation in child English seems to be different. As discussed earlier, the given child treats monosyllabic prepositions as stressed syllables. That leads to the fact that monosyllabic prepositions have properties not of functional but lexical categories in the child's language. Early English is restricted to only a bisyllabic left-headed foot (cf. Gerken 1996; Demuth 2001; Demuth and McCullough 2009). It can therefore be proposed to represent monosyllabic prepositions with the following article within a foot. In this respect, monosyllabic prepositions present a Strong element and articles constitute a weak element in the Sw trochaic foot in child English. The articles prosodify to the left to form part of a disyllabic foot with the monosyllabic prepositions. Consider the example in (6) taken from subsection 4.2.3.:

(6) *Child*

  (look) (at the) (pictures). (2;4)
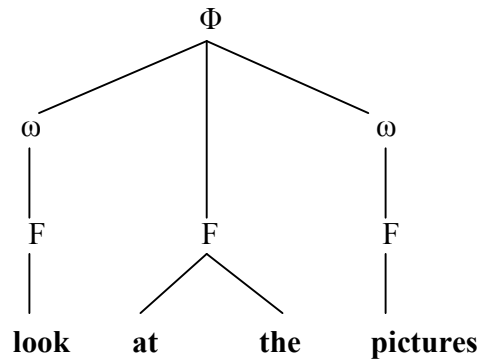
Early monosyllabic prepositions in nonfinal positions perform differently in comparison to adult speech. Though being a functional category in adult English, monosyllabic prepositions tend to act like lexical categories in children's language. They are stressed and, therefore, preserve phonological qualities of an unreduced syllable.

As mentioned above, the child produced more articles (87%) after the monosyllabic prepositions than in the other footed contexts (76%). This difference can be explained as an effect of the alignment constraint Align R (lex, PWd) operating in the speech of the given child. The right edge of a constituent in the syntactic structure should coincide with the right edge of this constituent in the prosodic structure (section 2.3.). In case the condition is followed, the alignment constraint mentioned above is satisfied. As shown in (6), the foot that consists of the monosyllabic preposition *at* and the following article is attached directly to the phonological phrase. The linear structure of (6) is demonstrated below:

(7) *Prosodic structure*: [[(look)$_{Ft}$]$_{PWd}$ (at the)$_{Ft}$ [(pictures)$_{Ft}$]$_{PWd}$]$_{PPh}$ (2;4)

Assuming that monosyllabic prepositions do not constitute a prosodic word, it can be said that the right edge of stressed monosyllabic prepositions in the syntactic structure coincides with the right edge of monosyllabic prepositions in the prosodic structure by attaching the foot directly to the phonological phrase. The situation is different with the other footed contexts. That is, the right

edge of the prosodic word *want* in the syntactic structure (4b) does not coincide with the right edge of this word in the prosodic structure (4a). The difference in the production of articles after the monosyllabic prepositions and in the other footed contexts is, therefore, proposed to be interpreted in terms of the alignment constraint.

As discussed earlier in the study, there are different patterns of stress alternation in words (section 2.5.). One kind of arhythmicity that can appear in words is a rhythmic lapse. Such lapses, that is, sequences of weak syllables that are not punctuated by a strong syllable, seem to be avoided in the speech. Turning back to the discussion of realization of monosyllabic prepositions in child English, the following can be mentioned. The performance of monosyllabic prepositions as stressed elements can partly be interpreted in terms of a rhythmic lapse. Consider the examples below:

(9)   *Child*
   a. (on the) (chair). 1;11.04
   b. (going) (on the) (dump) (truck). 2;4

In example (9b), the context preceding the preposition *on* is a disyllabic word with the second weak syllable. The preposition *on* and the article *the* present functional categories and are supposed to be unstressed in adult speech. Obviously, the result in adult English is three unstressed syllables in one sequence that are not punctuated by a stressed syllable. It can therefore be supposed that the child avoids such a rhythmic lapse in his early speech by adding an extra stress on monosyllabic prepositions. The same pattern applies to example (9a), where there are two unstressed syllables, i.e., the preposition *on* and the article *the*, before the lexical stressed word *chair*. Applying the status of a strong syllable to monosyllabic prepositions in cases like those in (9), the given child seems to achieve a regular stress pattern in his early utterances.

To sum up, monosyllabic prepositions tend to have the status of stressed syllables in child English. That is confirmed by the findings that monosyllabic prepositions are treated as footed contexts for the following article in the child's speech. The results have also shown that monosyllabic prepositions are realized at a high rate both in footed and unfooted contexts.

7. CONCLUSION

This thesis has considered the production of articles and monosyllabic prepositions in child English. The goal of the study was to address two primary issues. That is, whether early learners of English realize more articles in footed as opposed to unfooted contexts; and what the status of monosyllabic prepositions is in child English. For this purpose, the spontaneous speech productions of one English child from the age of 1;10.06 to 2;6.04 were investigated. The data were drawn from the Manchester corpus in CHILDES (Child Language Data Exchange System; MacWhinney and Snow 1990). To carry out this study, an examination of the main aspects of Prosodic Phonology has been conducted with respect to the prosodification of function words in child language. It has also been made a comparative analysis of the previous research on the prosodic account of children's article production in English and cross-linguistically.

Chapter 2 provided the discussion of the central issues of Prosodic Phonology. It was introduced the structure of the Prosodic Hierarchy in terms of which the constraints on prosodic structure were defined. It was shown that the Strict Layer Hypothesis imposed restrictions on the hierarchy of the prosodic constituents as well as the constraints on prosodic structure. The typology of Prosodic Phonology is fundamental in the understanding of the prosodic account of the production of function words in child language. It was further discussed that prosodic clitics represent the structure of function words. Specifically, nonfinal function words in English were assumed to be prosodified as free clitics. Some facts from English prosody with respect to stress patterns were also outlined in order to be used in the discussion of functional categories.

Chapter 3 was concerned with the analysis of previous studies on the production of early articles in Germanic languages such as English and Romance languages such as Spanish. The early phonological development in the former tends to be restricted to a binary foot, while the latter exhibits multisyllabic patterns at a very early stage of speech production. The difference in the development of functional categories in child language was captured in terms of the prosodic structure as well as the prosodic constraints operating in the target language.

Chapter 4 presented the data and methodology in the current investigation. Regarding footed and unfooted contexts, the data were coded with respect to the production of articles in DPs and PPs

as well as the production of monosyllabic prepositions on their own. While DPs and stressed disyllabic prepositions (e.g., *over, across*) clearly presented either a footed or unfooted context for the following article, the situation was not so straightforward with monosyllabic prepositions such as *in, on, to, at, etc.* in nonfinal sentence positions. An indirect analysis of the monosyllabic prepositions was therefore conducted in order to find out whether the latter are treated as footed or unfooted contexts for the following article in the child's speech.

In chapter 5, the results from the data analysis indicated that articles in footed contexts are realized more often that articles in unfooted contexts in the child's speech. The production of articles in PPs with monosyllabic prepositions appeared to be similar to the production of articles in straightforward footed contexts. The investigation of monosyllabic prepositions alone presented a relatively high proportion of their realization in both footed and unfooted contexts. Based on the two facts just mentioned, monosyllabic prepositions in nonfinal sentence positions were suggested to constitute a stressed syllable in the child's early speech.

In chapter 6, the production of articles in early English was assumed to be prosodically licensed. In keeping with the Prosodic Licensing Hypothesis (Demuth 2007), the given child is prone to realize a larger proportion of articles occurring in prosodically unmarked or footed contexts. The differences in the realization of articles in footed and unfooted contexts were explained in terms of prosodic constraints operating in child English. It was suggested that due to the exhaustivity constraint early articles in the child's speech failed to get access to higher levels of the Prosodic Hierarchy as the prosodic word and the phonological phrase (see e.g., Demuth 2007; Lleó and Demuth 1999 for similar ideas). Since this constraint seems to be ranked high in child English, articles can only be integrated at the level of foot by attaching to the preceding word and forming part of a disyllabic Sw foot with it. Unfooted articles imply that they are not incorporated even at the level of foot. So, early articles in English were assumed to be restricted to a binary foot as a consequence of the exhaustivity constraint. This fact provided interpretation for a larger amount of article realization in footed versus unfooted contexts in the speech of the given child. The prosodic structure of the child's early articles was assumed to represent internal clitics similar to the structure of early English articles shown in the studies of some other scholars (e.g., Demuth 2007; Demuth and McCullough 2009).

Chapter 6 also considered the child's monosyllabic prepositions in the context with the following article as well as the production of monosyllabic prepositions on their own. Monosyllabic prepositions with the following article were proposed to be prosodified within a foot. Interestingly, the percentage of article realization after the monosyllabic prepositions was even higher than in the other footed contexts. This difference was suggested to be explained as an effect of the alignment constraint Align R (lex, PWd). The right edge of stressed monosyllabic prepositions in the syntactic structure coincides with the right edge in the prosodic structure by attaching the foot with a monosyllabic preposition directly to the phonological phrase. In constrast, in the other footed contexts that predominantly consist of prosodic words the right edge of a syntactic word does not coincide with the right edge of this word in the prosodic structure. Regarding the production of monosyllabic prepositions alone, it was proposed that the child stressed monosyllabic prepositions in order to avoid a rhythmic lapse. The performance of monosyllabic prepositions as stressed syllables was assumed to eliminate the sequence of weak syllables not punctuated by a strong syllable in the child's speech.

To conclude, the current thesis has presented evidence for the influence of phonological contexts and prosodic constraints on the production of articles and monosyllabic prepositions in early child English. Thus, it provides further support for the prosodic account of acquisition of functional categories in early language. That said, the present thesis still offers directions for future research. It might be interesting to examine how the production of articles in children's speech is influenced by the input from an adult. Further investigation of monosyllabic prepositions can give a more detailed look at their status of stressed syllables in child English. It can be considered what exact degree of stress characterizes monosyllabic prepositions in early speech. The results can, in turn, be compared to the degree of stress on monosyllabic prepositions in adult English. Future studies might also examine whether monosyllabic prepositions present a prosodic word in early English. A variety of constraint interactions operating in child and adult English can further be analyzed in more detail. The issues mentioned above can possibly provide an interest for future work on children's acquisition of functional categories in the framework of the prosodic account.

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