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*The timing of production: the emergence of
the adverbial hierarchy.*

Relatrice

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Summary in Italian

La tempistica della produzione: l'emergere della gerarchia avverbiale.

L'obiettivo di questa ricerca è quello di esaminare il momento di produzione degli avverbi e la loro frequenza nei bambini inglesi. Inoltre, il nostro scopo è quello di verificare se l'ordine temporale in cui gli avverbi sono acquisiti segua la gerarchia sintattica proposta da Cinque (1999). La nostra ricerca è organizzata in tre capitoli: nel primo, proponiamo un'analisi della teoria sull'esistenza di una gerarchia universale proposta in "*Adverbs and functional heads: A cross-linguistic perspective*" (Cinque, 1999); nel secondo capitolo, riassumiamo gli studi precedenti sull'acquisizione degli avverbi, con un breve approfondimento sul caso dell'italiano; nel terzo, che costituisce il nucleo centrale del nostro lavoro, mostriamo i risultati e le implicazioni della nostra raccolta dati.

Per rispondere alla nostra domanda iniziale, abbiamo analizzato le conversazioni spontanee di una bambina madrelingua inglese (tra l'età di 1;9.13 e 2;6.28) con i suoi familiari. Nel dettaglio, abbiamo letto le prime 43 trascrizioni delle conversazioni contenute nel corpus *Lara* nel database CHILDES (MacWhinney, 2000). Successivamente, abbiamo raccolto in un file Excel tutti gli avverbi prodotti dalla bambina nell'arco temporale analizzato, considerando solo quelli dal significato inequivoco. Dopo aver classificato gli avverbi in relazione alla macro-categoria di appartenenza e organizzato i dati in tabelle pivot sulla base di tre variabili (avverbi, frequenza e momento di produzione), abbiamo realizzato un grafico e una tabella per ciascuna macro-categoria avverbale (tempo, aspetto, quantità, modo, grado e luogo). Ciascun grafico mostra la frequenza con cui un determinato avverbio compare nell'arco temporale, le tabelle invece evidenziano il momento di produzione. In questo modo, abbiamo individuato il giorno in cui un determinato avverbio compare per la prima volta e per quante volte viene ripetuto. I risultati mostrano che i primi avverbi ad essere acquisiti in ordine cronologico sono quelli di luogo e di quantità, mentre gli ultimi sono quelli di modo. Da un punto di vista della frequenza, vediamo che la presenza degli avverbi di luogo è preponderante, mentre gli avverbi di quantità sono i meno frequenti. Di seguito, è mostrato l'ordine cronologico di produzione delle macro-categorie:

(1) quantità/ luogo > tempo > grado > aspetto > modo.

L'ordine di acquisizione mostrato in (1) conferma l'ipotesi di Chejnová (2017), il quale mostra come le categorie avverbiali non vengano acquisite tutte nello stesso momento, ma gradualmente in fasi diverse. Inoltre viene confermata anche la teoria di Piaget (1969, come citato in Mandić, 2011): gli avverbi di luogo sono i primi ad essere acquisiti in quanto, da un punto di vista semantico, essi sono dotati intrinsecamente di riferimenti concreti alla realtà circostante. I bambini, mentre parlano, possono vedere effettivamente dove il soggetto o l'oggetto di cui si parla è posizionato nello spazio.

Al contrario, l'ordine in cui le macro-categorie avverbiali sono acquisite dalla bambina (1) non rispecchia la gerarchia sintattica proposta da Cinque (1999), come si può notare in (2):

(2) *Speech Act* (onestamente; francamente; fortunatamente) > *Modality* (possibilmente; forse; di solito) > Tempo (già; adesso; oggi) > Aspetto (sempre; mai; appena) > Quantità (completamente; tutto) > Modo (quasi; adeguatamente; velocemente) > Grado (abbastanza; anche; molto) > Luogo (ovunque; qui; lì).

Possiamo quindi affermare che la bambina ha acquisito una vasta gamma di avverbi in un ordine specifico e solo in seguito sarà in grado di produrre costruzioni complesse in cui gli avverbi occorrono insieme seguendo la gerarchia di Cinque.

Infine, nonostante l'originalità del nostro studio, esso presenta dei limiti. Poiché la ricerca è basata su l'analisi di conversazioni spontanee, non è stato possibile analizzare alcune categorie avverbiali, come *Speech Act* and *Modality* in quanto non sono stati acquisiti e prodotti dalla bambina nell'arco di tempo analizzato. Inoltre, non abbiamo potuto esaminare casi di co-presenza di più avverbi nella stessa frase dal momento che la bambina ha prodotto al massimo un avverbio per ogni frase.

In conclusione, speriamo che i nostri risultati contribuiscano a stimolare maggiori riflessioni nel campo dell'acquisizione degli avverbi nei bambini, ambito in cui c'è ancora una scarsa letteratura. Inoltre, confidiamo nel fatto che studi futuri completino il pezzo mancante, raggiungendo una maggiore completezza nella ricerca.

Abstract

This paper describes a research project designed to find out the timing of production of adverbs in English children. In order to answer our main question, we collected empirical data through the CHILDES database (MacWhinney, 2000), and we analysed the spontaneous production of one monolingual native English-speaker between the ages of 1;9.13 and 2;6.28. This study further discusses Cinque (1999)'s theories about adverbial hierarchy and bottom-up movement of adverbs. In addition, we explored previous research on the emergence of adverbs in children, highlighting a comparison between our findings and earlier investigations. The present study attempts to verify whether the timing of production found in our corpus follows Cinque's hierarchy. The results revealed that adverbs are acquired by the target child in an unambiguous order which does not fully reflect the syntactic hierarchy proposed by Cinque.

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Introduction

Since the 1960s, interest in the acquisition of adverbs has steadily grown. Depending on the meaning they convey, adverbs belong to different semantic categories, such as temporal, manner, degree and so on. In addition, they can be classified in two distinct classes: open classes, when they carry lexical meaning, and closed classes, when they bring grammatical information to the sentence. The present study investigates the emergence and distribution of adverbs in English children, focusing on one native English-speaker. A huge amount of research agrees that children acquire a language hearing caregivers' sentences and conversations in their first years (Chomsky, 1981, as cited in Pinker, 1984). On the other hand, some studies showed that adults' input is not sufficient to become familiar with the language of the community (Lust, 2006). However, through input, children perform mental operations to learn the correct grammatical structure of a language (Pinker, 1984). As a result, children assimilate a specific rule system through which they can generate new sentences (Chomsky, 1957, as cited in Brown, 1973); therefore, the MLU (Mean Length of Utterance) grows as children do (Brown, 1973), in different and gradual stages (Pačesová, 1968). Many approaches have been proposed to explain Language Acquisition in children. In the present work, we will adopt the Cartographic approach, referring interchangeably to adverbs or AdvPs. In addition, we will discuss the fixed relative order in which adverbs are merged, which is part of the UG (Universal Grammar) (Cinque, 1999).

This work consist of three chapters:

Chapter 1 gives a broad outline of Cinque's seminal work "Adverbs and functional heads: A cross-linguistic perspective" (1999), focusing on the theory of a universal hierarchy of adverbs. *Chapter 2* summarizes previous research on the emergence of adverbs in children, analysing different languages and providing an insight into acquisition of Italian adverbs. *Chapter 3* holds the central part of the thesis. It shows the result of collected data through the CHILDES database (MacWhinney, 2000) and verifies whether the timing of

production found follows Cinque's hierarchy, suggesting an answer to our research question: (Q1) What is the timing of production of adverbs in English children?

First of all, we focused on the frequency and the timing of production of adverbs in one English child; secondly, we analysed the order in which adverbs occur in the corpus; finally, we matched the order we found with Cinque's hierarchy.

Chapter 1

Cinque's analysis of AdvP hierarchy

In *Adverbs and functional heads: a cross-linguistic perspective*, Cinque (1999) adopts the Cartographic approach, according to which adverbs are merged in a dedicated Spec position along the clausal spine. They are merged in a fixed, determined order, and they are considered as independent phrases (AdvPs), rather than as adjuncts (Minimalist approach, Chomsky, 1995). Cinque discusses the fixed relative order of AdvPs in the first chapter of his work, and the “location-in Spec” theory in the second one.

Furthermore, the author explains the crucial characteristics and the sequence of the “lower” (pre-VP) AdvPs, the “higher” (sentences) AdvPs and the “lower” (pre-VP) AdvPs in VP-final position, underlining the differences between them.

The fixed order in which adverbs are merged is part of the Universal Grammar (Chomsky, 1959), and it is the same across languages. In particular, Cinque focuses his studies on Romance languages, but he also takes into account other languages, such as Korean, Turkish, and Chinese.

In this chapter, I will summarize the main points of Cinque's research, and I will focus in particular on the case of Italian.

1.1 Lower (pre-VP) AdvPs

Adverbs that occur in the lower portion of the clause are identified as “lower” AdvPs. They are merged between the (active) past participle (on the left) and the complement or subject (on the right). In the case in which several adverbs co-occur together, the fixed order is as in (1):

- (1) *solitamente* (usually) > *mica* > *già* (already) > *più* (any longer) > *sempre* (always)
> *completamente* (completely) > *tutto* (everything) > *bene* (well).

This sequence can be explained taking into consideration the inner characteristics of the AdvPs, and how each of them is transitively related to the others.

For its syntactic property, the Italian negative adverb *mica* necessarily precedes the adverb *già*:

(2a) *Non hanno mica già chiamato, che io sappia.*

'They have not already telephoned, that I know.'

(2b) *¹*Non hanno già mica chiamato, che io sappia.*

'They have already not telephoned, that I know.'

(From Cinque 1999: 5)

These AdvPs can occur together because they don't occupy the same position; therefore, using one of them does not exclude the others: if *mica* precedes *già*, *mica* occupies a higher position than *già* in the clause.

By transitivity², if *solitamente* precedes *mica*, and *sempre* follows *mica* (after *già* and *più*), *solitamente* must come before *sempre*.

(3a) *Ha solitamente sempre ragione lui.*

'He is usually always right'

(3b) **Ha sempre solitamente ragione lui.*

'He is always usually right.'

(From Cinque 1999: 6)

In the fixed order of AdvPs, *sempre* precedes *completamente*, which is followed by *tutto*.

¹ The asterisk (*) refers to an ungrammatical sentence.

² "Transitive law, in mathematics and logic, any statement of the form "If aRb and bRc, then aRc," where "R" is a particular relation, a, b, c are variables, and the result of replacing a, b, and c with objects is always a true sentence." *Britannica*. <https://www.britannica.com/topic/transitive-law>

Furthermore, *tutto* precedes manner adverbs, like *bene/male* (well/ badly).

- (4a) *Ha già detto tutto bene Gianni*
'Has already said everything well G.'
- (4b) **Ha già detto bene tutto Gianni*
'Has already said well everything G.'

(From Cinque 1999: 7)

However, if *tutto* is modified, coordinated or focused it can occur following *bene*:

- (5a) *Hanno spiegato bene pressoché tutto alla maestra.* (modified)
'They explained well almost everything to the teacher.'
- (5b) *Hanno spiegato bene tutto o quasi (tutto) alla maestra.* (coordinated)
'They explained well everything or nearly everything to the teacher.'
- (5c) *Hanno spiegato bene tutto, alla maestra.* (focused)
'They explained well everything to the teacher.'

(From Cinque 1999: 7)

This is the evidence that only the modified adverb can occupy the lowest position in the clause.

At this point, it is necessary to underline that each adverb in the previous sequence does not represent only a specific case, but it refers to the AdvPs of the corresponding larger class. Two or more AdvPs of the same class have the equivalent functions and position in the clause. For this reason, two adverbs of the same class cannot occur together in a clause, because they are in a complementary distribution, even though they could be opposite in meaning. "Lower" adverbs can be substituted as follows:

- *solitamente*: *di solito* ('usually'), *abituamente* ('habitually'), *e normalmente* ('normally')
- *mica*: *affatto* ('not at all'), *neanche/ nemmeno/ neppure* ('not even')
- *già*: *poi* ('later'), *non...ancora* ('not...yet')
- *più*: *ancora* ('still')
- *sempre*: *mai* ('(n)ever')
- *completamente*: *interamente* ('entirely'), *del tutto* ('wholly'), *parzialmente* ('partially'), *in parte* ('partly')
- *tutto*: *niente* ('nothing')
- *bene*: *molto* ('much'), *poco* ('little') (*tutto precedes molto if tutto is stressed*)

Because of the same occupied position of adverbs in the same class, if *più* (any longer) precedes *sempre* (always), *più* should also come before *mai* ((n)ever), which belongs to the same class of *sempre*. However, this does not happen:

(6a) *Lui non ha mai più vinto, da allora.*

'He has not ever any longer won, since then.'

(6b) **Lui non ha più mai vinto, da allora.*

*'He has not any longer ever won, since then.'

(From Cinque 1999: 9)

The contrast in (6) suggests that *mai più* ((n)ever any longer) is a fixed construction. Moreover, these two "lower" adverbs are inseparable. For instance, a participle cannot occur between *mai* and *più*, but it can occur both before and after the fixed construction.

1.2 Higher (sentences) AdvPs

As “lower” AdvPs, “higher” adverbs occur in a fixed structure. As Jackendoff (1972) notes, subject-oriented³ adverbs (intelligently, clumsily) follow in the clause speaker-oriented⁴ adverbs (probably).

Examining the internal hierarchy into detail, it is evident that speaker-oriented adverbs are not homogenous, but they are different one from others, and they can be classified into:

- domain adverbs: e.g. politically, legally;
- pragmatic adverbs: e.g. frankly, sincerely, honestly;
- evaluative adverbs: e.g. luckily, fortunately, happily;
- modal adverbs: e.g. probably, presumably;
- perhaps.

The resulting sequence in a clause is:

- (7) domain adverbs > pragmatic adverbs > evaluative adverbs > modal adverbs > perhaps > subject-oriented adverbs.

Subject-oriented adverbs follow speaker-oriented adverbs, and temporal adverbs (‘now’). The latter are freer than other adverbs. As Jackendoff (1972) argues, temporal adverbs have a partial fixed structure: they have to precede the subject-oriented adverbs in a fixed structure, but they are free with modal evaluative and pragmatic adverbs (speaker-oriented adverbs).

As a result, there are two possible ways in which high adverbs can occur in a clause:

- modal/ evaluative/ pragmatic adverbs > temporal adverbs > subjected oriented;

³ “The subject-orientation of adverbials [...] has been basically described as the scope of influence of an adverbial, such that its content is understood as referring especially to a single clause constituent, the subject, rather than to the whole predication.” (Valera, Hernandez. 1997-1998: 264-265).

⁴ These are adverbs which express a speaker’s attitude or comment about his or her statement (Lewis et al., 2020: 4)

- temporal adverbs > modal/ evaluative/ pragmatic adverbs > subjected oriented.

Consequently, temporal adverbs can be both at the beginning in the highest position, (before modal/ evaluative/ pragmatic adverbs) and after speaker-oriented adverbs, but they must occur before the subject-oriented adverbs.

1.3 Lower (Pre-Vp) AdvPs in VP-final position

As already mentioned in Section 1.1, “lower” (Pre-Vp) AdvPs precede the complement(s) of the verb. However, some of them can follow the complement(s), being merged in VP-final position, the lowest portion of the clause. To better clarify, the only possible sequence of “lower” adverbs is *mica > più > sempre* (Section 1.1).

(8a) *Da allora, non accetta mica più sempre i nostri inviti.*

'Since then, he doesn't any longer always accept our invitations.'

(8b) **Da allora, non accetta sempre mica più i nostri inviti.*

*'Since then, he doesn't accept always not any longer out invitation.

(From Cinque 1999: 6)

However, the order *sempre > mica > più* is plausible in VP-final position. It's possible if all the following statements are verified, as it is showed in (9):

- the object is cliticized⁵;
- *mica più* is stressed;
- there is a pause between *sempre* and *mica più*.

(9) *Da allora, non li accetta sempre (#) mica più.*

'Since then, he doesn't accept them always not any longer.'

⁵ A clitic is a morpheme with syntactic functions, but it cannot be independent and can never be stressed. *Oxford Reference*. <https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095618390>

(From Cinque 1999: 13)

This order of adverbs is possible also with a variation: the object, which is not cliticized, occurs between *sempre* and *mica più*, instead of the pause.

(10) *Da allora, non accetta sempre i nostri inviti mica più.*

‘Since then, doesn’t accept always out invitation not any longer’

(From Cinque 1999: 14)

In other words, all the “lower” AdvPs can occur in VP-final position only if they are reinforced by a specifier. In (9) and (10), *più* is pre-modified by *mica*, therefore, it’s able to carry heavy stress. As Cinque claims, the “lower” AdvPs in post-complement position must occur in the same order in which they occur in pre-VP position.

(11) *Gianni non vince le sue partite già più sempre bene.*

‘G. doesn’t win his matches already any longer always well.’

(From Cinque 1999:14)

On the other hand, “higher” (sentence) AdvP can occur in post-complement position only if they are “de-accented”.

(12a) **Non posso sopportare neanche Carlo onestamente.*

‘I can’t stand C. honestly’.

(12b) *Non posso sopportare neanche Carlo, onestamente.*

‘I can’t stand C., honestly’.

(From Cinque 1999: 15)

As mentioned in Section 1.2, in the higher sentence the adverbs of time are freer than other adverbs. Also in the higher portion of the clause, they show their flexibility in occurrences: they can take place in post-complement position without being “de-accented”, keeping their natural stress.

We have said that the “higher” AdvPs can occur in post-complement position if they are “de-accented”. However, they can occur after temporal, locative or manner adverbs in the post-complement position keeping their stress:

(13) *Hanno dato la notizia a Gianni proprio ora / allora / and so forth.*

'They gave the news to G. just now / then / and so forth.'

(From Cinque 1999:15)

As a result, “higher” and “lower” adverbs occur in a clause as follows:

"Higher" (sentence) AdvPs > "Lower" AdvPs > (DP_{subj}) (V) complements > place, time, manner, etc. adverbials > (focused) "Lower" AdvPs > de-accented material.

1.4 Circumstantial adverbials of place, time, manner

To conclude the explanation of the classification of AdvPs, it is necessary to briefly describe the class of ‘circumstantial’ adverbs, which follow the complement(s) of the verb within the VP. They consist of various elements (place, time, manner, means, company, reason, purpose, and so forth), and have specific characteristics which are summarized as follows:

- They are not fixed in a rigid structure, but they can freely co-occur in the clause.

(14a) He attended classes every day of the week in a different university.

(14b) He attended classes in each university on a different day of the week.

(From Cinque 1999: 28)

- They are produced in the prepositional form, as it is clear in (14).
- Despite their changeable position, they can never take place in pre-VP position (except for adverbs of setting that can occupy the initial Topic position).

1.5 Cases of AdvP movement

How are “higher” and “lower” AdvPs related to each other?

There are two possible answers: first of all, some studies show as adverbs are automatically generated in the two portions of the clause. On the other hand, Cinque tries to explain how the low and the high positions are linked by the movement of adverbs from bottom to up. This movement is possible thanks to the presence of an A-bar chain connecting the two positions.

(15) *Mai Gianni ti farebbe del male!*

‘Never (focus movement) G. would hurt you!’

(From Cinque 1999: 17)

In (15) it’s evident that *mai* ((n)ever) is a “lower” (Pre-VP) adverb that moves from a low position to Focus.

When there are two or more adverbs:

(16) *Tratta già male il suo assistente*

‘He is already treating his assistant badly’

(From Cinque 1999: 17)

In (16) the adverb *già* (already) precedes the manner adverb *male* (badly), correctly observing the sequence of “lower” (Pre-VP) AdvPs (*già* > *male*) seen in Section 1.1. However, in some cases, the movement from bottom to up could change the natural order established between the adverbs, as happens in (17). Here, it’s clear that, through a Wh-

movement, the manner adverb *male* raises to the “higher” position Focus, and precedes *già*.

(17) *Quanto male tratta già il suo assistente?*

‘How badly is he already treating his assistant?’

(From Cinque 1999: 17)

As Cinque claimed, despite the subversion of the order between the two AdvPs (*male* > *già*), *già* still takes scope over the manner adverb *male*.

In (17) it is visible that the subversion of the order of two adverbs is possible only through the movement from the bottom to an A-bar operator position (wh- or focus).

1.6 The AdvPs in Spec and the active past participle movement

In the second chapter, Cinque points out that AdvPs are necessarily merged in the Spec position. If AdvPs move from bottom to up, the movement is from a Spec position to a Spec position. In developing his theory, Cinque starts from Chomsky (1970) and Kayne’s (1994) X-bar structure, in which there is a specifier per projection. Furthermore, the fixed order in which adverbs occur is unusual under adjunctions, but it is coherent under the “location-in Spec” theory, according to which adverbs are on left branches. Finally, Pollock (1989) proved that AdvPs are fixed in a rigid sequence, whereas verbs move. Verb movement across AdvPs is proved as follows:

(18a) *Da allora, non hanno rimesso di solito mica più sempre completamente tutto bene in ordine.*

(18b) *Da allora, non hanno di solito rimesso mica più sempre completamente tutto bene in ordine.*

(18c) *Da allora, non hanno di solito mica rimesso più sempre completamente tutto bene in ordine.*

(18d) *Da allora, non hanno di solito mica più rimesso sempre completamente tutto bene in ordine.*

(18e) *Da allora, non hanno di solito mica più sempre rimesso completamente tutto bene in ordine.*

(18f) *Da allora, non hanno di solito mica più sempre completamente rimesso tutto bene in ordine.*

‘Since then, they haven't usually not any longer always put everything well in order’.

(From Cinque 1999: 45)

In (18), it's clear that there is a head position to the left of the adverb *di solito* (usually) and between all the following adverbs (except *tutto* and *bene*)⁶

Examples in (18) can be summarized and generalized in the following structure:

(19) [X⁷ [solitamente X [mica X [già X [più X [sempre X [completamente X [tutto bene [VP]]]]]]]]]].

It can be seen also for "higher" AdvPs with finite auxiliary verb raising. The movement of the finite V "around" the AdvPs suggests the following structure:

(20) [X [francamente X [purtroppo X [evidentemente X [probabilmente X [allora X [forse X [saggiamente X ...]]]]]]]]]

In (21) it is clear that, despite the verb moves to different head-positions, the sentences remain grammatical:

(21a) *Mi ero francamente purtroppo evidentemente formato una pessima opinione di voi.*

⁶ The first hypothesis is that here is no evidence for head position between *tutto* and *bene*. Moreover, there is a more interesting interpretation: *tutto* and *bene* are in two distinct specifier positions. The (active) past participles must move to the head to the left of *tutto* after it has passed through the head to the right of *bene* and between *tutto* and *bene*.

⁷ Capital Xs indicate head positions.

(21b) *Francamente mi ero purtroppo evidentemente formato una pessima opinione di voi.*

(21c) *Francamente purtroppo mi ero evidentemente formato una pessima opinione di voi.*

(21d) *Francamente purtroppo evidentemente mi ero formato una pessima opinione di voi.*

'Frankly I unfortunately had clearly formed a very bad opinion of you.

(From Cinque 1999: 49)

To sum up, the “location-in Spec” theory leaves “space” for only one XP specifier between two heads in the X-bar theory (Chomsky 1970; Kayne 1994), as proved in (19) and in (20).

In conclusion, Cinque claimed that the unique Spec positions, where the AdvPs are located, are the specifiers of the functional heads of the clause.

1.7 On the Order of Clausal Functional Heads

In Chapter 3, Cinque analyses the order of clausal functional heads without considering the order in which adverbs occur in a clause. He starts his analysis from the Mirror Principle (Baker, 1985), according to which morphology ties together with syntax. Cinque believes that the order of suffixes would reflect a particular order for the functional heads, in the mirrored order. In general, head-initial languages are expected to follow a mirror order with respect to head-final languages. Cinque reaches the conclusion that there is “a single overall order valid for all languages” in which functional heads occur:

(22) Mood_{speech act} > Mood_{evaluative} > Mood_{evidential} > Mod_{epistemic} > T_(Past) > T_(Future) >
Mood_{irrealis} > Asp_{habitual} > T_(Anterior) > Asp_{perfect} > Asp_{retrospective} > Asp_{durative} >
Asp_{progressive} > Asp_{prospective/ Mod root} > Voice Asp_{celerative} > Asp_{completive} > Asp_{(semel) repetitive} > Asp_{iterative}

- Epistemic modals express the speaker's degree of confidence about the truth of the proposition based on the kind of information he/she has;
- Time adverbs are located between epistemic modal adverbs and *forse* ('perhaps');
- Irrealis mood is revealed by *forse* ('perhaps') which can co-occur with *probabilmente* ('probably'), following it. Consequently, *forse* is not an epistemic modal adverb;
- Root modal adverbs express volition, obligation, ability and permission. They occur in a sentence as follows:

Mod_{volition} > Mod_{obligation} > Mod_{ability/permission}.

- Habitual aspect describes actions or states that last for a period of time through adverbs such as 'usually', 'generally', 'regularly' and so on;
- Repetitive/frequentative aspects express iterative actions. Even if "repetitive" and "frequentative" are often used as synonyms, Cinque individuates two separate aspect phrases, calling them the higher Asp frequentative (I) and the lower Asp frequentative (II).

(24) *Gianni spesso esce con la stessa persona spesso.*

'Gianni often dates the same person often.'

(From Cinque 1999: 92)

It's clear in (24) that *spesso* ('often') can occur in two positions (Asp_{frequentative (I)} and Asp_{frequentative (II)}). A similar double position is occupied also by adverbs expressing repetition on a single occasion (such as *di nuovo*, *nuovamente*, 'again'). These adverbs are put in the Spec position of Asp_{repetitive (I)} and Asp_{repetitive (II)}, preceding the adverbs in the Spec position of Asp_{frequentative (I)} and Asp_{frequentative (II)}.

- Celerative aspect is expressed through adverbs as 'quickly', which can quantify over the event or the process, as follows:

(25) 'John quickly lifted his arm.' (Event: 'John was quick in...')

'John lifted his arm quickly.' (Process: 'John did it in a quick way.')

(From Cinque1999: 93)

- Terminative aspect express that a situation/event reached an end point;
- Continuative aspect express that a situation/event has not reached an end point yet;
- Perfect/imperfect aspect refers to a limited duration action;
- Retrospective and proximative aspects in some languages refer to an event that took place a short while before some reference time (retrospective aspect- *appena*, ‘just’), while in certain languages they refer to an event which is going to take place a short while after some reference time (proximative aspect- *presto*, ‘soon’). Despite it is not clear if they are two different aspect or not, Cinque believes in the two-aspect solution: $Asp_{retrospective} > Asp_{proximative}$.
- Durative aspect characterizes a situation that lasts for a certain period of time (Comrie, 1976);
- Generic/progressive aspect refers to some inherent characteristic (of an object) that may not ever be realized;
- Prospective aspect marks a point just preceding the beginning of an event (Frawley, 1992);
- Completive aspect refers to the fact that the action/process has reached its natural end point. *Tutto* (‘everything’) is considered as a "Plural completion" (indicated with $Asp_{PlCompletive}$), because it implies a plurality of items, whereas *completamente* (‘completely’) is considered as a "Singular completion" (marked with $Asp_{SgCompletive}$). *Completamente* can occur in two different positions: the higher position was the “Singular completion”. The lower position follows *bene* and *presto/velocemente* (‘quickly’), *bene* > *presto* > *completamente*. As a result, the completive adverb *completamente* has a double position: $Asp_{SgCompletive}$ and $Asp_{SgCompletive (II)}$.
- Manner adverbs take place in the Spec position of VoiceP, because of their strong morphological relationship with Passive Voice. Manner adverbs such as *bene* (well)

precedes passive past participle. On the other hand, the active past participle necessarily precedes *bene* and *tutto*.

1.9 Conclusions

In his study, Cinque reaches two main conclusions: first of all, adverbs co-occur in a fixed order, occupying the Specifier position of the phrase. This rigid scheme is the same across languages. Secondly, the head morphemes (mood, modality, tense, aspect and voice) are fixed in a unique order which matches systematically the order of adverbs, from left to right. Cinque offers a deep analysis that plays an important role on the scope of adverb placement, achieving a new insight into the structure of UG.

Chapter 2

Previous studies on Adverbs acquisition

In this chapter, I will summarise the previous studies regarding children's language acquisition (Section 2.1). In particular, I will focus on acquisition of adverbs (Section 2.2; 2.3).

2.1 The timing of production in language acquisition

The first significant studies on children's language acquisition can be traced back to the 1960s, when Chomsky (1957, as cited in Brown, 1973) claimed that acquiring a language does not mean to learn a definite number of sentences, but it means to assimilate a specific rule system through which children can generate new sentences. Later, Chomsky (1981, as cited in Pinker, 1984) stated that children acquire a language hearing sentences and expressions in their first years. Before Chomsky's theories, research was built on transcription of children's spontaneous speeches. However, the collected data were not organised to show the developments and changes in children's words, and structures as the passing of time. As a result, these studies were incomplete and useless to understand the process of acquisition (Brown, 1973).

Subsequently, Lust (2006) pointed out that the "positive evidence"¹⁰ is not sufficient for children to acquire a language, because adults cannot give them all the input they need to become familiar with the language of the community. As a result, she introduced the importance for children to be exposed to the "negative evidence" (Lust, 2006). In other words, he refers to corrections made by parents when their children make mistakes from a semantic point of view. Moreover, parents detect errors of word formation, but they are not able to perceive syntactical mistakes. In general, they focus on pronunciation, the

¹⁰ Children acquire the language to which they are exposed (Lust, 2006).

accuracy of allomorphs, and the truthfulness of utterances, but not on syntax. However, researches have not reached an explanation for this ambiguity (Brown, 1973).

Starting from Chomsky's UG theory, Pinker claimed that language acquisition process can be understood through the "learnability-theoretical" approach: thanks to the input available from their parents, children perform mental operations to learn the correct grammatical structure of a language. Children use a kind of innate mental "algorithm" to analyse the input and extract the rules. In their brain, the input¹¹ is divided into words and morphemes (segments), which match and combine into new words. It is important to underline that the child does not use every word he or she hears as input. In particular, it is useful for language acquisition only the words they can catch and understand individually. This confirms the hypothesis according to which the semantic acquisition follows the syntactic one (Pinker, 1984).

Through knowledge of syntax, children can produce new sentences. It is clear that as the child grows, the length of sentences does so too. Researchers have constituted a set of rules to calculate the Mean Length of Utterance (MLU), which individuates five stages during acquisition.

In the first stage, children produce short sentences (from one to seven morphemes). In the following stages, the length increases as children's knowledge does. In conclusion, children create the correct word order only in the fifth stage. This shows that language acquisition is a long process during which words and grammatical structures are not produced all at once, but in different steps chronologically (Brown, 1973).

Differently, Pačesová (1968) divided the language development into three different stages:

- The stage of the first fifty words, in which are mostly produced interjections, appellatives related to people, and verbs describing his or her actions.

¹¹ We consider adults' input as strings of words.

For comparison, a survey of the existing word-categories as found in the first-fifty-word period is given showing their order of frequency: interjections (56.9%), substantives (23.8%), verbs (7.2%), particles (7.2%), adverb (2.8%), adjectives (1.4%), and pronouns (0.4%).

(From Pačesová, 1968: 65)

- The stage of the first one hundred words, where the same word-categories appear, but their frequency changes: substantives (37.4%) has the highest percentage of occurrence, followed by interjections (36.1%) and verbs (13.1%). In this stage, adverbs are the least produced (2.1%).

(From Pačesová, 1968: 115)

- The stage of the first five hundred words shows other changes in word-frequency:

While the substantives (50.5%) remain in the first place, the verbs (25.5%) come as the second most frequent category. The interjections (9.4%) thus appear in the third place. The remaining parts of speech are arranged in the following order: adjectives, pronouns, prepositions, adverbs, particles, numerals, conjunctions.

(From Pačesová, 1968: 215)

In conclusion, even if the process of language acquisition is gradual, children's sentences and word-combinations are mostly analysed when they are around twelve months of life, and beyond.

2.2 The acquisition of adverbs

As seen in Section 2.1, only about 2% of all words acquired by a child are adverbs. Consequently, there is not enough general information about acquisition of adverbs in literature. On the other hand, researchers mostly focus on acquisition of specific classes of adverbs.

Chejnová (2017) focused on the adverbial acquisition of a Czech child, analysing transcriptions of conversations between the child and caregivers. The author pointed out that the classes of adverbs are not acquired all at the same time, rather their acquisition happens in different moments: firstly, the child acquired adverbs of place, followed by adverbs of time, and adverbs of degree; finally, adverbs of manner are acquired.

This is the direct consequence of the fact that adverbs of place have concrete reference. Therefore, they are easily understood. When children talk about something, they can effectively see where it is located. On the other hand, other classes of adverbs have no material existence; due to the abstract references of these adverbs, children find them challenging to grasp. (Piaget, 1969, as cited in Mandić, 2011).

Furthermore, Clark (1971) focused on the acquisition of the temporal adverbs *before* and *after*. She underlined that children between 3 and 5 years of age acquire these adverbs in a unique order: firstly, they do not understand neither of the two adverbs; secondly, they only acquire *before*; thirdly, they recognize *after* as if it had the same meaning of *before*; finally, *after* is accurately acquired. This study shows that children acquire only some of the semantic properties of a new word; subsequently they expand their knowledge throughout exposure to the language ambient. In addition, Harner (1975, as cited in Chejnová, 2017) pointed out that the acquisition of temporal adverbs *yesterday* and *tomorrow* changes among children 2,3 and 4 years, and their use does not always correspond to adult usage. Moreover, Mandić (2011) analysed the frequency of 38 spontaneous temporal adverbs in different age of acquisition. The result shows that among these 38 adverbs, *tomorrow*, *last night*, *the day before yesterday*, and *after* are wrongly reported

by children. This underlines that children often make mistakes¹² in the production of temporal adverbs, expressing past and future time.

On the other hand, Liang, Wu and Li (2019) believed that future temporal adverbs are the most frequent in children's speeches. They studied the development of temporal adverbs of Mandarin children in four age groups (2;6, 3;6, 4;6, 5;6). Although children are able to produce adverbs to refer to past, present, and future time in all ages, they produce significantly more future temporal adverbs than present and past subtypes. Finally, with increased age, children were able to produce all subtypes of temporal adverbs.

Additionally, in his doctoral thesis dissertation, Xu (2016) studied the acquisition of the adverb of frequency *again* modifying goal-PP constructions in English. In this case, the meaning of *again* is ambiguous between a repetitive and a restitutive reading as follows:

(26) John walked to the village *again*.

Repetitive: John had walked to the village before.

Restitutive: John had been at the village before.

(From Xu, 2016: 57)

The repetitive meaning presupposes that the agent has performed the action before; the restitutive meaning presupposes only that the result has already occurred.

The research underlines that, despite the fact that adults rarely use the restrictive reading of *again*, children easily acquire it by age 4 and 5. Moreover, children match their knowledge about syntax and the one related to the meaning of *again* to deduct the restitutive reading of *again*.

Finally, Alvarez (1999) proposed a comparative study on acquisition of the adverbs between English-speaking and Spanish-speaking children, focusing on *almost* ("casi" in Spanish), the manner adverbs *upside down* ("cabeza", "abajo") and other manner adverbs

¹² Mandić (2011) pointed out two different types of mistakes in language acquisition: (i) overextension of meaning, namely children use adverbs in unusual contexts, and in larger senses than adults usually do; (ii) inadequate meaning, namely there is a lack of congruence between the tense used by children and the time to which the adverb is referred.

in ‘-ly’ (“-mente”). Through a series of three designed experiments (two truth-value judgment tasks, and an act-out task), Alvarez proved that children try to attach these adverbs as highly as possible in the syntactic structure, obeying the principle of the UG. In conclusion, there were not any significant syntactic differences between English and Spanish children.

2.3 The acquisition of adverbs in Italian children: a case study

Even if many researchers analysed Italian children’s language acquisition and investigated the development of their first vocabulary, the literature on Italian adverbial acquisition is quite scarce. In particular, Patrizi and Sanfelici (2024) carried out research to both determine the timing in which different adverbial items emerged in Italian children’s early speech, and to reveal how the architecture of adverbial projections develops during acquisition.

Patrizi and Sanfelici (2024) analysed and collected data, investigating the adverbs provided in *Il primo vocabolario del bambino* (Caselli and Casadio, 1995 and later works), in the Italian version of the MacArthur-Bates Communicative Development Inventory (MB-CDI), and in the *Wordbank*. Through data, they pointed out that children start acquiring adverbs before 18 months with a complete acquisition of the target adverbs by age three. Some adverbs like *qui/qua, lì/là, ancora, poco, tutto, tanto* are acquired earlier (by 24 months) than other adverbs like *troppo, oggi, ieri, tardi, molto, di più*, which do not reach 100% even at 36 months. A great increase in the proportion of production (more than 50%) appears roughly around 24 months, as expected since around this period most children undergo a great lexical development.

Moreover, they divided the analysed adverbs into three macro-categories: temporal adverbs, place adverbs and quantity adverbs. As a result, they showed that place adverbs emerge before quantity adverbs, whose production in turn precedes that of temporal adverbs.¹³

¹³ As seen in Section 2.2, Mandić (2011) underlined the contrast between the concrete connotations of place adverbs and the abstract ones of temporal adverbs. For their material existence, the former are acquired before the latter.

However, this study has some limitations: the sources used to collect data do not show the context in which adverbs occur. In some cases, adverbs can modify phrases, but they can also function as arguments. As a result, it is difficult to determine their exact syntactic functions, without clear indications about context. In order to overcome these limitations, Patrizi and Sanfelici (2024) investigated the spontaneous production of 17 monolingual Italian-speaking children with an age ranging from 1;04 to 3;04, collected in the CHILDES database. As seen before, also in this case there is a great variability in the timing of emergence: adverbs like *prima* ‘before’, *poi* ‘then’, *ieri* ‘yesterday’, *già* ‘yet/already’ and *bene* ‘well’ were produced earlier than others like *allora* ‘then’, *forse* ‘maybe’, *oggi* ‘today’. They divided adverbs into five categories¹⁴: Speech Act, Modality, Temporal, Aspectual, and Manner.

Manner adverbs are produced at an early wMLU (weighted Mean Length of Utterance) stage, followed by Aspectual, Temporal, Modality and Speech Act adverbs as follows:

(27) Manner AdvPs > Aspectual AdvPs > Temporal AdvPs > Modality AdvPs > Speech Act AdvPs.

(From Patrizi and Sanfelici, 2024: 12)

Finally, Manner adverbs are located in the lower portion of the hierarchy, and they are associated with the lowest mean wMLU, while Speech Act adverbs, located in the higher portion, are associated with the highest mean wMLU. Finally, the adverbs merged in the middle of the hierarchy are related to a mean wMLU which is intermediate between that of lower and higher adverbs. However, it is not clear how children use this hierarchy.

¹⁴ Adverbs related to quantity and place were not included here.

Chapter 3

The emergence and distribution of Adverbs in English children: a case study

This study investigates one main research question:

Q1. What is the timing of production of adverbs in English children?

This question aims at verifying whether the timing of production found follows Cinque's hierarchy.

3.1 MATERIALS AND METHODS

This research is based on the analysis of one English child's spontaneous speech, collected in the CHILDES database. We analysed the *Lara* corpus, which consists in naturalistic interactions between the target child, Lara, and her relatives.

3.1.1 An introduction to CHILDES database

The CHILDES (Child Language Data Exchange) database (MacWhinney, 2000) is a database of specialized corpora of spoken language, which collects transcriptions of natural conversations between children and adults. Since 1981, when it was created by MacWhinney, CHILDES has been constantly updated. Now, it provides access to approximately 300 million characters (300 megabytes) of child language data, uploaded by researchers around the world. Thanks to the upgrades, scholars can analyse data, which are collected in standardized and organized transcription systems. Transcripts include data on the learning of over 26 different languages spoken by children from different ages.

In the CHILDES project have been developed three separate, but integrated tools for language analysis of transcriptions: the "CHAT" transcription format, the "CLAN" package of analysis programs, and the "CHILDES" database.

All data are collected in the “CHAT” transcription system. In particular, they are stored in the TalkBankDB, where they are freely accessible, browsable and downloadable. Researchers use the “CLAN” tool to compare different children's productions and analyse different parameters, as the MLU. In this way, the three tools work in a complementary way to allow us to identify tendencies in language acquisition.

This program was used in the present study in order to analyse the *Lara* corpus in CHILDES. Lara¹⁵ is a monolingual British English-speaking child, whose conversation with her caregivers (mother, father, grandmothers and grandfather) have been collected in the homonym corpus. It consists of one longitudinal study built on 120 hours of audio-recorded speech between the ages of 1;9.13 and 3;3.25¹⁶, and a written diary record of the child's wh-questions produced between 2;7.21 and 3;3.30. The aim was to record at least one hour's data per week, but to record more if time allowed, so the amount of data varies significantly from week to week. In total, nearly 49,000 child utterances and over 97,000 caregiver utterances were transcribed. In particular, we have examined the available transcriptions between the ages 1;9.13 and 2;6.28, for a total of 43 files analysed.

3.1.2 Method

Once the corpus had been selected, we downloaded it and named each file as in the CHILDES database, specifying the age (year;month.day). Firstly, we have read the first 43¹⁷ files of the corpus; secondly, we have collected all adverbs acquired by the target child, and reported in each file transcription; thirdly, we organized the collected data in pivot tables, structuring them on specific values: age, adverb and adverbial macro-categories. In particular, we analysed the adverbial frequency and the timing of production of the child, proceeding from the particular (considering year, month and day of production) to the general (year of production). Initially, we arranged the age values in columns and the adverbs in rows. Then, we added the third value, i.e. the macro-categories, arranging them on columns and rows alternatively. In this way, we could examine not

¹⁵ The name Lara is a pseudonym.

¹⁶ Intensive data collection was not possible at 2;4 and 2;5 because the birth of the child's younger sister meant that caregivers were unable to devote as much time to recording. Data collection was intensified after 2;6 in order to capture in greater detail the child's acquisition of more complex structures.

¹⁷ Two files (1;09.19 and 2;06.17) of the 43 analysed are empty. As a result, we examined 41 files.

only the singular lexical items, but also the occurrence of the adverbial macro-categories. Consequently, we decided to order the macro-categories occurred in the corpus, matching them with Cinque's hierarchy seen in the first chapter:

- (28) Speech Act (*honestly; frankly; (un)fortunately*) > Modality (*possibly, perhaps; usually*) > Temporal (*already* (2); *now* (27); *today* (5)) > Aspectual (*always; never* (1); *soon* (1)) > (Q)uantifier (P)hrase (*completely; everything; much*) > Manner (*nearly* (2); *properly* (5); *quickly* (1)) > Degree (*enough* (2); *too* (4); *very* (4)) > Locative (*everywhere* (1); *here* (34); *there* (40)).

The frequency of the adverbs considered is given in the Table below:

Category	AdvP occurrences	Total occurrences
Speech Act	0	0
Modality	0	0
Temporal	<i>already</i> (2); <i>first</i> (2); <i>later</i> (4); <i>now</i> (27); <i>soon</i> (1); <i>still</i> (1); <i>then</i> (4); <i>today</i> (5); <i>tomorrow</i> (1); <i>yet</i> (3).	50
Aspectual ¹⁸	<i>again</i> (14); <i>never</i> (1); <i>sometimes</i> (1).	16
QP ¹⁹	<i>more</i> (4).	4
Manner	<i>better</i> (1); <i>fast</i> (1); <i>instead</i> (2); <i>nearly</i> (2); <i>properly</i> (5); <i>quickly</i> (1); <i>really</i> (2).	14
Degree	<i>enough</i> (2); <i>just</i> (18); <i>too</i> (4); <i>very</i> (4).	28
Locative	<i>apart</i> (1); <i>away</i> (18); <i>back</i> (7); <i>down</i> (32); <i>downstairs</i> (4); <i>everywhere</i> (1); <i>far</i> (1); <i>here</i> (34); <i>off</i> (15); <i>out</i> (15); <i>outside</i> (2); <i>over</i> (3); <i>round</i> (6); <i>somewhere</i> (1); <i>there</i> (40); <i>through</i> (5); <i>up</i> (18); <i>upside-down</i> (1); <i>upstairs</i> (2).	206

Table 1: Frequency of AdvPs in English CHILDES corpus.

¹⁸ Among the Aspectual adverbs, the frequentative Aspectual AdvPs are the only ones found in the examined corpus.

¹⁹ QP generically includes quantity-related AdvPs, which can be located lower in the hierarchy.

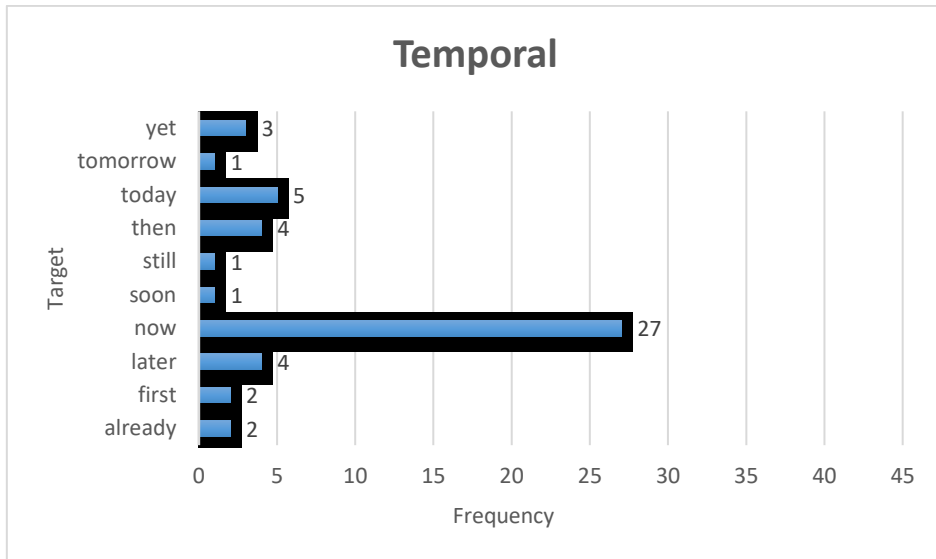
As seen in Table 1, some adverbs were not found in our corpus (such as Speech Act and Modality adverbs), whereas other adverbs (as Locative adverbs) were very highly represented. Finally, there is an extensive occurrence of interjections (*no* (39); *yes* (41)), which do not fit into the Cinque's hierarchy. Interjections are not actually part of the syntactic representation (Browning, 1996, as cited in Cinque, 1999), and they do not add lexical meaning to the sentence.

A total of 398 sentences were annotated. The initial numbers were larger, but we excluded some sentences for several reasons. First of all, in certain cases, the same adverb occurred with the identical functions more than once in the same file; as a consequence, we considered it only once. Secondly, during the process we selected only the sentences with an unambiguous meaning for the research. For instance, some child's expressions were not completely understandable. The transcriber decided to indicate the missing parts with specific symbols, such as *XXX*. If the context was comprehensible enough to catch the meaning of the utterance, we took into consideration the sentence for the analysis; otherwise, it was excluded.

3.2. RESULTS

In order to investigate the emergence of AdvPs, we considered the timing of production in the English target child. In the following graphs, we propose a temporal analysis of the emergence of adverbs, focusing on each adverbial macro-category. In other words, we show how the acquisition of different types of AdvPs progresses over time. Firstly, we divided adverbs in categories, and then we examined them in detail.

In the graph below, we represented the frequency of Temporal AdvPs, while in the table we analysed the timing of production of each lexeme classified as a temporal adverb. We have repeated this procedure for each macro-category. In this way we have illustrated the timing of production and frequency of all acquired adverbs in the analysed corpus (between 1;9.13 and 2;6.28).



Graph 1: Frequency of Temporal adverbs.

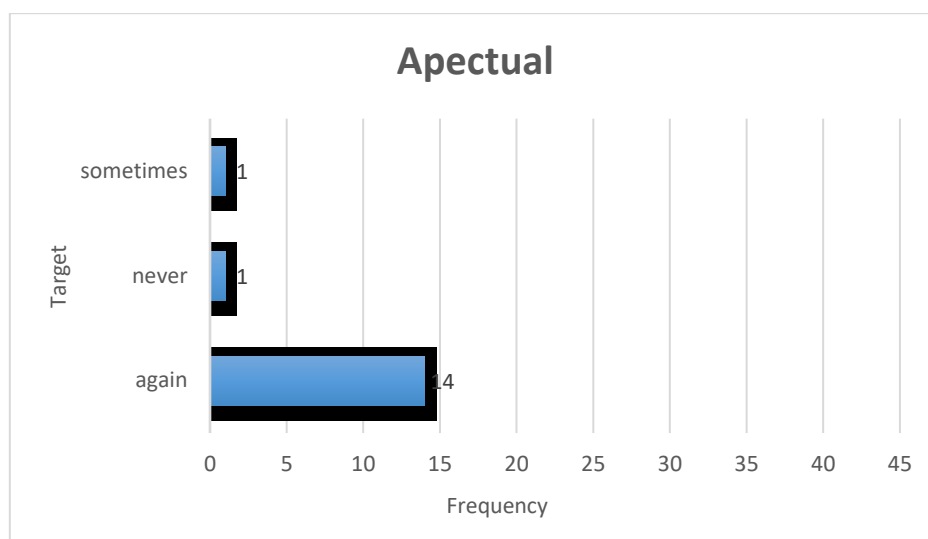
	yet	tomorrow	today	then	still	soon	now	later	first	already
1;9.13										
1;10.7							x			
1;10.18										
1;11.4							x			
1;11.5				x						
1;11.9						x	x			
1;11.26										
1;11.27							x			
2;0.2							x			
2;0.8										
2;0.17			x	x			x			
2;0.19							x			
2;1.10							x			
2;1.11							x			
2;1.16										
2;1.19								x		
2;1.21							x			

2;1.25										
2;2.3							x			
2;2.4							x		x	
2;2.5										x
2;2.14							x			
2;2.17										
2;2.18							x			
2;2.21							x			
2;3.16										
2;3.23	x						x			
2;4.16								x		
2;4.18										
2;5.8							x			
2;5.10							x			
2;5.25					x					
2;6.0							x			
2;6.7									x	
2;6.16							x			
2;6.18	x			x			x			
2;6.19				x			x			
2;6.22	x	x		x			x	x		x
2;6.24							x			
2;6.25					x		x			
2;6.28				x	x		x	x		

Table 2: Timing of production of Temporal adverbs.

Graph 1 shows that ‘now’ (27) is the most produced Temporal adverb; on the other hand, ‘soon’ (1), ‘still’ (1) and ‘tomorrow’ (1) are the least frequent. As we can see from Table 2, ‘now’ is reported almost every day. In addition, while in some days (in particular in the first year) the target child did not say even a Temporal adverb, the 2;6.22 was a highly

profitable day: the largest number of Temporal adverbs appeared, among which ‘*tomorrow*’ emerged for the first time.



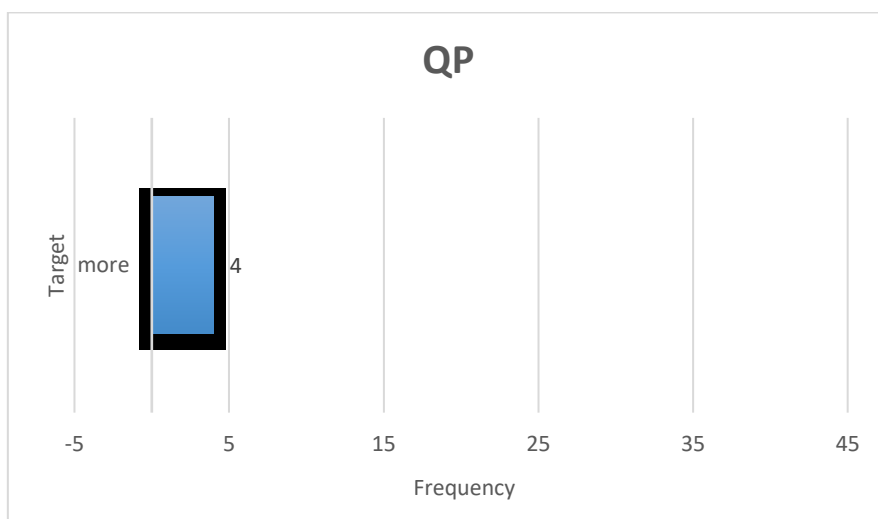
Graph 2: Frequency of Aspectual adverbs.

	sometimes	never	again
1;9.13			
1;10.7			
1;10.18			
1;11.4			
1;11.5			x
1;11.9			
1;11.26			
1;11.27		x	x
2;0.2			
2;0.8			
2;0.17			
2;0.19			
2;1.10			
2;1.11			x

2;1.16			x
2;1.19			
2;1.21			
2;1.25			x
2;2.3			
2;2.4			x
2;2.5			x
2;2.14			
2;2.17			
2;2.18			
2;2.21	x		
2;3.16			
2;3.23			x
2;4.16			x
2;4.18			
2;5.8			x
2;5.10			
2;5.25			
2;6.0			
2;6.7			
2;6.16			
2;6.18			x
2;6.19			
2;6.22			x
2;6.24			
2;6.25			x
2;6.28			x

Table 3: Timing of production of Aspectual adverbs.

Graph 2 illustrates that ‘again’ is the most frequent Aspectual adverb, whereas ‘sometimes’ and ‘never’ appeared only once. As it is evident in Table 3, ‘never’ emerged with ‘again’ in the same day (1;11.27), but not in the identical sentence.



Graph 3: Frequency of QP adverbs.

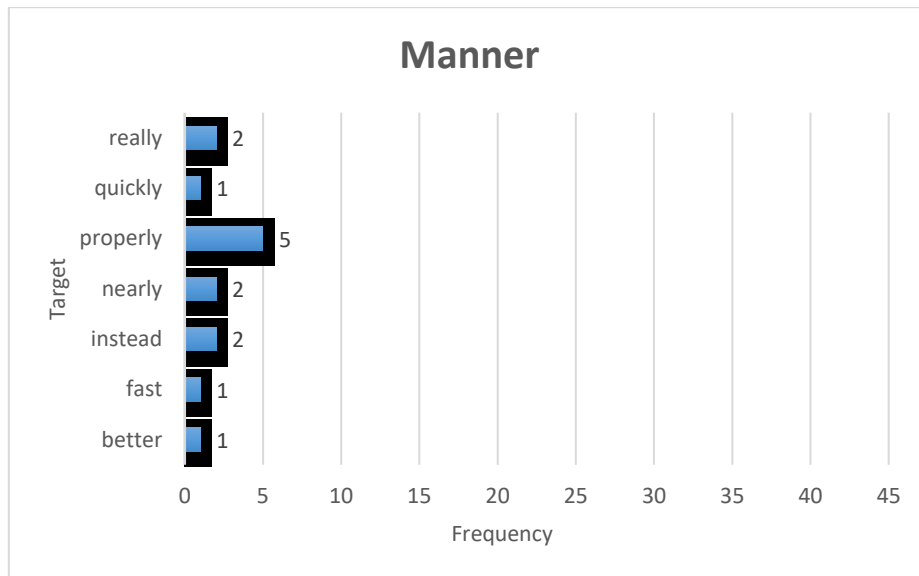
	more
1;9.13	x
1;10.7	x
1;10.18	
1;11.4	
1;11.5	
1;11.9	
1;11.26	
1;11.27	
2;0.2	
2;0.8	
2;0.17	
2;0.19	
2;1.10	
2;1.11	

2;1.16	
2;1.19	
2;1.21	
2;1.25	x
2;2.3	
2;2.4	
2;2.5	
2;2.14	
2;2.17	
2;2.18	
2;2.21	
2;3.16	
2;3.23	
2;4.16	
2;4.18	
2;5.8	
2;5.10	
2;5.25	
2;6.0	
2;6.7	
2;6.16	
2;6.18	
2;6.19	x
2;6.22	
2;6.24	
2;6.25	
2;6.28	

Table 4: Timing of production of QP adverbs.

The QP adverbs are the least found in the corpus (Graph 3). In addition, among this adverbial macro-category, the target child acquired only ‘*more*’. Table 4 shows how the timing of production of this adverb is quite ambiguous. It emerged twice in the first year,

in less than one month. Later, it appeared after almost three months and, finally, in 2;6.19. As a result, it is detected only four times discontinuously.



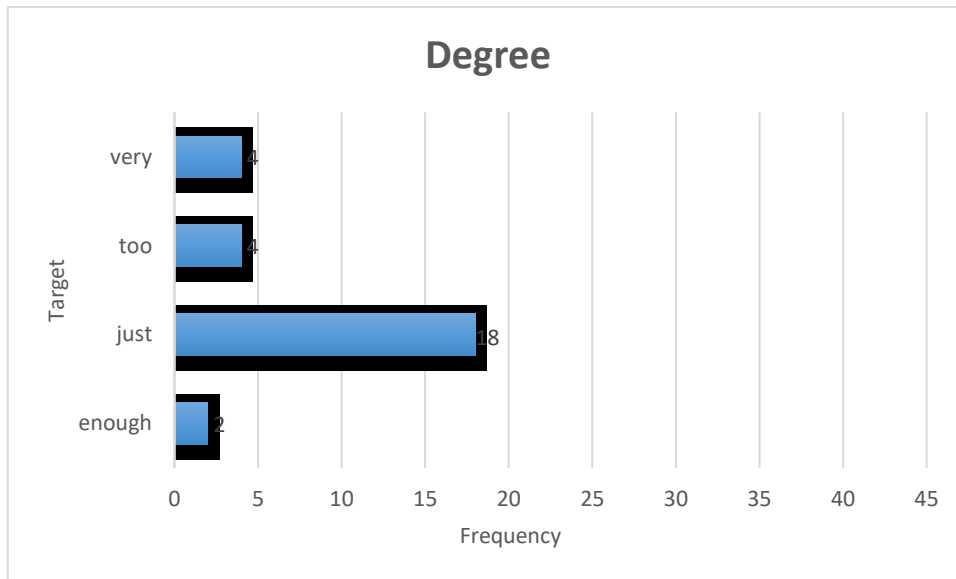
Graph 4: Frequency of Manner adverbs.

	really	quickly	properly	nearly	instead	fast	better
1;9.13							
1;10.7							
1;10.18							
1;11.4							
1;11.5							
1;11.9							
1;11.26							
1;11.27							
2;0.2							
2;0.8				x			
2;0.17							
2;0.19							
2;1.10							

2;1.11							
2;1.16							
2;1.19							
2;1.21							
2;1.25							
2;2.3							
2;2.4							
2;2.5							x
2;2.14							
2;2.17							
2;2.18							
2;2.21			x				
2;3.16							
2;3.23			x	x			
2;4.16							
2;4.18							
2;5.8			x				
2;5.10							
2;5.25	x						
2;6.0							
2;6.7							
2;6.16					x	x	
2;6.18							
2;6.19					x		
2;6.22			x				
2;6.24							
2;6.25	x	x					
2;6.28			x				

Table 5: Timing of production of Manner adverbs.

The frequency of Manner adverbs (Graph 4) is quite scarce in comparison with that of Temporal and Aspectual AdvPs examined before. In fact, the most frequent Manner adverb is ‘*properly*’, which occurs only five times. Table 5 underlines that in the first year, not one adverb is told, only from the beginning of the second year Manner adverbs are detected.



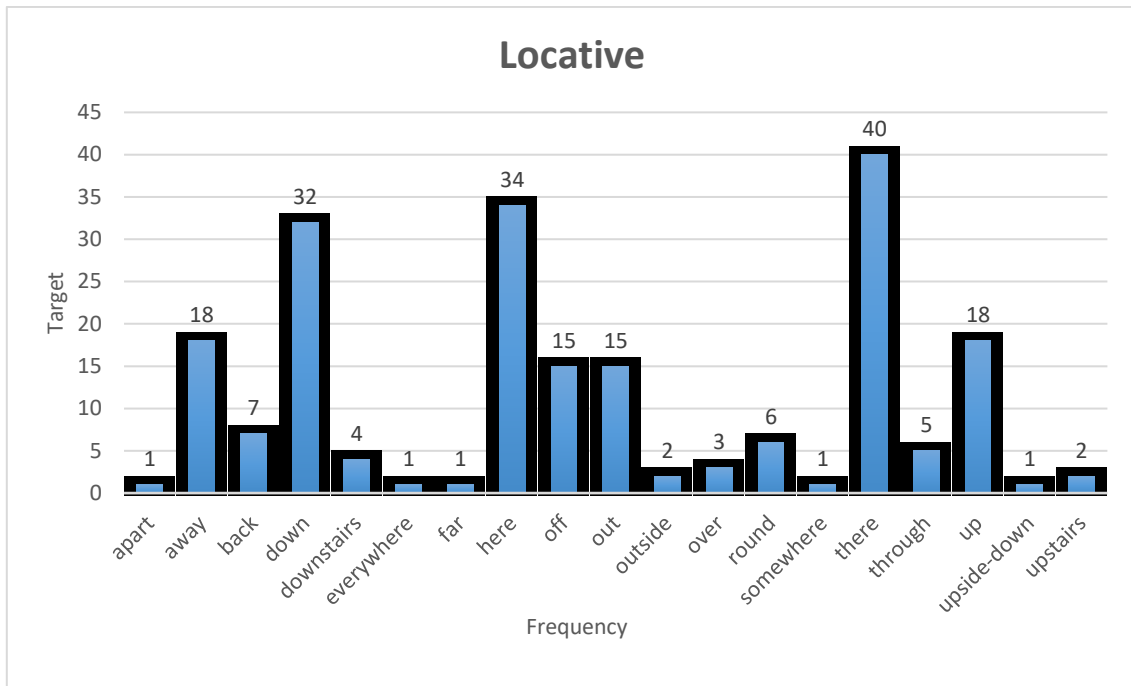
Graph 5: Frequency of Degree adverbs.

	very	too	just	enough
1;9.13				
1;10.7				
1;10.18				
1;11.4		x	x	
1;11.5			x	
1;11.9			x	
1;11.26	x		x	
1;11.27			x	
2;0.2	x			
2;0.8				

2;0.17			x	
2;0.19				
2;1.10				
2;1.11				
2;1.16				
2;1.19				
2;1.21			x	
2;1.25			x	
2;2.3				
2;2.4				
2;2.5		x	x	x
2;2.14				
2;2.17		x		
2;2.18				
2;2.21			x	
2;3.16		x		
2;3.23			x	
2;4.16			x	
2;4.18				
2;5.8			x	
2;5.10				
2;5.25			x	
2;6.0			x	
2;6.7			x	
2;6.16				
2;6.18				
2;6.19				
2;6.22			x	x
2;6.24	x			
2;6.25				
2;6.28	x		x	

Table 6: Timing of production of Degree adverbs.

In the examined period, only four Degree adverbs (*enough*, *just*, *too*, *very*) are acquired (Graph 5). The most current is *just* (18). While *just*, *too* and *very* have been noticed since the first year, *enough* appeared only after two years (Table 6).



Graph 6: Frequency of Locative adverbs.

	apart	away	back	down	down- stairs	every- where	far	here	off	out
1;9.13				x				x		
1;10.7		x		x				x		
1;10.18		x	x	x				x		
1;11.4				x				x		x
1;11.5				x				x		
1;11.9		x		x				x		x
1;11.26		x		x				x		x
1;11.27		x		x				x	x	

2;0.2		x		x				x	x	
2;0.8		x						x		x
2;0.17			x	x				x		
2;0.19				x						
2;1.10				x	x					
2;1.11		x		x				x		
2;1.16				x					x	
2;1.19							x	x	x	
2;1.21								x		
2;1.25		x		x				x	x	
2;2.3			x	x				x		x
2;2.4		x	x	x				x		
2;2.5			x	x	x			x	x	x
2;2.14					x			x		x
2;2.17				x				x		
2;2.18		x		x				x	x	
2;2.21		x		x				x		x
2;3.16		x						x		x
2;3.23	x	x		x	x			x		
2;4.16										
2;4.18		x		x				x	x	
2;5.8								x	x	
2;5.10				x				x		
2;5.25		x		x				x	x	
2;6.0								x		
2;6.7				x						x
2;6.16				x		x		x	x	x
2;6.18			x	x				x	x	x
2;6.19			x	x				x		x
2;6.22		x		x					x	x
2;6.24										

2;6.25				x				x	x	x
2;6.28		x		x				x	x	

Table 7: Timing of production of Locative adverbs ('apart'-'out').

	outside	over	round	some- where	there	through	up	upside- down	upstairs
1;9.13					x	x			
1;10.7					x				
1;10.18			x		x	x			
1;11.4					x				
1;11.5					x				
1;11.9		x			x		x		
1;11.26			x		x				
1;11.27					x		x		
2;0.2					x				
2;0.8					x				
2;0.17					x		x		
2;0.19					x		x		
2;1.10					x				
2;1.11	x		x		x		x		
2;1.16						x			
2;1.19					x	x	x		
2;1.21					x				
2;1.25	x				x		x		
2;2.3			x		x		x		
2;2.4			x		x			x	
2;2.5					x				
2;2.14					x				
2;2.17					x				

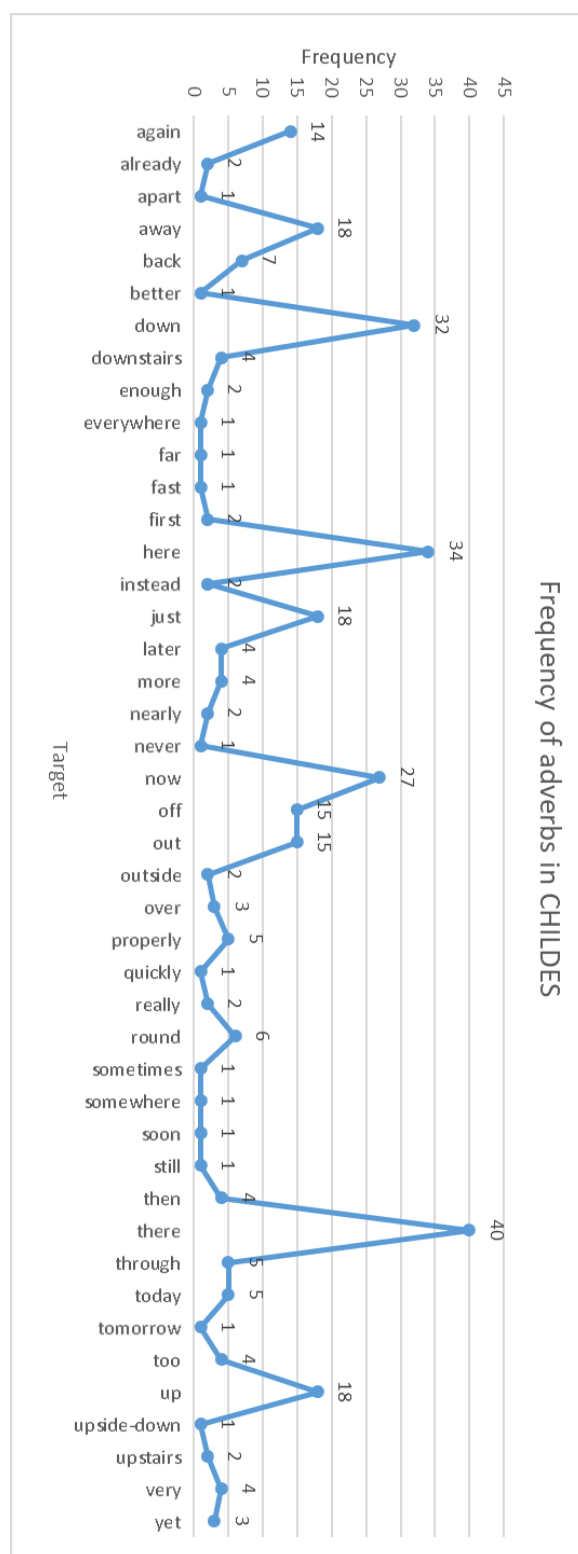
2;2.18					X		X		
2;2.21					X				X
2;3.16					XX ²⁰				
2;3.23					XX		X		
2;4.16					X		X		
2;4.18					X	X			
2;5.8					X				
2;5.10					X				
2;5.25							X		
2;6.0					X				
2;6.7		X			X		X		
2;6.16									
2;6.18					X				
2;6.19					X				
2;6.22				X			X		
2;6.24					X		X		
2;6.25			X		X		X		
2;6.28		X			X		X		

Table 8: Timing of production of Locative adverbs ('outside'- 'upstairs').

Locative adverbs (Graph 6) constitute the predominant part of the acquired adverbs. 'There' is the most current adverb among all AdvPs found in the corpus, followed by 'here'. We have studied the timing of production of Locative adverbs in two tables (Table 7; Table 8) due to space constraints. We can see that 'here' and 'there' appear in almost all analysed files. In addition, we can notice that the target child daily revealed at least one Locative adverb. For instance, in 2;3.23, we found 7 Locative adverbs. Even if Locative AdvPs are early acquired, some of them ('everywhere', 'somewhere', 'upside-

²⁰As already underlined in Section 3.1.2, in each file we analysed the same adverbs with identical functions only once. However, in 2;3.16 and 2;3.23, 'there' is considered twice because it appeared in two different contexts. (i) In 2;3.16, firstly, 'there' emerged alone in a one-word sentence; secondly, it is acquired in a noun phrase ('a poorly there'). (ii) In 2;3.23, 'there' emerged in two different sentences.

down') appeared only once, after two years. The frequencies of all adverbs found in the Lara corpus are reported in Graph 7:



Graph 7: Frequency of adverbs in CHILDES.

Table 9 shows that QP and Locative adverbs emerge earlier than others (1;9), followed by Temporal adverbs (1;10), Degree and Aspectual adverbs²¹ (1;11). On the other hand, Manner adverbs are the last acquired; they emerged at the age of two. In particular, in 1;9.13, the target child acquired ‘down’, ‘here’ (Locative), and ‘more’ (QP). It is clearer in Table 10: the target child acquired all adverbial macro-categories in the first year, except for Manner adverbs. Moreover, we consider the frequency of all macro-categories. Between 1;0 and 2;6, Locative adverbs appeared 206 times. In other words, Locative AdvPs constitute 51,76% of the total adverbs. On the contrary, QP adverbs represent only 1% of the whole categories.

	1;9	1;10	1;11	2;0	2;1	2;2	2;3	2;4	2;5	2;6	total
Temporal	0	1	5	5	4	7	2	1	3	22	50
Aspectual	0	0	3	0	3	3	1	1	1	4	16
QP	1	1	0	0	1	0	0	0	0	1	4
Manner	0	0	0	1	0	2	2	0	2	7	14
Degree	0	0	7	2	2	5	2	1	2	7	28
Locative	4	11	26	18	29	40	13	8	11	46	206

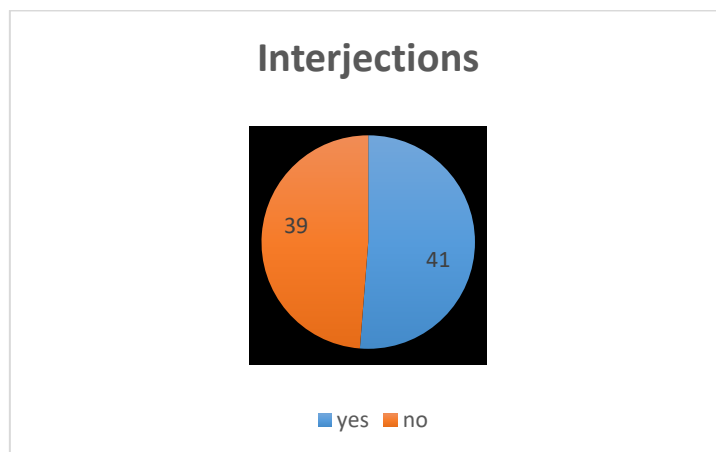
Table 9: Timing of production (year; month) and frequency of adverbial macro-categories.

	1	2
Temporal	6	44
Aspectual	3	13
QP	2	2
Manner	0	14
Degree	7	21
Locative	41	165

²¹ Degree adverbs emerged before Aspectual AdvPs: in 1;11.4, the target child acquired ‘too’ and ‘just’ (Degree AdvP), while the following day ‘again’ (Aspectual Aspectual) was acquired.

Table 10: Timing of production (year) and frequency of adverbial macro-categories.

In conclusion, a few words on interjections are necessary. In our analysis, we collected data on the timing of production and distribution of interjections ('yes' and 'no'). Despite the fact that they do not fit into the Cinque's hierarchy (Section 3.1.2), it is important to underline that they are highly frequent in the examined corpus. Graph 8 shows that 80 interjections are found in the *Lara* corpus. Finally, 'yes' and 'no' emerged in all files (Table 11). These adverbs often occurred alone. Finally, their frequency soared over time, from twice (in 1;9) to 18 times (in 2;6).



Graph 8: Frequency of interjections.

	1;9	1;10	1;11	2;0	2;1	2;2	2;3	2;4	2;5	2;6
interj	2	4	10	7	12	13	4	4	6	18

Table 11: Timing of production (year and month) and frequency of interjections.

3.3 DISCUSSION

This work focused on the analysis of spontaneous speech productions of adverbs in one English child, using the CHILDES database. We have examined 41 files from the *Lara* corpus, which is related to one monolingual English-speaking child, ranging from 1;9.13 to 2;6.28 years. The theory to verify was Cinque's hierarchy of adverbs proposed in 1999, exposed in Chapter 1. In particular, our question aims at verifying if the timing of production of adverbs in English children respects Cinque's hierarchy.

Q1. What is the timing of production of adverbs in English children?

The results of Q1 show that QP and Locative AdvPs are the first adverbs emerged (1;9.13), followed by Temporal AdvPs (1;10.7), Degree AdvPs (1;11.4) and Aspectual AdvPs (1;11.5). Finally, Manner AdvPs are the last acquired (2;0.17). In other words, the target child acquired Temporal adverbs less than one month later than QP and Locative AdvPs. In addition, Degree and Aspectual adverbs emerged about one month later, while Manner adverbs appeared at the beginning of the two years. As a result, the acquisition of distinct adverbial categories differed by only one month.

Furthermore, our findings agree with Chejnová (2017)'s conclusions. She underlined that children acquire different classes of adverbs in a specific order: Locative AdvPs > Temporal AdvPs > Degree AdvPs > Manner AdvPs.

In addition, in our research, frequency matters. Matching frequency and timing of production, our results show that adverbs develop around the second age of life, with some adverbs emerging around 26 months (such as '*better*' and '*properly*'). Considering each macro-category, our findings underline that within a single category, there are adverbs which emerge sooner than others. For instance, in Temporal domain, '*today*' is acquired six months earlier than '*tomorrow*'. In addition, Mandić (2011) pointed out that children make mistakes with adverbs referring to past events ('*last night*') and future ('*tomorrow*'). However, in our analysed corpus, '*tomorrow*' emerged only once²², but in a correct context. Liang et al. (2019) investigated the development of Temporal adverbs in Man-

²² Lara: '*You can't do it tomorrow*' (file 020622).

darin Chinese and found that children produced significantly more future Temporal adverbs than the present and past subtypes. Despite the high presence of future adverbs, present adverbs are the most represented in our corpus, while those referred to the past occur rarely.

As seen in Section 3.1.2 we ordered the macro-categories occurred in the corpus, matching them with Cinque's hierarchy seen in the first chapter:

- (29) Speech Act (*honestly; frankly; (un)fortunately*) > Modality (*possibly, perhaps; usually*) > Temporal (*already* (2); *now* (27); *today* (5)) > Aspectual (*always; never* (1); *soon* (1)) > (Q)uantifier (P)hrase (*completely; everything; much*) > Manner (*nearly* (2); *properly* (5); *quickly* (1)) > Degree (*enough* (2); *too* (4); *very* (4)) > Locative (*everywhere* (1); *here* (34); *there* (40)).

In our corpus, we did not find all the possible items, but we covered almost all positions (except for Speech Act and Modality) within the hierarchy. As seen in Chapter 1, Temporal adverbs are freer than other adverbs: they can occur both before and after Modality AdvPs, which follow Speech Act AdvPs. Because in our corpus Speech Act and Modality adverbs did not emerge, we can hypothesize that Temporal adverbs place at the beginning of the structure. In addition, Temporal is found before Aspectual, QP and Manner AdvPs. Therefore, we expect the following possible order: Temporal > Aspectual > QP > Manner. Furthermore, Degree adverbs are found after Manner adverbs, but just before “*well*”/“*badly*” which occur in the lowest position. Finally, Cinque did not include Locative adverbs in his hierarchy; however, as seen in Section 1.4, circumstantial adverbs of place are not fixed in a rigid order: they can freely occur in the clause, but they can never be placed in pre-VP position. As a result, we placed Locative AdvPs at the lowest position of the clause, following Degree adverbs:

- (30) Temporal > Aspectual > QP > Manner > Degree > Locative.

- (31) *yet/ tomorrow/ today/ then/ still/ soon/ now/ later/ first/ already* > *sometimes/ never/ again* > *more* > *really / quickly/ properly/ nearly/ instead/ fast/ better* > *very/ too/ just/ enough* > *apart/ away/ back/ down/ downstairs/ everywhere/ far/ here/ off/ out/ outside/ over/ round/ somewhere/ there/ through/ up/ upside-down/ upstairs*.

In (31), we have matched all adverbs we have collected in the *Lara* corpus with Cinque's hierarchy. We cannot determine if, in the analysed sentences, the items occur as in the order proposed by Cinque. In fact, in the corpus emerged at most one adverb per sentence. Consequently, we cannot examine how more adverbial items co-occur together. However, we were able to compare Cinque's hierarchy with the order in which the target child acquired adverbial categories. In (32) and (33), the order in which the target child acquired macro-categories is clear:

(32) QP/ **Locative** > **Temporal** > **Degree** > **Aspectual** > **Manner**.

(33) *more/ apart/ away/ back/ down/ downstairs/ everywhere/ far/ here/ off/ out/ outside/ over/ round/ somewhere/ there/ through/ up/ upside-down/ upstairs* > *yet/ tomorrow/ today/ then/ still/ soon/ now/ later/ first/ already* > *very/ too/ just/ enough* > *sometimes/ never/ again* > *really/ quickly/ properly/ nearly/ instead/ fast/ better*.

Comparing (31) and (33), it is evident that the order in which adverbial categories are acquired is not the same as they occur in Cinque's hierarchy. Moreover, in (34) we represent the sequence of adverbs in relation to their timing of production, summarizing all tables seen before. It reflects the order seen in (33):

(34) *down/ here/ more/ there/ through* > *away/ now* > *back/ round* > *just/ out/ too* > *again/ then* > *over/ soon/ up* > *very* > *never/ off* > *nearly* > *today* > *downstairs/ upstairs* > *outside* > *far/ later* > *first/ upside-down* > *better* > *already/ enough* > *properly/ sometimes* > *apart/ yet* > *quickly/ really/ still* > *tomorrow* > *everywhere/ fast/ instead* > *somewhere*.

In conclusion, we can claim that the target child acquired a range of adverbs in a unique order, and later she would be able to build complex constructions in which adverbs co-occur together, following Cinque's hierarchy. Future research could deepen the syntactic order of more adverbs in the same sentence in English-speaker children.

Conclusions

Our aim throughout this study has been to explore the acquisition of adverbs in English-speaker children. To the extent of our knowledge, no previous studies have ever focused on English children's acquisition of adverbs in light of a Cartographic approach (Cinque, 1999). Considering that our research is built on the analysis of spontaneous speech, the main limitations of our findings lie in the inability to explore certain adverbial items because of their absence. As a consequence, we did not have the possibility to make a complete and accurate analysis. Despite these limitations, we offered a comparison between our collected data and previous studies. For example, we proved that Locative adverbs are acquired before Temporal items, according to Piaget (1969) and we agreed with Chejnová (2017)'s conclusions. On the other hand, our findings did not verify Mandić (2011)'s theories. Moreover, after a deep analysis of Cinque (1999)'s seminal work, we showed that the order in which the target child acquired the adverbial macro-categories is not the same as they occur in Cinque's hierarchy (1999). Taken in conjunction with recent literature, our hope is that the findings contribute to stimulate reflection on language acquisition, and highlight areas for further research. To conclude, we were not able to investigate how more adverbs can co-occur in the same sentence, because in our corpus at most one adverbial item appeared in each sentence. As a result, we hope that future studies will complete the missing piece to better understand how adverbs develop in children.

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