Pied-piping in wh-questions:
What do children say about it?

Natalia Pavlou

In partial fulfillment of the requirements for the degree of Master of Arts by research

University of York

Department of Language and Linguistic Science

September 2011

To my mother

An everyday hero

Abstract

Errors/non-target responses characterizing sub-extraction of a wh-phrase from complex DPs in child speech are found in first language acquisition studies (van Kampen 1997 among others) and have provided the basis for arguing the complexity of question formation involving pied-piping.

In this dissertation, data were drawn from 81 children, aged 3;0-6;0, participating in two experiments, with one eliciting a D-linked question in complex phrases such as *inda milo* 'which apple' in Cypriot Greek. The results validated previous literature on sub-extraction phenomena and have provided the first observation for such cases in the specific variety. Errors were characterized by movement of the operator and stranding of the noun in which+NP structures, such as 'which apple'. Another error involved movement of the operator and pied-piping of a noun, but stranding of the second noun in wh+NP+NP structures, such as *ti xroma tsenda* (lit., 'which color bag').

Results from the production experiment show that children show high percentages of omission of the NP in D-linked questions (up to 50%) in all age groups. Their responses involve stranding of the NP (7%-17%), which does not seem to fade out even in the oldest age group. These errors appear across ages when children produce a wh-question with the wh-phrase *ti* 'which'. In a set of responses, where *inda* 'which' is used, errors are found only in the youngest group and do not appear with the successful use of *inda* 'which'.

A comprehension task was later administered to a subset of the children that participated n the production experiment and some of the data collected are used to compare the acquisition of D-linked questions between production and comprehension. Children provided more than 60% successful responses in the comprehension experiment showing a steady development by age. Lower percentages are found in object D-linked questions, suggesting greater difficulty in the comprehension of object D-linked questions in comparison with subject D-linked questions (Goodluck 2005 and subsequent work). Subject D-linked questions initially appear to be acquired at the age of 4, whereas object D-linked questions appear at the age of 6.

With focus on sub-extractions, the Immediate Move Hypothesis is proposed to account for these errors in D-linked questions and other environments of similar type. It predicts the 'optionality' in pied-piping, expands the syntactic term 'shortest' in the Minimal Link Condition and provides a theory of movement in children based on the smallest possible element satisfying the maximum number of requirements in syntax.

The types of errors produced by children involve a logical explanation under which fundamental notions of Minimalism, such as Economy, are expressed through different structures defining these errors as innately-motivated patterns.

List of Contents *Page*

List of Tables *Page*

List of Figures *Page*

Acknowledgments

First, I thank both my supervisors Bernadette Plunkett and George Tsoulas for their suggestions and feedback at different stages of my research. Their expertise and broad knowledge of different topics was much appreciated and used for the merging of methodologies and experiments with theoretical concepts.

Second, I truly thank Tamar Keren-Portnoy, the third member of my dissertation advisory panel, for her valuable comments both on the linguistic side of my thesis, but also in technical issues for the completion of my MA degree (by research) at the Department of Language and Linguistics.

I also acknowledge the financial support from the Department of Language and Linguistics for my participation in conferences.

Part of the methodology used in this thesis was the outcome of long discussions with my close friend and co-author Elena Papadopoulou to whom I owe my sincere thanks. I am certain that the sharing of common interests and the application of her excellent skills in linguistic experiments with innovative concepts will constitute a strong base for future collaborative work.

The identification of errors in wh-questions in child speech was a topic initially discussed in the context of the research conducted by the Cyprus Acquisition Team (CAT) during my undergraduate studies. CAT continuously supported in financial and other ways any efforts made to promote this research. I especially thank Kleanthes K. Grohmann for his

invaluable comments and suggestions on previous and current work and for guiding me towards pursuing a post-graduate qualification in linguistics. Thanks also go to some of the members of the CAT team for their useful comments.

Last, I would like to express my deep thanks to family and friends, and mostly to Panikos Kyprianou˙ even though they are not part of any linguistically related society, they have strongly supported me and offered me their help and feedback in different aspects of my research.

Author's declaration

I hereby certify that I am the sole author of this dissertation, which has not been previously published or submitted for publication.

I certify that my dissertation does not violate anyone's copyright nor violate any proprietary rights to my knowledge. Any ideas, methodologies, analyses, or anything else from work of others that is included, and is published or similarly, is acknowledged following the referencing system of the relevant department. I also confirm that any previous reference to the material included in this thesis has been properly acknowledged in both oral and written (poster) presentations and a full reference of the dissertation, has been provided.

I declare that this is a true copy of my dissertation, including any final corrections and revisions, as approved by my supervisors and my dissertation advisory panel, and that this dissertation has not been submitted for a higher degree or any other degree to any other University.

Chapter 1. Introduction

The study of first language acquisition has been the matter of many debates and discussions in every field related to human uniqueness. Language is the means of differentiating human uniqueness from other living creatures and the mechanism of obtaining this 'charisma' or developing this genetic endowment can lead to a significant and substantial understanding of our own nature. The idea that language acquisition is not random, but rather a heredity of language capability from generation to generation has provided the grounds that children follow abstract principles which are not led by any specific instruction or environmental effects (Chomsky, 1981). According to this view, language acquisition depends on an innate module in each human.

The acquisition of first language by children is a long procedure that may involve a series of stages. Considering that children are exposed to minimal data from adults, who speak the target language, and end up producing a vast number of words and possible syntactic structures in just a few years, this procedure can be fairly called a very quick one. Several studies have been conducted over the last decades aiming to describe and present these stages in detail with regard to the acquisition of different items, structures or sounds. The significance of identifying these stages lies in the importance of understanding the different sequences, patterns and procedures that are taking place in order for an infant's speech to develop to an adult's speech. Each stage reported for each structure in any language contributes to the complete picture of language acquisition between world languages and in that sense, assists the understanding of language groups that show similar patterns across the world.

The current MA dissertation aims to contribute by presenting and analyzing children's speech and reporting the specificities identified in a specific variety. Further, it aims to explore the theoretical background on experimental data and discuss whether the assumptions are predicted or not. The syntactic phenomenon under investigation is Pied-piping in D(iscourse)-linked wh-questions in Cypriot Greek (hence, CG) (in the sense of Pesetsky, 1987). The study of pied-piping in wh-questions has been studied in many ways mainly in the field of theoretical syntax and semantics and many proposals have led the way to a detailed comprehension of the syntax and semantics involved in it.

The acquisition of pied-piping, on the other hand, is not extensively studied and the different approaches to the phenomenon of pied-piping in language have not all been attested. The importance of merging both syntax and acquisition so as to reach more defined conclusions is undoubtedly a great one and I purpose to do this here. Theories may predict that pied-piping should or should not take place in certain syntactic environments with specific semantic interpretations; but, what do children say? The predictions outlined on theoretical grounds may not be met at the first years of a child, or even throughout the procedure of their first language acquisition. The rules that apply in adult speech may be absent in the principles mastered by the child or the child may have not yet set the boundaries for the use of each structure with the equivalent semantic restrictions. These general and abstract thoughts may falsify existent theories or provide further evidence to fully understand this complex syntactic phenomenon.

The investigation of theoretical applications in the acquisition of pied-piping is the ultimate goal of this dissertation. The specificities and idiosyncrasies found in the acquisition of pied-piping in CG and the comparison of them with the variety of

Mainland Greek (hence, MG), which is also used on the island of Cyprus in a certain degree, is a secondary one. Cross-linguistic comparison with other languages will aim to further discussion on the importance of these studies in other languages as well. The research questions of this study are the following:

(a) What are the similarities and differences that can be observed in the acquisition of CG D-linked wh-questions with other languages?
(b) What is the role of the D-linking factor in the late acquisition of D-linked structures?
(c) 'Why' and 'where' do errors appear, if errors can be observed?
(d) What theoretical implications can the errors provide for a theory of grammar?

This study begins with a detailed description of previous or similar studies concerning the pied-piping phenomenon. Studies describing languages where pied-piping in wh-questions is characterized by a movement of the wh-phrase and the relevant NP at the beginning of the sentence are presented first. These are followed by studies in languages where complex interrogative phrases can be achieved by movement of the wh-phrase and not necessarily of the NP.

Chapter 2 provides a description of wh-question formation in CG and focuses on pied-piping structures in Greek generally and the possibility of Split-DPs in the specific varieties. After the theoretical background is given, the problematic aspects which are not applicable in children speech are discussed.

Data for discussion were collected using an elicitation and a comprehension experiment as well as other sources of CG and MG data. These are analyzed in

Chapter 3 with the description of the methodologies, the procedures of the experiments and the findings that are relevant for this dissertation.

The experimental data show the problematic aspects of the acquisition of pied-piping, which are addressed under a theoretical model. Chapter 4 proposes the theoretical ideas that can be assumed to explain the patterns found in early speech in D-linked questions and other similar structures.

This study will explore experimental findings through theoretical approaches and indicate the importance of thinking about the acquisition of Pied-piping. Concluding remarks in Chapter 5 will outline major findings and conclusions of the study and set the course for further future research.

1.1 Theories of Pied-Piping

In simple terms, pied-piping in wh-questions is used to describe the syntactic situation when a phrase larger than a wh-word appears in a fronted position in the clause. In this first case, the wh-word, a determiner moves to the target position and pied-pipes the NP along with it (1a) (in the sense of Ross 1967). Additionally to this classic case of pied-piping, there are other cases, where what is pied-piped along with the wh-phrase is a preposition (1b):

(1) a. Which car are you driving [which car]?

b. To whom did you show your car [to whom]?

In most languages, pied-piping follows the patterns described above but there have been reported cases in Mesoamerican languages, where pied-piping with a wh-

phrase follows a different order to the one usually met in the specific language. Pied-piping with inversion (PPI) (Smith-Stark 1988) is a term used to describe a special word order appearing when a wh-phrase pied-pipes an NP in certain Mesoamerican languages. In these languages, it is rare to find single wh-words such as these exist in English, but they exhibit a more complex system where the wh-word combines with third person pronouns to create 'who' and 'what' (Broadwell and Key, 2004). In Copala Trique, pied-piping is always obligatory in order to form a question involving a possessor or a determiner. There is also a generalized interrogative *me*, which is combined with a noun to function as 'which'. PPI predicts that the possessor phrase *me ze* does not follow the NP in a possession relation in interrogative clauses (2b), even though in declarative contexts the order would be the opposite (Broadwell and Key, 2004):

(2) a. ¿Me ze tocua qui-ranj Waan?
WH N P:house com-buy Juan
'Whose house did Juan buy?'
b. *¿Tocua me ze qui-ranj Waan?
P:house WH N com-buy Juan

(Broadwell and Key, 2004, p. 4)

In which-NP phrases, the determiner status of the wh-word yields the same inversion and the wh-word precedes and does not follow the NP. Following the above, pied-piping with determiners and possessors in head-initial languages seems to follow the order appearing in English.

(3) a. ¿Me ve' qui-ranj Waan?
WH house com-buy Juan
'Which house did Juan buy?'
b. ¿Ve' me qui-ranj Waan?
house WH com-buy Juan

(Broadwell and Key 2004, p. 5)

Two other types of pied-piping are the 'massive' and 'recursive' pied-piping.[1] The first is usually found in restrictive relative clauses and embedded interrogatives. Recursive Pied-Piping is defined as in (4):

(4) *Generalization on Recursive Pied-Piping*

If a wh-phrase α can pied-pipe a constituent β, and if β is in a canonical position to pied-pipe γ, then α can also pied-pipe γ.

(Heck, 2008)

(5) a man $[_{DP}$ whose deckchair$]_2$ you spilled coffee on t_2

a man $[_{DP}$ whose sister's deckchair$]_2$ you spilled coffee on t_2

a man $[_{DP}$ whose sister's lawyer's deckchair$]_2$ you spilled coffe on t_2[2]

In the example above, it follows that recursion is applied in *whose*, which can pied-pipe *the whose sister's deckchair*.

Pied-piping follows mostly all the theories proposed for the fronting of wh-words, so understanding its structure depends very much on a good understanding of

[1] These are described in detail in Heck (2008), who illustrates examples from different languages.
[2] According to Heck (2008), this is only one of the three instances of recursive pied-piping, labeled as recursive Specifiers.

wh-movement in general. Theories of pied-piping usually express the idea that wh-words may have a special property or that the position that they move to has a special property. As discussed by Cable (2008), the definition itself can be presented in many ways. For example, pied-piping can be expressed as the syntactic phenomenon that occurs when "an operation that targets the features of a lexical item L applies to a phrase properly containing LMax" or it can be the case that a pied-piping structure occurs when "a phrase properly containing the maximal projection of a wh-word (or related operator) has undergone fronting".

A standard approach to pied-piping is a process called feature percolation (Chomsky, 1973), which predicts that a mechanism enables features to spread across phrase boundaries. Feature percolation has been seen as feature movement, where the wh-feature of the wh-word undergoes movement outside the projection of the wh-word. Specifically, it is the idea that a node β can transfer features to a node α that dominates β (as explained in Heck, 2009). This idea, as it appears, has empirical problems, but these will not be explicitly outlined here (Heck, 2009). However, there have been several other proposals and theories after the idea of feature-percolation. Heck (2009) proposes that feature checking is performed through Agree (Chomsky, 2000) and not feature percolation, based on the lack of locality restrictions, which are beyond the scope of the current discussion.

Cable (2008) approaches the topic of pied-piping through a more general and recent Q-based approach to wh-movement and follows the theory of Q/WH-Agreement languages (Kratzer and Shimoyama, 2002). Q (Hagstrom 1998) can move on its own, but when it takes a complement it results in movement of an XP. Cable (2008) argues that "an operation triggered by the features of a lexical item is applied to a phrase properly containing the maximal projection of that item" (p.22). Referring

to examples from Tlingit, Cable (2008) also argues that there are no true cases of pied-piping since the fronted phrase in a wh-question never properly contains the Q-particle. He concludes that there is no feature percolation since it is contrasted with the idea of Q/WH agreement, if agreement only looks into features that already exist in the structure.

The topic of Q particles in languages is a very crucial one to assist our understanding of the formation of wh-questions and has been discussed as one of the key elements that need to be taken into account for universality in wh-questions (Soare, 2007). There are languages where the Q features may be represented with the existence of an overt Q particle and there are languages where there is no overt item bearing such feature. To address the issue of the co-existence of the Q feature and the [wh] feature in the structure of an interrogative clause, Soare proposes that there are certain patterns that the two may appear in across world languages. Following her proposal, syncretic focus languages do not split between the Q and the wh features, but have the two syncretic on one head and movement depends on the existence of an EPP feature on Foc head. Non-syncretic focus languages split between the Q-feature which is expressed as the Q-particle and the [wh] feature and the presence of an EPP feature is related with the [Q] feature.

In an application of the Q-particle theory, Yeo (2010) uses the concept of QP to explain the optionality in French Split-DPs. “Specraising” is referring to movement of the operator to the Spec of the QP phrase and “SpecPied-piping” means the movement of the pied-piped phrase.

The ‘Pied-Piping problem’ also includes the understanding of the operations involved as well as the link between the interfaces of syntax and semantics. There

have been different theories during the last decades, concentrating on the overt or covert interpretation of pied-piped elements in wh-in-situ structures (Reich, 2002). A starting point was Nishigauchi's (1990) conclusion that there is pied piping in LF in Japanese, which was enriched with von Stechow's (1996) 'WH-structure' as a second abstract syntactic component and where the pronominal wh-phrase adjoins to the pied-piped phrase. This 'Reconstruction Approach' aimed at explaining the correct interpretation of in-situ wh-phrases. Criticism against this approach showed that it predicts wh-movement which is sensitive to islands in LF as well as problems with remnant movement in multiple wh-phrases. A follow-up approach looks for a solution to the interpretation of the restriction of pied-piped phrases. Reinhart (1994) introduces a choice function variable f to represent this restriction and gives a purely semantic solution to the problem. Counter-evidence from multiple questions was applied as criticism to this approach. A rather different approach was given by Rullmann and Beck (1998) who argued that the semantic restriction of which-phrases should be interpreted in-situ and it should be considered as a presupposition.

To address the problem of the restriction interpretation in in-situ wh-phrases, Reich (2002) follows a structural approach through feature percolation. He argues that covert movement of [+wh] and [+P] (phrase) occurs to higher functional projections on top of the wh-phrase. These functional projections look like a 'small' CP which is like the 'large' CP. With Reich's system both simple and complex wh-phrases are interpreted in a uniform way, following a 'Cartesian' model of the wh-phrase restriction and the only difference is the special functional projection wP found in complex wh-phrases.

The theories discussed above concentrate on the understanding of the existence of pied-piping in language, but pied-piping can be optional in some

languages. The optionality of pied-piping is discussed by Cable (2008), who proposes that pied-piping and sub-extraction generally occur in free variation with one another. He draws his conclusions based on the Q-based approach as discussed above and the fact that there are several languages and structures where both can appear. We turn in the next section for further relevant discussion.

1.2 Partial Pied-Piping, Split-DPs and Optionality

One of the most significant aspects of the pied-piping puzzle is the reasons lying underneath the optionality of the bare operator movement only, as found in certain languages. French, for example, shows optionality in the movement of the NP with the same interpretation maintained in both cases (5a and 5b):

(6) a.**Combien**$_i$ as-tu lu **de livres**?
how-many have-you read of books
b. **Combien de livres** as-tu lu
how-many of books have-you read
'How many books have you read?'

Movement of the bare operator can be the result of the Economy principle, which is a substantial principle of the language mechanism or it could be something completely different. If there is a more economical way to pied-piping that has the same interpretation, then the existence of pied-piping is highly challenged.

These puzzling questions have been addressed through a lot of theories and many examples. One of these examples was provided as an argument to support Last Resort (Chomsky 1995). Last Resort is a theory predicting that pied-piping occurs so that the structure will not crash at LF. It predicts that "if γ moves within Σ, then γ must check some probe on the Σ-cycle" (Heck 2008, p. 189). Heck follows the idea that if there is a constraint C that requires movement and is more important than Last Resort, then there can be movement which is not feature-driven. This theory does not appear to be supported by the errors produced by children (discussed in Chapter 3 and 4), as Last Resort does not apply and hence children' speech constantly violates the Pied-piping constraint.

Another well-known approach to the optionality in pied-piping is called Distributed Deletion (Fanselow and Cavar, 2002). They argue that a deletion operation may delete either of two copies created after Movement in a non-strict deletion theory of movement. Under their approach, different features exist when a structure of Split-DP appears. Namely, a [+wh] is the higher copy, which is deleted, while the other one has a [+Foc] feature. In the case of pied-piping, only the [+wh] feature exists in the structure. Consider the following example from Serbo-Croatian:

(7) a. [CP **Na jaki** Marek **dach** kocił]?
on what-kind Marek roof jumped

b. [CP **Na jaki** **dach** Marek kocił]?
on what-kind roof Marek jumped
'On what kind of roof did Marek jump?'

(Butler and Mathieu 2005)

One would expect that if a language has the possibility of 'choosing' which copy to delete every time, then this would be generally applied across the different structures

bearing the same features within the same language. As discussed in Chapter 2, CG has Split-DPs structures which involve a possession wh-phrase, but such optionality is ruled out in the case of which-NP questions.

A third major account of Split-DPs is Remnant Movement (Starke, 2001; Kayne, 2002), which predicts that an X item would be extracted from a constituent and then the constituent would move to its target position. Case licensed to moved NP is the apparent trigger for such a movement to a functional projection. As this proposal was made for French *combien*-constructions, which allow Split-DPs in adult language, no support can be given for which-NP structures discussed in this study. Given the different structures involved, the lexical properties involved could differ, as also pointed by Gavarró & Solà (2004a).

By comparing full and partial movement, Butler & Mathieu (2005) argue that there is a fixed scope in a Split-DP structure, which in certain environments may appear ungrammatical or ambiguous. There are also differences found in the agreement of the past participle between full and partial pied-piping in French. Additionally, they emphasize the mystery around the split of PPs by presenting structures from French illustrating a relevant point. Other differences which they enumerate involve the thematic, the reconstruction and the stress problem.

To address the problem of Pied-piping, Butler and Mathieu (2005) suggest that there is a visibility requirement in syntax that plays a functional role in question formation. Specifically, "it ensures that an overt signal is made" and identifies the type of question that is being asked (p.11). They add that structures with *combien* 'how many', which allow optional sub-extraction in French, check a feature to satisfy the visibility requirement.

A rather different approach to explain the syntax of non-canonical quantification of Split-DPs (Mathieu, 2002) describes the stranded noun as a predicative indefinite, which denotes a property. In his analysis, Mathieu argues that there is a quantificational element that takes scope where it is merged and that full pied-piping is correlated with focus. But, partial movement is related only with focus on the operator and a topic function for the stranded noun. An important conclusion of this analysis is that movement in a Split-DP is not triggered by features; it is a pragmatically-related phenomenon.

Last, there has also been some work on Split-DPs in Modern Greek (Mainland Greek). Mathieu and Sitaridou (2005) discuss split wh-constructions and the grammaticality of them in Classical Greek. In Classical Greek, split wh-constructions were possible:

(8) a. Tina dynamin echei?
which.ACC power.ACC have.3SG
'What power does s/he have?'

b. Tina echei dynamin?
which.ACC have.3SG power.ACC
'What power does s/he have?'

The same optionality does not appear today for wh-questions in MG (Horrocks and Stavrou, 1987), except in the case of *pianu* 'whose'. Through a series of examples regarding the split between adjectives and nouns and negative quantifiers, Mathieu and Sitaridou (2005) conclude that variation originates from the lexicon and not for a parametric reason. In their paper, they emphasize the importance of morphologically rich systems that allow Split-DPs and follow an analysis based on predicate inversion. Split-DP derivation is given in a way that an extracted element, which is an adjective

with a determiner, is extracted and φ-features allow for the empty noun to be licensed. The adjective then undergoes inversion driven by an EPP feature and moves to a relevant position higher up in the structure. With regard to the possibility of a Split wh-construction involving a wh-possessor, Mathieu and Sitaridou (2005) argue that loss of rich morphology plays a crucial role. However, they identify that in some registers, even split of wh-possessors is impossible. The reason for this, they argue, is the potential ambiguity between a genitive and a dative reading of *tinos* and *pianu* 'whose' in MG, where the direct object is assigned ACC and the indirect object DAT case. In CG, the Split wh-possessor does not appear as in MG, but ambiguity appears as predicted by Mathieu and Sitaridou (2005). We will return to this issue in the next chapter.

Different theories have been proposed to explain the phenomenon of pied-piping and the optionality of splitting a DP in certain languages. It is sometimes the case that not all theories are supported by empirical idea since not all theories are built based on the same populations. By looking into data from children, we can identify the application of the proposed theories or find something completely different that can explain the beginning of the acquisition of pied-piping in language. Before proceeding to the actual experiments in Chapter 3, we need to explore the wh-syntax of CG, which is the variety under discussion.

Chapter 2. Wh-questions in Cypriot Greek

The study of wh-questions has been pursued in the literature of CG in different ways. The interest lies in the special nature of the Cypriot-specific wh-phrases and their possible function as cleft-like forms or their combination with focus Complementizers. To introduce the matter, it is important to note that in CG, there is use of wh-phrases also found in MG. Additionally, there are types of Cypriot-specific wh-phrases, which are not found in MG. To distinguish these, wh-phrases as used in MG will be labeled as MG wh-phrases, while the rest will be labeled as CG wh-phrases, following the table below:

MG	CG	Meaning
pios/pjos	*pcos*	'who'
ti	*ti/ inda mbu*[3]	'what'
pu	*pu*	'where'
pote	*pote*	'when'
poso	*poso(n)*	'how much'
jati	*jati/ inda/ inda mbu*	'why'
pos	*pos/ indalo(i)s*	'how'
(apo pu)	*pothen*	'from where'

Table 1 Wh-questions in CG

There are many similarities between the MG and CG wh-phrases, as also noted by Grohmann and Papadopoulou (2010), but *inda* and its variants remain specific to CG.

[3] *Inda mbu* is sometimes treated as a single element, depending on the analysis assumed (see Pavlou, 2010a; Papadopoulou, in progress; Kanikli, 2009)

Simeonidis (2006) reports that *inda* is derived from the pronoun *tinda*, used in Asizes[4]. Contrary to the MG wh-arguments, *inda* is not inflected for gender, number or case.

Of special interest has been the issue of *embu* in CG, which is a lexical item appearing optionally in wh-questions. Grohmann, Panagiotidis and Tsiplakou (2006) first analyzed syntactically the distribution of *embu* with wh-arguments and suggested the idea that sideward movement into a cleft small clause is taking place for *embu* to appear. Panagidou (2009) follows the same assumptions and extends the idea of a cleft-like structure in wh-phrases like *inda mbu* 'what', but without extensively discussing it. A contrastive point of view (Kanikli, 2009; Papadopoulou, in progress) argues against a cleft structure by claiming that *embu* is a focus Complentizer, which is not inflected by tense and does not accept negation.

(9) a. Pcos embu efie?
who.NOM is-(it)-that left.3SG
'Who left?'

b. Pcon embu ides?
whom.ACC is-(it)-that saw.2SG
'Who did you see?'

c. Pote embu epies?
when is-(it)-that went.2SG
'When did you go?'

d. Pu embu epies?
where is-(it)-that went.2SG
'Where did you go?'

[4] This is "a text of laws from the island dating to 10th and 11th centuries" (Grohmann & Papadopoulou 2010:79)

e. Jati embu epies?
why is-(it)-that went.2SG
'Why did you go?'

f. Indalos embu epies?
how is-(it)-that went.2SG
'How did you go?'

Pavlou (2010a) reports that *ti* 'what' and *jati* 'why' cannot be combined with *embu*, but they take the form appearing in Table 1 as *inda mbu* 'what' or *inda*/*inda mbu* 'why'.

(10) a.*Ti embu efaes
what.ACC is-it-that ate.2SG
'What did you eat?'

b.?Jati embu epies
why is-it-that went.2SG
'Why did you go?'

While these are marked as ungrammatical and odd correspondingly, one could say that they sound more like a combination of MG and CG and thus, do not sound natural to a native speaker. Pavlou (2010a) offers a detailed description of similarities and differences between *inda mbu* 'what' and *inda*/*inda mbu* 'why'. Aiming at a comparison of *inda*-wh-phrases and clefts, Pavlou (2010b) also reports findings from children acquiring CG that will be discussed in some detail in Chapter 3.

The main focus of this thesis, however, is concentrated on pied-piping as seen in complex wh-phrases or as otherwise known D-linked wh-phrases (Pesetsky, 1987). A prototypical pattern characterizing D-linked wh-phrases is given by a wh-phrase and a noun (which+N). Their pragmatic function determines that the wh-phrase is limited to a set of objects that have been previously established or appear in the discourse.

In CG, D-linked wh-phrases appear with the MG-like *ti* 'what' and the Cypriot-specific wh-phrase *inda* 'what' (11a & 11b):

(11) a. Inda tsenda kratas?
which bag.ACC holding,2SG
'Which bag are you holding?'

b. Ti tsenda kratas?
which bag.ACC holding.2SG
'Which bag are you holding?'

Table 1 does not include *inda* having the meaning 'what'. The reason is that while *inda* 'what' appears in texts (Simeonidis, 2006) and is in use with the same meaning only by certain minorities in Cyprus today. It is also found in 'frozen' expressions used across the island (as in (12 and 13) taken from Pavlou, 2010a), but it does not appear to be a possible wh-object in any other free distribution.

(12) a. Inda kori?
what girl
'What's up girl?'

b. Inda kamnis?
what doing.2SG
'How are you?'

(13) a. Inda na kamo?
what to do.1SG
'Do I have another choice?'

b. Inda na pis?
what to say.2SG
'There's nothing to say!'

Note, however, that even though *inda* 'what' does not appear widely as a possible wh-object, it has preserved its determiner status in D-linked wh-phrases.

A further note on the distribution of *inda* 'what' in D-linked questions is given considering the examples in (14). Grohmann and Papadopoulou (2010) note that *inda* 'why' cannot remain in-situ and always need to be fronted, but *inda* 'what' in a complex wh-phrase can be found in-situ (14b).

(14) a. Inda vivlion θkiavazi o Nikos?
which book.ACC reading.3SG the Nick.NOM
'Which book is Nick reading?'

b. O Nikos θkiavazi inda vivlion?
the Nick.NOM reading.3SG which book.ACC
'Nick is reading which book?'

We can assume then that when *inda* 'what' is found in a complex wh-phrase, it is found in the position of the D head.

(15) $[_{TP}$ O Nikos$[_{T'}$ θkiavazi$[_{vP}$ ~~O Nikos~~ ~~θkiavazi~~$[_{VP}$ ~~θkiavazi~~ $[_{DP}$ inda vivlion]]]]

This assumption captures the findings across languages (Mathieu and Sitaridou, 2005 among others) that a D-linked wh-phrase cannot co-occur with a determiner and a noun[5], as observed in (16):

[5] This is a constraint to certain wh-words, but as we will seen in Section 2.2. *tinos*/ *pciu* can be followed by a determiner.

(16) * O Nikos θkiavazi inda to vivlion?
the Nick.NOM reading.3SG which the book.ACC
'Nick is reading what book?'

It should be noted that *inda mbu* 'what' (or 'why') obligatorily always undergo movement to the initial position of the clause. *Inda mbu* 'what' or 'why' and the underlying reasons explaining why it cannot remain in situ will not be discussed here (see Pavlou, 2010a for discussion of *mbu* being merged higher up in the clause).

This section has provided a picture of the status of wh-phrases in CG and the specificities of question formation. Following the examples given above, *ti* and *inda* 'which' are the two pre-nominal wh-phrases in CG, which are assumed to occupy the head position of a DP.

2.1 Split-DPs in Greek

Split-DPs can be fairly called an extension of the pied-piping puzzle, which is discussed extensively for languages that allow both to appear. As already introduced in Chapter 1, French is widely known to have the '*combien*-questions', where pied-piping appears as optional:

(17) a. **Combien**$_i$ as-tu lu **de livres**?

how-many have-you read of books

b. **Combien de livres** as-tu lu?

how-many of books have-you read

'How many books have you read?'

(Butler and Mathieu, 2005)

This phenomenon was given different approaches from time to time as reviewed in Chapter 1 (Section 1.2).

Split-DPs, or better split wh-constructions, were allowed in Classical Greek as presented in Mathieu and Sitaridou (2005). At that time, wh-elements did not need to raise together with the relevant nominal. These structures appear with the use of *tis*, which was inflected for phi-features. Today, the possibility for split-constructions as shown in MG appears only in wh-constructions that involve a possessor marked with genitive Case (Table 2).

Classical Greek	MG	CG	Meaning
tis-tina-tis	*ti*	*ti*	'what'
	tinos$_{POSS}$	*tinos*$_{POSS}$	'whose'
	Pianu/Pjanu$_{POSS}$	*Pcu*$_{POSS}$	'whose'

Table 2 Wh-phrases that allow(ed) Split-DPs

As shown in the table, CG follows a similar pattern in strictly not allowing any split-DPs in wh-constructions except in the case that a possessor element is involved.

Although MG and CG can use the same wh-phrase, namely *tinos* 'whose', it appears to be the case that Greek Cypriot speakers disallow the possession reading, when there is a possibility of a second reading. The availability of sub-extraction from a *tinos*-phrase, with no change in meaning can be seen in (18b) for MG. When *tinos* is separated from *to vivlio*, as in (18b), the same interpretation is possible. Although CG also employs *tinos*-phrases, when the reading in (19) is available, the reading corresponding to (18b) becomes unavailable, as given in the glosses:

(18) a. Tinos to vivlio eferes?
whose.GEN the book.ACC brought.2SG
b. Tinos eferes to vivlio?
whose.GEN brought.2SG the book.ACC
'Whose book did you bring?' (MG)

(Horrocks and Stavrou, 1987, p.89)

(19) a. Tinos to vivlio eferes?
whose.GEN the book.ACC brought.2SG
'Whose book did you bring?"
b. Tinos eferes to vivlio?
whose.GEN brought.2SG the book.ACC
'Who did you bring the book to?' (CG)

Tinos in (19) is interpreted as the indirect object of the ditransitive verb *ferno* 'bring'. In contrast, when *tinos* or *pcu* 'whose' is used with a monotransitive verb then the

interpretation given necessarily involves the possession relation and in this case sub-extraction of *tinos* or *pcu* is available in CG:

(20) a. Tinos extares to aftokinito?
whose.GEN scratched.2SG the car.ACC
b. Pcu extares to aftokinito?
whose.GEN scratched.2SG the car.ACC
'Whose car have you scratched?'

It follows that movement of MG *tinos* 'whose' in ditransitive structures takes place from a DP, which expresses a possession relation with 'the book'. In CG, the wh-phrase is a different DP functioning as the indirect object, which is usually assumed to be adjoined to the verb.

While these two possible structures capture the facts as they are, the reasons for the typological difference between two closely related varieties are unclear. This can lead to the conclusion that both structures are possible with the same wh-question, but only one of them actually is grammatical in CG. To provide further explanations, we need to examine the possible readings that ditransitive verbs have in CG. The examples given in (21) involve a type of optionally ditransitive verb:

(21) a. Egorasa to aftokinito tis Marias
bought.1SG the.DET car.ACC the.DET Maria.GEN
'I bought Maria's car'
'I bought Maria the car' or 'I bought the car for Maria'

b. Egorasa aftokinito tis Marias

bought.1SG car.ACC the.DET Maria.GEN

'I bought Maria a car' or 'I bought a car for Maria'

As observed in (21), in the absence of a determiner the meaning in (21b) is restricted and does not allow for the possession interpretation as in (21a). Without proving any arguments at this point, determiners may be related with specificity and thus, creating the restriction for a possession relation.

Having explained the restrictions on Split-DPs in CG, we will end this chapter by concluding that there is a possibility for sub-extraction in Cypriot, which differs from similar cases in MG. A similarity between the two varieties is that this possibility appears only in possession phrases in wh-questions, and therefore does not necessarily constitute an example for generalizing sub-extraction in wh-questions.

2.2 A motivation for the study

As we have seen, languages differ typologically in whether they allow Split-DPs in interrogative and other environments.

The typological differences between MG and CG, as well as other languages, seem to suggest that there is parametric variation with regard to the optionality observed in pied-piping phenomena in wh-questions. This leads to question of whether pied-piping restrictions are in place from the beginning of language acquisition and whether this typological difference between languages can also be observed in children. Studies, such as van Kampen (1997) have shown that children

use Split-DP structures in their speech in languages that do not allow Split-DPs. Should children acquiring a language like CG, where Split-DPs are not widely allowed, be expected to over-generate the use of sub-extractions from wh-phrases?

In order to examine the true nature of split-DPs, or better the sub-extractions in child speech, this study will use data from experiments administered to Greek Cypriot speakers, which are explained in detailed in the next Chapter.

Chapter 3: Acquisition of D-linked questions in Cypriot Greek

As will be described in section 3.1, many studies have suggested that there are difficulties and abnormalities in the acquisition of D-linked questions. As we will see, this has been found in the omission of NP's from the complex structures of D-linked questions, the lack of movement of the NP along with the operator, the type of question preferred and other problems. These findings are reported by several studies that are mentioned below. Even though these studies refer to a variety that is also used in some extent in Cyprus (Asproudi, 2011) no explicit study has been undertaken to study the acquisition and the possible error patterns in CG. This chapter begins with a review of these studies, before turning to an examination of the same issues in CG.

This dissertation targets the study of the path of acquisition of D-linked questions in Greek Cypriot children in an attempt to understand the complexity of the pied-piping phenomenon in this type of structure. It will also explore the view that pied-piping and D-linking cause the difficulty in the acquisition of these structures. More specifically, the research questions, presented in Chapter 1 and repeated below, will be further addressed.

(a) What are the similarities and differences that can be observed in the acquisition of CG D-linked wh-questions with other languages?
(b) What is the role of the D-linking factor in the late acquisition of D-linked structures?
(c) 'Why' and 'where' do errors appear, if errors can be observed?
(d) What theoretical implications can the errors provide for a theory of grammar?

Data will be drawn from an elicitation and comprehension task on D-linked questions in child groups and this study will aim at an understanding of the errors produced which can be crucial for a theory of pied-piping in wh-questions.

Following the possible diglossic or *bi-x* (Grohmann, 2011) context in Cyprus, as introduced in Chapter 2, this study aims to examine the competence of Greek Cypriot children in the production and comprehension of D-linked questions and looks at the different patterns identified to show any difficulties related to acquisition in a multi-linguistic environment. A diglossic effect would be relevant only if there is an effect appearing in the use of MG wh-phrases, which did not appear with the use of Cypriot wh-phrases. The elements used in the production experiment described below are Cypriot-specific and thus, offer grounds to support their preference and use by children growing up in Cyprus.

In order to attest the aforementioned questions, two experiments were carried out and results were compared with data from a corpus of spontaneous speech in CG. In the first experiment, a production game was given to elicit different types of questions, including D-linked questions by Greek Cypriot children. To compare their production and any abnormalities observed, in the second experiment a comprehension task was used. The experimental side of acquisition is then compared with data drawn from Papadopoulou's corpus (in progress) on spontaneous speech in an attempt to identify any patterns in naturalistic speech and also address the input given by parents to children regarding, the use of Cypriot-specific elements instead of MG-like input that is surely given by the schooling environment.

The remainder of this chapter will discuss the two experiments used for this dissertation and the results and conclusions that can be drawn from them. Section 3.2 is devoted to the first experiment, which discusses the choice of the participants, the

design of the experiment, the results and the discussion. The comprehension task is discussed in the following section. Section 3.4 provides a comparison between the elicitation and the comprehension tasks and Section 3.5 provides discussion on other aspects and conclusions related to the experiments.

3.1 Studies on the acquisition of pied-piping in wh-questions

The acquisition of D-linked wh-phrases has been a topic pursued by different fields because it may combine several factors and offer implications for different theories. A significant question concerns the similarities and differences between languages related to the specificities met during the acquisition of this syntactic phenomenon. The degree to which error patterns appear in the world languages and the patterns often met can indicate what is worth noting for the purposes of this project. The main concern of the thesis is to discuss the theoretical implications in the L1 of TD children.

The prediction that can be easily made is that structures like D-linked wh-phrases will be late acquired because of the complexity involved. To ensure that predictions made or what is taken for granted can be falsified, there is need to look into previous studies examining the same or similar structures. Drawing from these studies on language acquisition, it appears that the case is much more complex as different error patterns and idiosyncrasies appear in the acquisition of D-linked wh-phrases.

A recent study on the acquisition of long-distance MG wh-questions in preschool age children reported errors related to wh-phrase sub-extraction (Asproudi, 2011). Ninety children, aged 4;0-7;0, participated in a production experiment where

they needed to identify a hidden object and match toy characters. The participants were divided in three age groups (4;1-5, 5;1-6, 6;1-7), with a total of 30 children in each group. Asproudi reports that sub-extraction of wh-phrases was the most frequent technique and argues that these are in line with Dutch data (van Kampen, 1997). It is worth noting that all errors reported following sub-extraction were presented with a moved wh-phrase and a DP, and not an NP, in its base position. These errors led her to conclude that the morphological richness of MG, aligned with other languages is a key factor to the possibility of sub-extraction of wh-phrases in child speech. In addition, Asproudi makes a note on the preference of children for the more economical LF, rather than PF representation in these contexts. The notion of Economy in the production of these errors will also become relevant in Chapter 4.

Van Kampen's work (1994, 1996, 1997, 2000 and subsequent work) has been influential for understanding that the errors appearing in the acquisition of D-linked questions follow a theoretical reasoning. A PF/LF discrepancy in child language was thought to be the motivation of D-linked questions, as well as other structures (see van Kampen, 1996 for a detailed discussion) for children to produce this kind of errors.

(22) welke wil jij [twh liedje] zingen?
which want you song sing?
'Which song do you want to sing?'

(van Kampen, 1996)

The data discussed in her work are drawn from a spontaneous corpus of Dutch children and this can indicate the natural appearance of this kind of error in early

speech. In her analysis, X' raising is triggered by morphological greed or by a PF adjacency condition. This kind of movement is proposed to have a direct link with the satisfying of any PF needs.

A comparison of van Kampen's (1997) and Chen, Yamane and Snyder (1998) for the violation of Ross's LBC (1967) in Dutch and English was given by Nomura and Himoru (2005). They tested 15 Japanese-speaking children (4;4-5;2) using an experiment set up to test Ross's LBC and have concluded that Japanese children do not violate the condition. Van Kampen's work (1997) is thus challenged regarding the status of errors as speech and not grammar-driven errors.

Another language, which shows error patterns in the acquisition of D-linked questions is Catalan (Gavarró & Solà 2004a; Gavarró & Solà 2004b). Gavarró & Solà do not support the idea that these can be "performance" errors that are based on overload expressed in child speech. They also reject a structural analysis, in which the categorical status of the nominal differs in every language, an idea which was first discussed by Corver (1990) and adopted later by Hoekstra, Koster and Roeper (1992) for child speech. According to this analysis, a DP in a given language can be a barrier and not allow left branch extraction, but it does not account how violations can happen (see Gavarró & Solà, 2004a for further discussion). Even though a morphological analysis based on the richness of languages seems the most obvious analysis, Catalan and Dutch (van Kampen, 1997) are not considered morphologically rich languages. Based on the above exclusion, Gavarró & Solà's proposal is based on Kayne's (2002) remnant movement, which is determined by Case requirements. This split Case requirement can be found in other structures that are language-specific to Catalan.

Additionally, Roeper and Perez-Leroux (1997) discuss the interpretation of questions by children (Schaeffer, 1991) expressing lack of movement of the NP in D-linked questions. In the examples, there are wh-possessor questions which appear with the same errors as discussed in Chapter 2, namely movement of the operator to the beginning of the clause, even though "the morphological constituency is altered by the phonological creation of a single word whose" (p.16), and this causes the need for pied-piping.

Apart from L1 acquisition, there have been some experiments attesting the acquisition of D-linked wh-questions in language impaired populations in MG. Stavrakaki's study (2006) is one of the commonly-cited works for wh-question production by Greek SLI children. In her experiments, there were 8 SLI children with 2 control children for each one of them. The methodology used was similar to one of the experiments that will be presented further below and it included D-linked and non-D-linked subject and object questions. The child needed to ask a puppet a question about a scenario acted out with toys. More specifically with regard to D-linked questions, Stavrakaki reports, that there were three animals of which two were identical. The different one would chase one of the identical animals and would prompt the questions 'which monkey did the rhino chase?' The methodology is presented here in detail to emphasize the similarity of the experiment providing the data that will be used for discussion (Section 3.2).

Typically developing children are reported to have acquired the syntactic procedure for the formation of wh-questions by age 4. However, the error analysis presented for this study indicates that there was frequent omission of the NP in D-linked subject and object questions. According to Stavrakaki, this error may have been the consequence of the phonological similarity between *pjos* 'which' and *pjos*

'who'. In addition to the errors reported for typically developing children, SLI children showed a tendency to convert a non-D-linked question into a D-linked question or a non-D-linked *who*-object question to a D-linked *which*-object question. These errors appear even if one considers that the comparison of the processing of D-linked questions and non-D-linked questions should define the latter as 'easier'. Most importantly though, this study reports *gap-filling* errors which are characterized by splitting of the wh-phrase and the NP, as illustrated in (21):

(SLI response)

(23) O andras pion htipise ton pithiko?
the man.NOM which hit.3SG the monkey.ACC?
'Which monkey did the man hit?'

(Stavrakaki, 2006, p. 390)

A great difference between the type of errors presented here and those that will be discussed later on for CG is the use of the article with the D-linked NP. Stavrakaki reports that the presence of the article is based on the grammatical properties of the Greek language, but as we will see these errors also appeared without an article in Greek Cypriot children speech. Further, she adds that the existence of Split-DPs was possible in the Classical Greek grammar. Additional observations show that there were also Case errors expressed in D-linked questions by children, which are also met in wh-questions in another study (Stavrakaki, 2004). Following Avrutin (2000), Stavrakaki concludes that the interpretation of D-linked questions requires the discourse linking with the NP and the costly simultaneous participation of syntactic

and discourse-relevant operations. In sum, all errors reported from Stavrakaki's study are summarized below:

Errors in D-linked questions (Stavrakaki, 2006)	
Omission of the NP in subject and object questions (TD)	which Ø V
Non-D-linked questions converted into D-linked questions (SLI)	who_{ACC} V NP_{NOM} > which NP_{NOM} V NP_{ACC}
D-linked *who*-object converted into non-D-linked *which*-object (SLI)	who_{ACC} NP V > $which_{ACC}$ V
Splitting of the wh-phrase and the NP (with the presence of an article)	$which_{ACC}$ Ø V NP_{ACC}
Case errors were expressed	who_{ACC} V NP_{ACC}

Table 3 Errors in Stavrakaki's (2006) production experiment

Movement problems in wh-questions have been observed in previous studies and have led to the hypothesis of the Computational Grammatical Complexity (CGC) (van der Lely, 1994; van der Lely and Battell, 2003; Marinis and van der Lely, 2007). CGC predicts that Grammatical SLI (G-SLI) children have a specific part of their computational system that affects syntactic movement. It is especially strong, when there are many movement operations occurring. Van der Lely and Battell have reported that errors on the production of wh-questions by G-SLI children involve problems with Pied-piping, where the NP was not pied-piped with the operator (22). They propose that the wh-phrase is immediately merged to Spec, CP instead of moving in G-SLI children.

(24) What did Mrs. Peacock like jewellery?

(Marinis and van der Lely, 2007)

CGC hypothesis follows the idea that the deficit responsible for G-SLI grammar involved movement and that this operation is optional. In their experiment, van der Lely and Battel (2003) elicited subject and object questions for 'who', 'what' and

'which' wh-phrases in a group of 15 G-SLI and two control groups of 12 TD children. From these, they emphasize particular problems with extraction of a referential wh-phrase and its movement in the clause as well as *gap-filling* errors.

Marinis and van der Lely (2007) extend the idea that movement occurs with the problematic responses to account for the performance of G-SLI children in gap-filling syntactic dependencies in wh-questions. Following a picture-priming methodology, they concluded that G-SLI children process wh-questions through a "thematic association" (p.572) through the verb and the antecedent. According to them, G-SLI children do not process wh-questions through filler-gap dependencies and therefore the prediction from the CGC is supported.

Counter-evidence for the CGC have been reported based on explorations of children responses and lack of evidence (Lin, 2006). Specifically, the optionality of movement in wh-questions predicted for G-SLI children by CGC is not met in Leonard's corpus (CHILDES) (MacWhinney, 2000). Lin concludes that A-movement and wh-movement are not optional in G-SLI grammar.

Pied-piping problems from language impairment studies are not only restricted to those already mentioned, but information related to Pied-piping can be also drawn from aphasiology. It appears that aphasics have problems with the comprehension of D-linked wh-phrases (Avrutin, 2000; Hickok and Avrutin, 1995) and that this could be a structural deficit or a problem related to the syntax- discourse interface (Avrutin 2000[6]). More recent studies argue that it should not be taken as a deficit in aphasics but as a performance deficit (Goodluck, 2008). Syntactically, the matter has been approached following Rizzi's approach (1990) and it was assumed that the difficulty

[6] More specifically, the Weak Syntax Hypothesis predicts that there is "intact syntactic knowledge, but due to lack of recourses, patients choose alternative ways (discourse)" (Avrutin, 2011)

in D-linked questions originates from the binding chain of the referential of the NP (Hickok and Avrutin, 1995).

Following all previous studies, it appears that lack of movement in pied-piping structures is encountered in child speech. Errors related to production of D-linked questions are often characterized by such errors and difficulty in their comprehension shows the complexity of the structure.

Referentiality has been discussed as the key issue in D-linked wh-questions. The basic idea is that the more information available, the easier it is to assist the link in the sentence. Referentiality can predict that the order of wh-words is what<who<which NP because 'who' needs to be animate and an individual and 'what' can be anything. It has been argued to depend on the presence of a medial wh-expression in languages that allow it and it appears that when the referentiality of the defining wh-expression is minimal, the most frequent is the presence of a medial expression (Isobe, 2008).

Even though the complexity of the structure is self-evident, it is still unclear whether the sole movement of the operator and the standing of the noun in wh-NP is related to PF conditions driven by convergence with LF. The movement of more than one word in a syntactic derivation can also be the case for the problematic cases, as this is anti-minimalist and not economic. Furthermore, the studies mentioned have not considered the effect of the Economy principle but concentrated on the morphological triggers and PF conditions that can appear.

Having discussed the idiosyncracies found in other languages, we will now turn to CG and the two experiments used for the purposes of this dissertation.

3.2 Elicitation Task: Guess What Game (GWG) [7]

Guess What Game (GWG) was designed to elicit wh-questions and cleft sentences by Greek Cypriot children based on the close relation of the two as argued in the literature (Grohmann, Panagiotidis & Tsiplakou, 2006). The hypothesis that wh-phrases are analyzed as clefts was tested and partially discussed in previous work (Pavlou, 2010a; Pavlou, 2010b) and therefore, no special emphasis will be given to these issues in the current study. For the purposes of this work, there will be focus on the data collected for D-linked questions, which can also be compared with the percentages given for simple wh-questions (Pavlou, 2010b). The design of the experiment controlled to a great degree children's speech of the targeted responses and promoted the production of questions instead of declarative sentences.

3.2.1 Participants

The participants in this experiment were 81 children tested from the urban area of Limassol at the south part of Cyprus. Children were tested at both public and private kindergartens in order to also compare if the two different types of schools had any possible correlations to the language produced by children. (Cypriot) Greek was used as the language of instruction by Greek Cypriot teachers in the kindergarten area. Children were randomly selected from different classes within the kindergartens with the only conditions to fulfill the age criterion needed for the purposes of the study and to have been born and raised in Cyprus by Greek Cypriot parents. The children did

[7] Special thanks to Elena Papadopoulou for providing her advice for the design of the experiment to satisfy the needs and initial hypothesis. Her skills on experimental design have appeared to be productive both for the purposes of previous and current work.

not have any cognitive or language difficulties and had not received any speech therapy treatments in the past, as confirmed by their teachers.

Each participant was tested once in their school environment (kindergarten) and the duration of the game for each participant was 15-20 minutes. The participants were grouped by age, but tested individually. Before the beginning of the game, the researcher had a short conversation with the child, asking them about their favorite cartoon or story to make him/her feel comfortable with the new environment.

The children were divided into 4 age groups based on chronological order: 3 year-olds (3 yr), 4 year-olds (4 yr), 5 year-olds (5 yr) and 6 year-olds (6 yr), as illustrated below:

Age Group	N/Participants	Mean	Standard Deviation	Total Productions (Target & Non-target)
1 (3;0–3;11)	19	44= 3;8	3,7	76
2 (4;0–4;11)	22	55= 4;7	2,8	88
3 (5;0–5;11)	22	66= 5;6	3,5	88
4 (6;0–6;4)	18	74= 6;2	1,2	72

Table 4 Participants in the elicitation task

The first column shows the 4 age groups and the age range for each age group. The second column shows the number of participants for each age group and the mean age and standard deviation for each group is given in the following columns. The sex of the participants was controlled as much as possible, even though one of the groups, identified on Table 5 as 3(4;0–4;11), has a bigger number of female participants.

Age Group	Male	Female
2 (3;0–3;11)	11	8
3(4;0–4;11)	8	14
4 (5;0–5;11)	11	11
5 (6;0–6;4)	9	9

Table 5 Sex of participants

Children participated in the experiment after parent's and teacher's consent. Information requested on the consent form involved the first language of the child, the place and date of birth as well as indicators for the socio-economic status of the family (Appendix A.1-A.2). These, however, will not be discussed here as they provide no immediate relevance to the phenomenon studied.

3.2.2 Design

The Guess What Game (GWG) was designed to elicit wh-questions and cleft sentences. It is a picture-based game with pictures illustrating two figures, a male and a female and two objects (Appendix B.2 and B.3). Randomization (Appendix B.1) was provided so that the male and the female figures would participate in an action alternately.

The initial hypothesis (Pavlou, 2010a) for the design of the experiment required a rather complex design, which aimed at eliciting the production of 4 types of Cypriot-specific *inda*-questions and subject and object clefts. To include all these

structures, the experiment was constructed 6 blocks with each block testing one structure, as shown below:

BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4	BLOCK 5	BLOCK 6
Inda mbu 'what'	*Inda* 'why'	Subject Cleft	***Inda* which'**	*Inda mbu* 'why'	Object Cleft

Table 6 Blocks of structures in the elicitation task

Block 1 involved a wh-object question with *inda mbu*, a Cypriot-specific wh-phrase (see Grohmann, Panagiotidis and Tsiplakou. 2006; Papadopoulou, in progress; Pavlou, 2010b among others). Block 3 and block 5 were testing why-questions, but each one with a different wh-phrase. D-linked questions were given in block 4 with the wh-phrase *inda* 'which'. Block 3 and Block 6 involved cleft sentences. An example of the target sentences for each block is given below:

Block 1

(25) Inda mbu krata o andras?

what holding.3SG the man.NOM

'What is the man holding?'

Block 2

(26) Inda kathete o andras?

why sitting.3SG the man.NOM

'Why is the man sitting?'

Block 3

(27) En o andras pu kofki to milo

is.3SG the man.NOM that cutting.3SG the apple.ACC

'It is the man that is cutting the apple'

Block 4

(28) Inda kutin anii o andras?

which box.ACC opening.3SG the man.NOM

'Which box is the man opening?'

Block 5

(29) Inda mbu xamogela o andras?

why smiling.3SG the man.NOM

'Why is the man smiling?'

Block 6

(30) En to aspro psomi pu troi o andras

is the white bread.ACC that eating.3SG the man.NOM

'It is the white bread that the man is eating'

Each block had 2 Warm-ups and 4 target sentences. The warm-ups were given to model the kind of structure elicited from the child.

Randomization was provided on the basis of the type of structures included in the experiment. Fillers were not provided because the number of the structures was

taken to be a satisfactory factor for the children not to become aware of the being tested.

3.2.3 Material and Procedure

The materials used were two puppets, a baby frog and a baby lion, so as to provide enthusiasm to the children for the game. A small ceramic chicken coop was used and baby chickens were put in it. Three metallic boxes, in the form of a basket, were used for the child and the puppets to collect the chicks in each correct answer they gave. A video-camera was used during the testing sessions to ensure that the speech produced by the child could be analyzed later and any features that might facilitate the understanding of any patterns could be reported.

The game was designed to create a competitive feeling between the child and other participants, which in this case these were the two puppets (Eisenbeiss, 2009). This, as noticed in other studies (Papadopoulou, in progress), offers a high motivation for the children to participate in the game and in any experimental setting.

The procedure followed was the same for all children tested and each child was introduced to it individually. The researcher and the child played the game in a quiet area of the kindergarten so as to facilitate the concentration of the child on the game. The researcher would sit at a table next to the child. On the table, there was a coop with chicks, a wooden dog and a file with pictures of A4 size (see Appendices). The researcher would then say the following: "We are going to play a game and the game is to collect chickens with baby lion and baby frog and see who can collect the most chicks. We cannot grab the chicks because they are guarded and the dog will allow us to take the chicks only if we play the game. The one who collects the most

chicks will be the winner and will win a prize at the end. What you have to do is to ask a question about each picture I show to you. What the baby frog and baby lion need to do is to answer these questions. If any of them answers correctly the dog will give him a chick. Any time any of them doesn't answer correctly you will get a chicken". The child believes that s/he is competing with the puppets, but by manipulating the way that the puppets respond, the researcher ensures that the child always wins the game.

As noted above, the test had 24 items in six sections each investigating a different syntactic structure. Each block was presented in sequence. In the current study, I will discuss the findings for the 4 tokens of block 4, which involved D-linked questions. Each set of test items was preceded by two warm up items. In the warm-up tokens, the researcher provided a model question but the puppet refused to answer because she was an adult and stated that it would only answer questions uttered by the child. In the warm up items, the child simply copied the adult's question but then s/he was told that s/he must go ahead to ask the questions directly. At the end of each section, the researcher says 'you must be tired, let me have a go again now' and let's ask the question in a different way. She then provides a model in a new target construction. The same scenario was repeated for each set of items. An example, as used in Block 4, is provided below:

Warm-up 2: Inda aftokinitaki krata I korua?
(Researcher) which car.ACC holding.3SG the girl.NOM
'Which car is the girl holding?'
Puppet: En su milo esena.
(To research.) *not you.GEN talk.1SG you.ACC*

Pezo mono me mora.

play.1SG only with children.ACC

'I am not talking to you. I only play with children'.

Researcher: Thelis na rotisis esi ton vatraxulin?

(To child) *want.2SG to ask.2SG you.NOM the.DET baby-frog.ACC*

'Do you want to ask the baby frog?'

Child: Inda aftokinitaki krata I korua?

(To puppet) *which car.ACC holding.3SG the girl.NOM*

'Which car is the girl holding?'

Puppet: To kotzino.

(To child) 'The red one'.

Researcher: Ate, rota ton gia.

(To child) *come on ask.2SG him.ACC fo.PRE*

tuti tin fotografian

this.DEM the.DET photograph.ACC

'Now, ask baby frog about this picture'.

Target 1: Inda doro anii o andras?

(Child) *which present.ACC opening.3SG the man.NOM*

'Which present is the man opening?'

The child then produced other 3 more questions and the researcher repeated the same procedure for the next blocks.

3.2.4 Overall Results

The video-files were used to enter each child's responses into an Excel spreadsheet and children's names were entered in a coded form. The spreadsheet was constructed to allow an item analysis for the 4 age groups.

With regard to the production of D-linked questions, the types of scoring involved 4 coding categories. The first category was marked if the child had produced a question with the Cypriot *inda* 'which', the second was marked if the child had produced a question with *ti* 'which', given the *bi-x* (Grohmann, 2011) context of Cyprus. Other categories were used to mark responses which were given as declarative sentences, and not questions (-Q). There was also an 'Other' category, which involved single-word utterances or non-clauses and a 'No Response' category.

A control group with 10 adults also participated in the experiment and showed a high percentage of target responses.

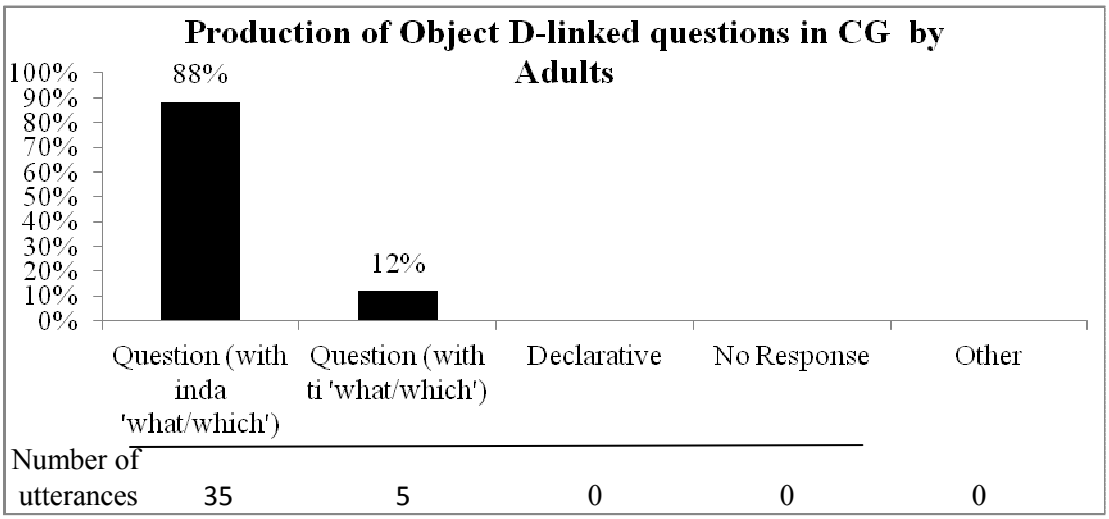


Figure 1 Production of Object D-linked questions in CG by Adults

Adults mostly produced *inda*-questions, following the target responses, but a relatively low percentage (12%) responded with a non-target *ti*-question.

Overall, the successful production of 'which' questions was relatively poor, as summarized in Figure 2. D-linked questions had the lowest percentages in comparison with the elicitation of the other wh-questions in the experiment (see Appendix (B.5) for a summary of the comparison). Figure 2 shows the results for the 5 coding categories of the responses.

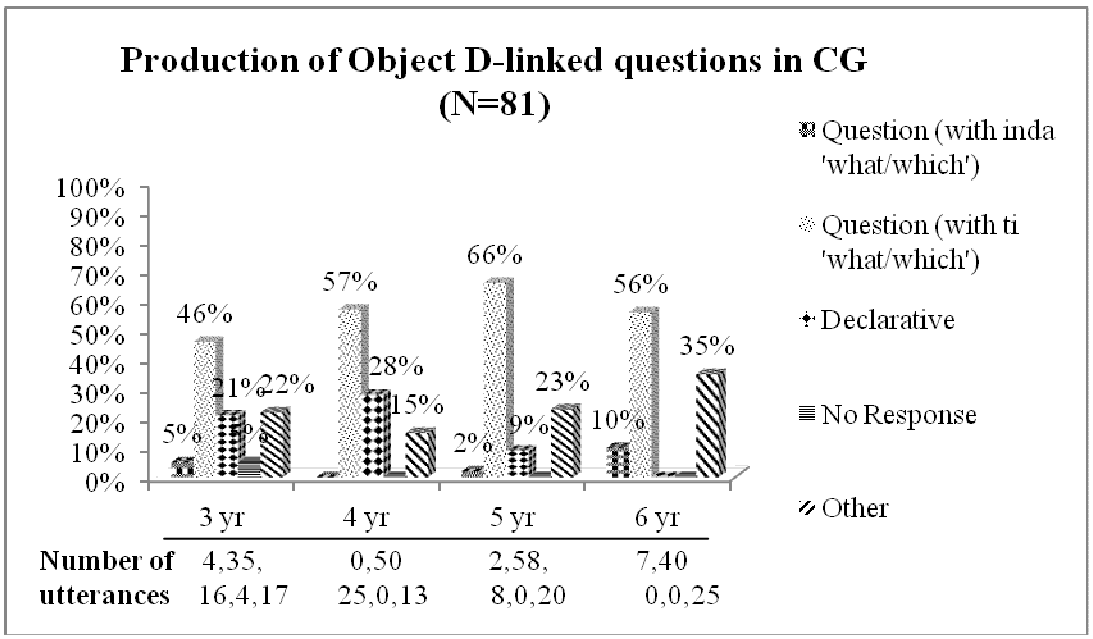


Figure 2 Production of D-linked questions: Overall results

Children performed very poorly in the successful production of target questions and showed a substantial preference for the MG-like wh-phrase *ti* 'what'. Very low percentages were observed for the production of questions with *inda* 'which' and this appears in the youngest group (3 yr) and the older groups (5 yr & 6 yr). There were relatively high percentages of declarative sentences[8] in the 3 yr and 4 yr groups.

[8] Responses marked with the 'Other' category were single-word utterances or string of words which did not form a proper clause.

The percentages shown in Figure 2 can be sub-divided into further categories as other sub-types were observed. These percentages do not just show the successful production of the pied-piped structure with a wh-phrase, but also production of a question with omission of the noun and ungrammatical questions characterized by lack of movement of the noun.

(31) Ti aftokinitaki krata o andras?
which car.ACC holding.3SG the man.NOM
'Which car is the man holding?'

(32) Ti krata aftokinitaki o andras?
which holding.3SG car.ACC the man.NOM
'Which car is the man holding?'

(33) Ti krata o andras?
what/which holding.3SG the man.NOM
'What/ which is the man holding?'

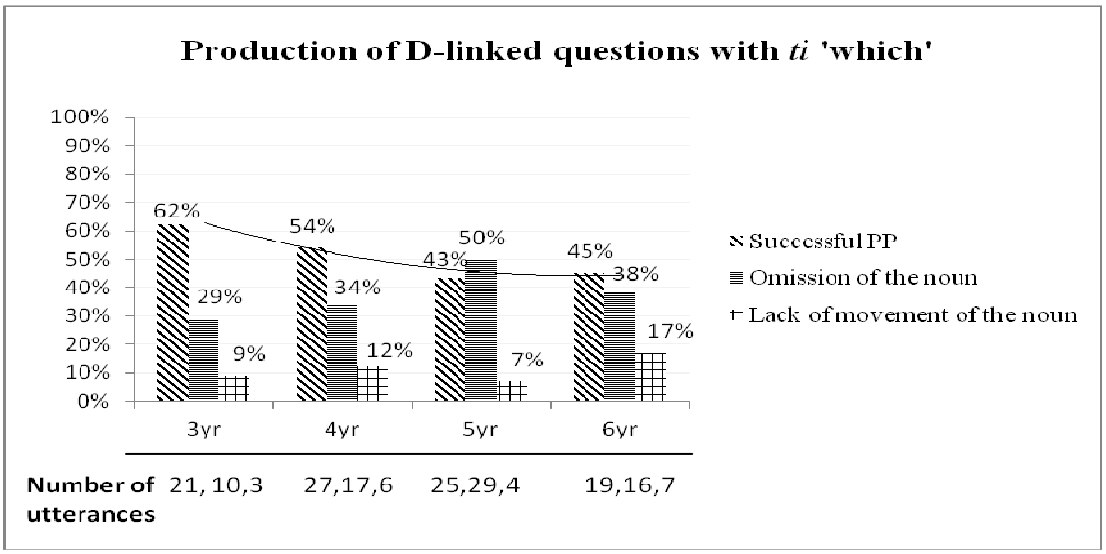


Figure 3 Sub-types of responses to D-linked questions

Figure 3 corresponds to the overall question production with *ti* 'which'. Note that the successful pied-piping in wh-questions decreases by age. Very high percentages were observed with regard to the omission of NP from the D-linked question. Sentences such as (34), containing *ti* on its own are also grammatical, if considered as an object question. Responses, such as *Ti troi I kopela* 'what is the girl eating?' have been treated in the figures above as missing an NP and not being simple object questions, because to produce a *what*-question in the context where a model was provided in the warm-ups would be unexpected. [9]

(34) Ti troi I kopela?
what.ACC eating.3SG the woman.NOM
'What is the woman eating?'

In addition, errors were also observed showing the predicted lack of movement of the noun phrase and sole movement of the operator. This kind of error appeared with both a stranded NP and a determiner + NP sequence (see Section 3.2.6.1 for discussion).

Figure 4 below shows responses from children when attempting to produce a question with *inda* 'what'. As can be seen in Appendix (B.6) which details the number of responses for each subtype, the total number of such responses was very limited. The total of *inda* responses (4=3 yr, 0= 4 yr, 2=5 yr & 6= 6 yr) is represented as 100%, so the breakdown of response patterns can be seen to differ substantially from the pattern seen in Figure 2.

[9] Such sentences were unexpected given that there was a certain kind of syntactic priming (Papadopoulou & Pavlou, to appear) and the number of target questions was very limited for the child to show any other effects, such as producing a different type of question.

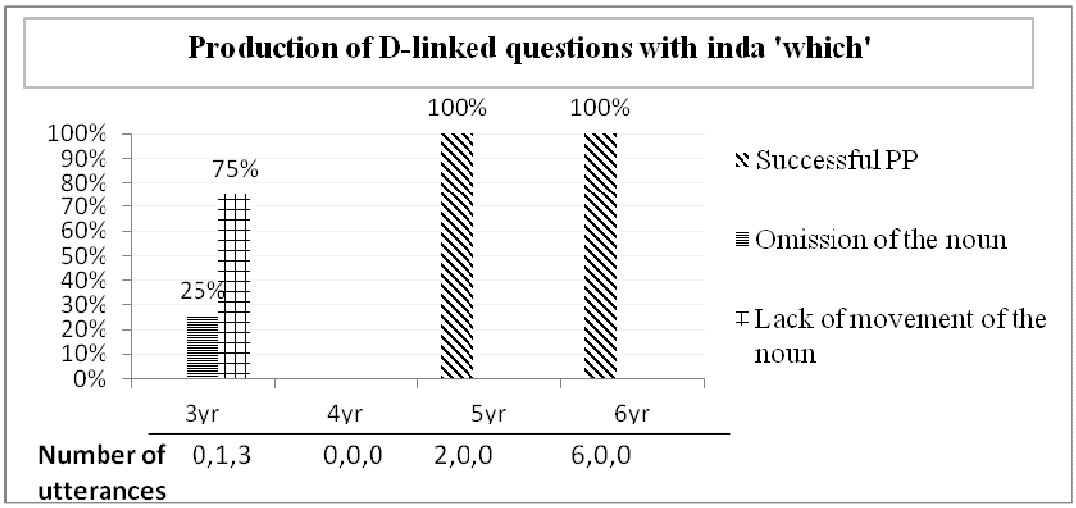


Figure 4 Successful pied-piping and errors with *inda* 'which' in Block 4

Even though there was no successful production of questions with the use of the Cypriot-specific *inda* 'which' in the 3 yr and 4 yr groups, the limited utterances of *inda* in 5 yr olds and 6 yr olds show that the children performed at ceiling in any attempt made. The children exhibited target pied-piping of an NP with *inda* 'which' and formation of a D-linked wh-question. Errors in this case appear only in the 3 yr old group, which is the youngest group and would expectedly show the greatest frequency of errors for a late-acquired structure. A noticeable difference between *inda* 'which' in comparison with *ti* 'which' is, that the former constitutes an adjunct question 'why'[10] when used alone while the latter forms a subject or object question what'[11]. The grammaticality of *inda* alone either as an adjunct or marginally as an object restricts the likelihood that this will be found as an error.

In order to see how likely it was for the children to produce errors in this experiment with the expectations based on the design, further statistical analysis was

[10] This excludes any interpretation of *inda* as 'what', which is acceptable by some speakers in Cyprus.
[11] There are contexts, where 'ti', usually used as 'what' can mean 'why':
(1) Ti fonazis?
why shouting.2SG?
'Why are you shouting?

needed. For this experiment, a chi-square test for goodness of fit was adopted for each age group (i.e. 4 chi-square tests for 4 age groups). The specific test is applied in studies, where there is one dependent categorical variable and there is need to calculate whether the frequencies of the variable are distributed as expected from a particular probability distribution. In this experiment, the dependent variable was the production of D-linked questions, which was independent to the errors that appeared later on. The probability distribution assigned was assuming a 90% success rate and two error rates of 5% each for the errors appearing. This probability distribution is suggested for this particular study based on the minimum possibility for appearance of errors[12], the design of the experiment in a way that only targets successful answers and the lack of previous empirical findings verifying use of statistics in experiments with wh-questions in Cypriot Greek.

The software used for the test was the statistics program R, which uses a programming language to apply functions on arguments. Based on the calculation made using R, the results of the distribution show that these differ significantly from chance. More specifically, the p-value[13] as calculated based on the assumed expectations corresponded to the following for each age group: x^2= p<0.001, p<2.141e-10 (3 yr), x^2= p<0.001, p< 2.2e-16 (4 yr), x^2= p<0.001, p< 2.2e-16 (5 yr) and x^2= p<0.001, p< 2.2e-16 (6 yr). This means that the results were not expected based on the assumed expectation from the design of the experiment and can be considered, therefore, as significant. This chi-square test shows that in each age group the responses do not conform to the 90%-5%-5% pattern i.e. correct responses were fewer than 90% expected, omission are more than 5% and lack of movement of the

[12] This study did not expect errors, but allowed for a few with equal occurence of the 2 errors discussed above.

[13] These are the so-called probabilities of error p that show the probability of the observed effect and every other result that deviates from H0 even more when H^0 is true. They are compared to a significance level (5%) and iff p is smaller than it, we reject H^0 and accept H^1.

NP is more than 5%. A chi-scquare for independence was also employed to test whether the observed frequencies of the levels of the dependent variable vary across the levels of the independent variable based on the same expectations. The calculation showed that there is no significant difference between age and the results presented above (with p-value = 0.2818) and the expected frequency amount is not met (see Appendix B.7)[14]. Additionally, there is no correlation between age and the target responses (x=0.046, Pearson=0.046, Sig. (2-tailed) = 0.681) or target responses including omission of NP (x=0. 174, Pearson= 0.174, Sig. (2-tailed)=0.120).

3.2.5 Discussion

This section provides a discussion of the (a) the types of responses observed in children's production (b) implications and conclusions based on the results (c) comparison of the results on the elicitation of object D-linked and simple questions (d) comparison of the errors in the experiment and in a spontaneous corpus in Cypriot Greek (Papadopoulou, in progress).

3.2.5.1 Types of responses in children's production

The errors observed in children's speech were initially divided into categories with omission of NP or lack of movement of the NP. The latter appears both with the presence of an article or without, giving a DP or an NP correspondingly. The grammaticality of the first (omission of NP) as an object question restricts the

[14] Pearson residuals were also calculated, expressing when positive/negative, the corresponding observed frequency as greater/ less than the expected frequency. The more the Pearson residuals deviate form 0, the stronger the effect is (see Appendix B.8).

possibility of calling it an error. Examples for the omission of NP in children's data are given below:

Omission of the NP

(35) a. Inda troi I kopela?
which/why eating.3SG the girl.NOM
'(*Which apple is the girl eating)/Why[15] is the girl eating?'

b. Ti kovi I kopela?
which/what cutting.3SG the girl.NOM
'(*Which bread is the girl cutting)/What is the woman cutting?'

Examples in (30) are characterized by omission of the noun in the block targeting D-linked questions, which was widely produced by children. They were uttered without any pauses showing the lack of NP in any position of the clause.

Ungrammatical sentences in any context were also given by children and in these cases, the NP or DP was pronounced in its base position creating a Split-DP. Even though there are languages that accept this type of structures in D-linked questions (Chapter 1, Section 1.2), CG disallows Split-DPs in wh-questions, as explained in Chapter 2.

Lack of movement of the NP

(36) a. * Inda fori o andras kapelo?
which wearing.3SG the man.NOM hat.ACC
'Which hat is the man wearing?'

[15] An interpretation of 'what is the girl eating' can also be given to this example, but it would be marginally accepted.

b. * Ti anigi kutin o andras?

which opening.3SG box.ACC the man.NOM

'Which box is the man opening?'

Errors of the type in (31) were produced without any pauses, and even though a phonological analysis has not been carried out for the purposes of this study, the questions impressionistically were pronounced in a natural way.

In contrast with (31), there were cases where children left behind a noun with an article:

Lack of movement of a DP

(37) a. * Inda fori o andras to kapelo?

which wearing.3SG the man.NOM the hat.ACC

'Which hat is the man wearing?'

b. * Ti anigi to kutin o andras?

which opening.3SG the box.ACC the man.NOM

'Which box is the man opening?'

These types of error are taken to be very different from the ones without the presence of an article since there is a major syntactic difference observed. I assume that a pronounced article takes a position in the D head (see Chapter 4) and these errors are thus incompatible with the assumption that there is sub-extraction of the wh-phrase from the D head.

Last, a complex Split-DP, as it will be referred to for now, was also another category of error observed:

Complex Split-DP's

(38) a.* Ti xroma krata aftokinitaki o andras?
which colour.ACC holding.3SG car.ACC the man.NOM
'What is the colour of the car that the man is holding?'

b.* Inda xroma krata aftokinitaki o andras?
which colour.ACC holding.3SG car.ACC the man.NOM
'What is the colour of the car that the man is holding?'

In the experiment's design, some items were contrasted according to their colour, making the children to easily produce 'what color bag' instead of 'which bag'. In (33), an operator *ti* 'which' or *inda* 'which and a complex NP *xroma aftokinitaki* 'color car' should enter into a pied-piping relation and move together to the beginning of the clause. However, children produced questions of the type given in (33), characterized by movement of the wh-phrase and an NP to the beginning of the clause, while keeping the other NP in a VP-internal position. This yields ungrammaticality since in the adult language, both NPs 'color' and 'car' obligatorily move to the beginning of the clause. In all cases involving two NPs, the children moved the wh-phrase with the NP 'color' stranding the 'contentful' noun and no errors showing the opposite were observed (for the syntactic analysis of these structures, see Chapter 4, Section 4.3). Children, therefore, do not produce the target structure, which involves a wh-phrase and a noun but use a very similar structure which also requires pied-piping. The errors observed in the second and more complex structure, show that children move the wh-phrase and an NP and strand the

'contentful' noun instead of moving both NPs together with the wh-phrase (31a & 31b).

These errors show that there are certain idiosyncrasies in the acquisition of these structures, which are found both in CG but also in other languages. These insights can offer implications for understanding the language acquisition mechanism, as these will be explored in Chapter 4.

3.2.5.2 Discussion of the results

Stavrakaki's study in MG shows that typically developing children acquire object which-questions between the ages of 3;5-5;6, but she does not provide specific ages when this happens. The children tested between those ages showed more than 80% target production and that is taken to show acquisition of the structure.

If the criterion for acquisition is taken to be the 80% and above, children did not acquire the pied-piping with the wh-phrase *ti* by age 3 based on Figure 2. There is no calculated percentage of target responses with the wh-phrase *ti* over 80%. By looking at the individual responses in the participant analysis given for the 4 target questions below, it is clear that successful pied-piping appears in all groups and that some of the children perform to ceiling even in the '3 yr' group (0-20).

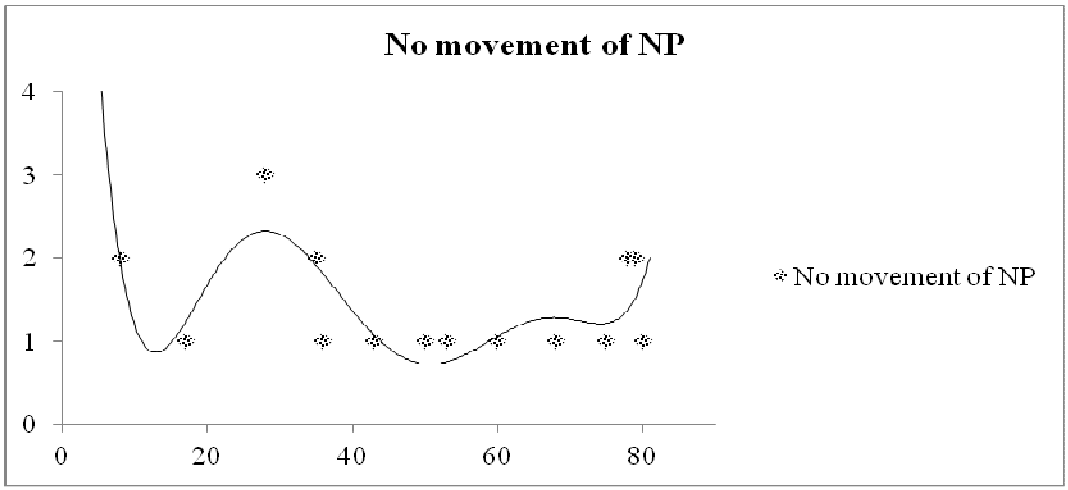


Figure 5 Individual responses showing no movement of NP

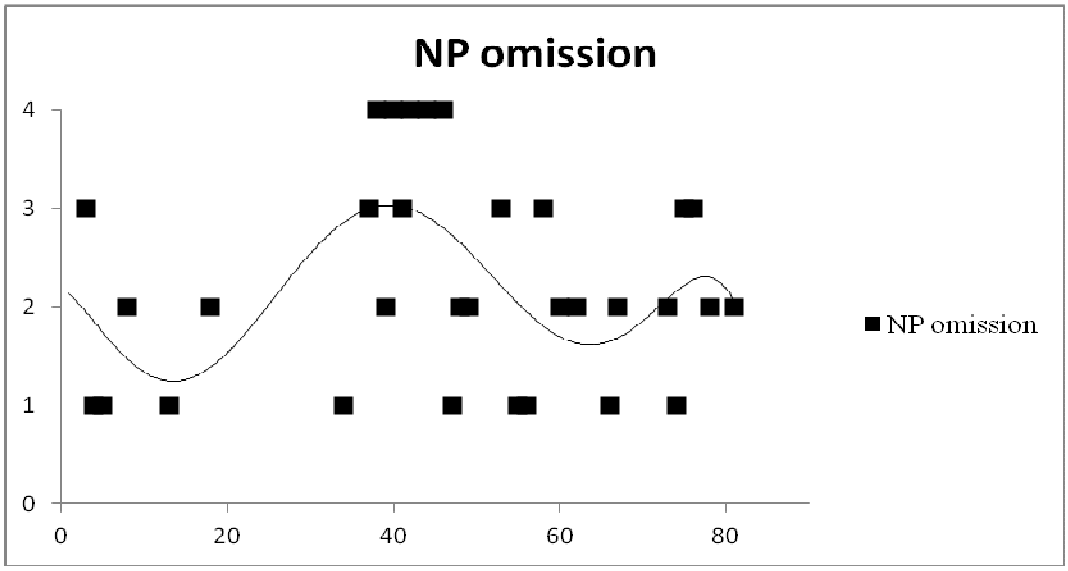


Figure 6 Individual responses showing NP omission

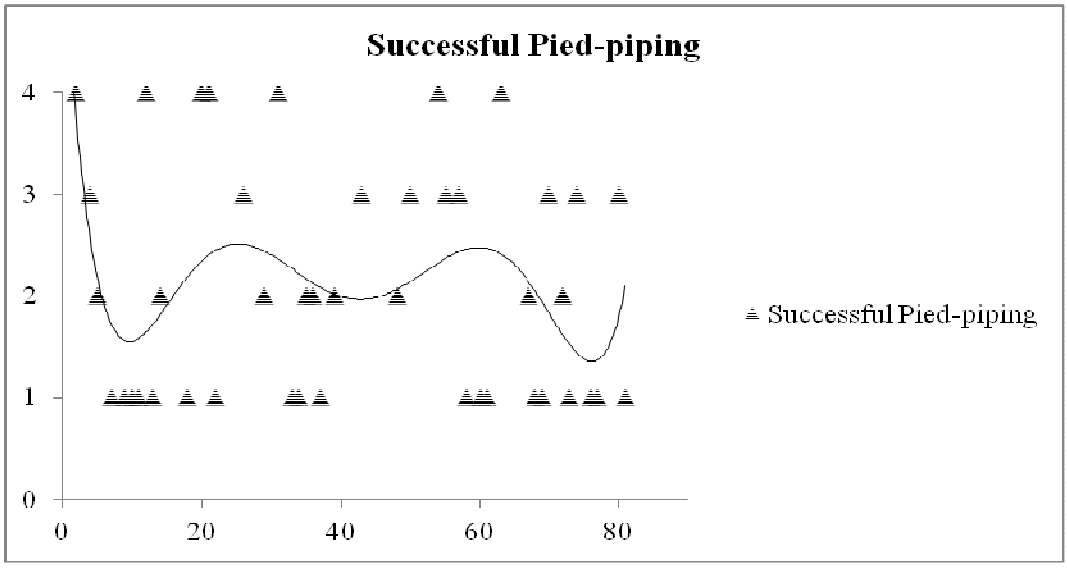


Figure 7 Individual responses showing successful Pied-piping

In the figures above, children are presented chronologically (0-20= 3 yr, 20-40= 4 yr etc.). Given the frequency of successful pied-piping structures on Figure 7, the percentage of 80%, as found in Greek children, cannot be used for the acquisition of D-linked questions in this case. Some children perform at ceiling at the age of 3 and some children perform much lower even in older groups. It is argued that D-linked questions with *ti* are acquired at age 3 and that inter-variation can always exist based on the low target responses of some of the children in that group.

In the case of the use of *inda* in D-linked questions, a participant analysis showed that successful pied-piping appears only at the oldest children of the '5 yr' group and that it appears more frequent in the '6 yr' group. This differs from the observation made before that pied-piping with *inda* is acquired at age 5.

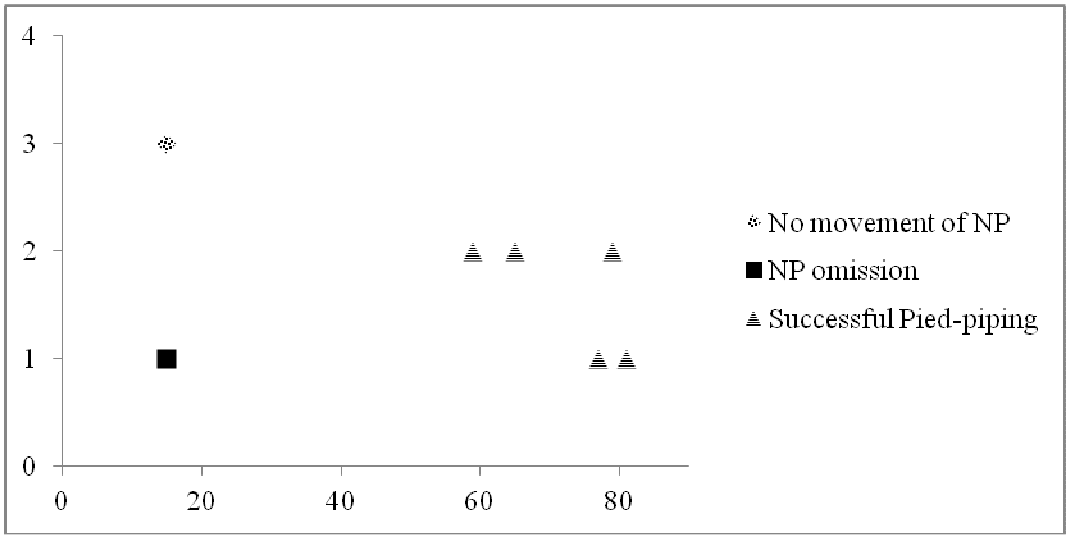


Figure 8 Participant analysis with inda (presented chronologically)

Given the results in Figure 8, D-linked questions with *ti* are acquired earlier than those with *inda*. We might conclude that this is due to the marginal acceptability of *inda* as an object wh-word in CG, opposed to the wide use of *ti* as an object wh-word.

Following the Continuity Hypothesis (Pinker 1984) sub-extraction in child speech is not a performance error, but as a manifestation of adult grammar in children. (Gavarró & Solà 2004a). In languages that do not allow sub-extraction, it's use is

expected to fade out by age of 5 and/or 6 years old. Following this conclusion, the constant appearance of such errors in all age groups, even in the oldest groups, offers the grounds to support the idea that these are innately-motivated patterns, and not performance errors.

3.2.5.3 D-linked questions vs. wh-object questions

The path of acquisition of D-linked questions was given based on the use of the Cypriot-specific wh-phrase *inda* and the MG-like wh-phrase *ti*. Following the description of the results above, successful production of D-linked questions with *ti* was much more frequent than with *inda*. The percentages, however, decrease by age and this is bizarre from an acquisition perspective, even for structures typically showing late acquisition.

As already mentioned, the errors that appeared in children responses belonging in the category characterizing the omission of NP can be grammatical in the relevant context. This kind of error was also found in Stavrakaki's (2006) study, where children tended to also omit the NP with the Greek wh-phrase 'which'.

For the purposes of understanding the path of acquisition of these structures, it is worth comparing the results with the acquisition of wh-object questions in the Guess What Game (Pavlou, 2010b). Given that the errors could form grammatical wh-object questions, an assumption could be that at the relevant age, wh-object questions were already acquired and were 'easier' for the children to produce.

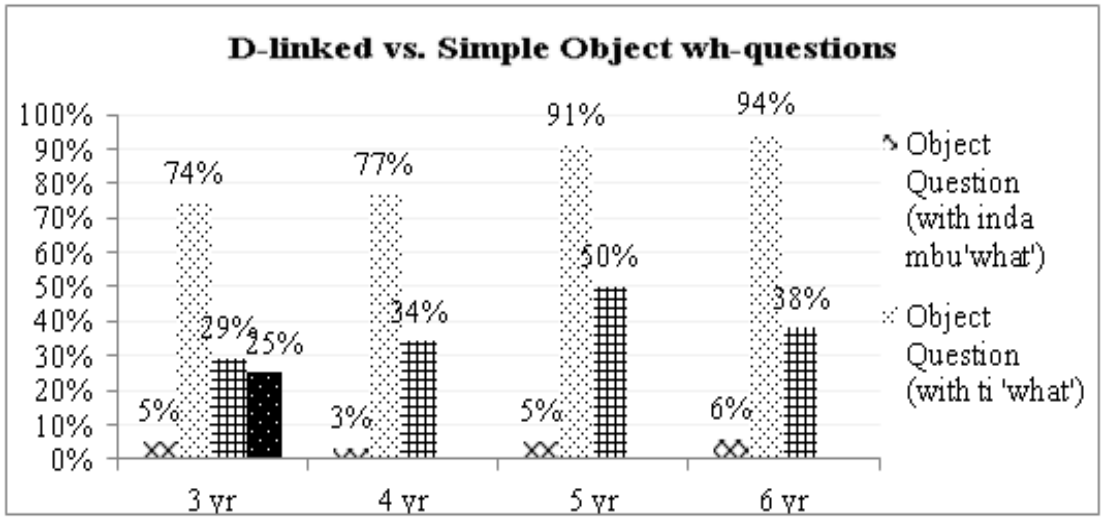


Figure 9 Comparison of D-linked and Simple Object wh-questions

The assumption that the errors observed with the omission of NP are simple wh-questions is challenged with the comparison in Figure 9. Children start producing wh-object questions with a percentage of 74% with the use of *ti* 'what', which gets close-to ceiling percentages in later ages. Comparing that to the results collected from the errors in the production of D-linked questions that belong to the category 'omission of the noun', there does not seem to be a clear correlation between the two. In fact, the percentages of errors remain fairly constant across the ages with the exception at the '5 yr' but the percentages of simple wh-object questions get better. Therefore, this restricts an interpretation where the high percentages of simple wh-questions could explain the high percentages of errors with the use of *ti* 'which'.

3.2.5.4 Experimental settings vs. spontaneous speech

The high success rates in other blocks of the game suggest that children had no problem with the design of the experiment. In order to determine whether the types of errors found in the elicitation task could be due to experimental factors, a spontaneous

speech corpus, the Papadopoulou corpus (Papadopoulou, in progress), was also checked for utterances with D-linked questions and any other complex wh-phrases. Two 30-minute spontaneous speech video-recordings with a three (2.5) months interval in between were conducted between children and their parent/caregiver. Papadopoulou argues that this kind of naturalistic data in language acquisition give a better account with regard to the input given to the children by parents.

For the purposes of this study, children's speech was transcribed and analyzed to account for any similar errors to the ones already mentioned. Data were examined from 12 children from the first session, who were aged 2;1-3;9 and 7 of them around the ages of 3;1-3;2 from the second session. The choice of the children was based on the number of completed transcriptions of the recordings. Table 7 below shows the results.

The table shows any utterances found that correspond to a D-linked question either with *inda* or with *ti* and any cases with lack of movement of the NP in a D-linked question. Another complex structure, namely 'how much + NP' was also identified any utterances were included in the tables.

1	2	3	4	5	6	7	8
	Age in months	**Inda 'which' +N**	**Ti 'which+ N**	**Inda 'which' (lack of movement of NP)**	**Ti 'which' (lack of movement of NP)**	**pos- 'how much' +N**	**pos-'how much' (lack of movement of NP)**
AN_MA_10	2;10	0	0	0	0	0	0
	3;1	0	2	0	0	1	0
PE_MA_10	2;10	0	0	0	0	0	0
	3;1	0	1	0	0	0	0
IA_FE_11	2;11	0	1	0	0	0	0
	3;2	0	0	0	0	0	0
MA_MA_11	2;11	0	0	0	0	2	0
	3;2	0	1	0	0	0	0

Table 7 Spontaneous speech- First and second session

With exception to Table 7, the other children, ranging in age from 2;1- 4;2, did not produce any ungrammatical utterances. Table 7 may suggest that sub-extraction phenomena may not be only related to age and that these are also rarely found in naturalistic speech. Other complex phrase, such as *how much/many*+ NP were also successfully pied-piped at the same age. Successful responses were also found in older ages during the second testing session.

Even though naturalistic speech can be the most persuasive methodology used in experiments, it always carries the danger that children will not produce the target structures. This, however, does not mean that they do not use the structure or in this case, that they do not make any errors. Very few utterances were observed regarding pied-piping of the noun with a wh-phrase with either *ti* 'which' or *inda* 'which'. No lack of movement of the noun was observed, as in the data collected in experimental

settings. Although no errors were observed, the overall rate of use of complex wh-phrases is so low that this may not be meaningful.

It appears that in this corpus, children did not make any errors, such as lack of movement of the NP. All the cases reported show grammatical pied-piping structures in the form of D-linked question 'which+NP' and 'how much+NP'. In contrast with van Kampen's data (1997) found in her corpus, Papadopoulou's corpus does not show this kind of patters as discussed for the experiment above.

Because of the limited utterances, no clear answer can be provided. It can be argued, however, that if this is an experimental effect, then it is one found cross-linguistically and not solely in this experiment (Asproudi, 2011 among others). By taking into account the difference in the methodologies of the experiment, it is highly unlikely that children make these errors because of experimental settings.

3.3 The Comprehension Task

Data related to the comprehension of D-linked questions in CG were drawn from a different experiment testing the comprehension of wh-questions in CG[16]. These data are used here for complementary and comparative purposes to the experiment described above. Following the literature on the comprehension of D-linked questions (Avrutin, 2000; Hickok and Avrutin, 1995; Goodluck, 2008), there is an observed difficulty with regard to the comprehension of D-linked questions in impaired populations. This difficulty is stronger in the comprehension of object D-linked

[16] This experiment was designed to test the comprehension of 'ambiguous' questions in Cypriot Greek, following the discussion for subject-object asymmetries in the comprehension of wh-questions (Plunkett & Pavlou, in progress). D-linked questions were given as fillers to the ambiguous questions and are also used for the purposes of this dissertation.

questions, even though both subject and object D-linked questions need to establish the D-linking assumed.

The aim of the analysis of the data collected from the comprehension experiment was to identify any possible difficulties that Greek Cypriot children may have and identify any patterns that can explain the apparent difficulty in the production of D-linked questions.

3.3.1 Participants

The participants of this experiment were a subset of the children tested for the production task. These children were selected based on the age and sex criterion and based on that not all of the children (n=81) that participated in the first experiment agreed to participate in the second experiment. In this experiment, 40 children were tested from the urban area of Limassol in the south part of Cyprus.

Each participant was tested once in their school environment (kindergarten) and the duration of the game for each participant was 5-10 minutes. The participants were grouped by age, but tested individually. Before the beginning of the game, the researcher introduced the context (procedure) to the child and invited the child to play with her.

For purposes of comparison with the other experiment, the children were divided to 4 age groups based on chronological order: 3 year-olds (3 yr), 4 year-olds (4 yr), 5 year-olds (5 yr) and 6 year-olds (6 yr), as illustrated below:

Age Group	N/Participants	Mean Age in months	Standard Deviation
1 (3;0–3;11)	10	43=3;7	3.7
2 (4;0–4;11)	10	55=4;7	3.8
3 (5;0–5;11)	10	66=5;6	2.5
4 (6;0–6;9)	10	77=6;5	3.7

Table 8 Comprehension task: Participants

The first column shows the 4 age groups and the age range for each age group. The second column shows the number of participants for each age group and the mean age and standard deviation for each group is given in the following columns. So, each age group involved 10 children.

The sex of the participants was balanced as much as possible, with exception of group 2 (4;0–4;11), as shown in Table 9:

Age Group	Male	Female
1 (3;0–3;11)	5	5
2 (4;0–4;11)	3	7
3 (5;0–5;11)	5	5
4 (6;0–6;9)	6	4

Table 9 Sex of participants

Children participated in the experiment after parental and teacher's consent (Appendix A.1-A.2).

3.3.2 Design

The design was based on testing the comprehension of 'ambiguous' questions, following similar methodology to that used in Plunkett & Pavlou (in progress)[17], which tested the comprehension of ambiguous subject and object wh-questions in French[18] and Cypriot Greek. The rest of the questions involved subject and object D-linked questions.

In contrast with the production experiment, the wh-phrase used in D-linked questions was not *inda* 'which', but *pcos-pca-pco* 'which', an inflected form of a Cypriot wh-phrase. The item *inda* cannot enter into a pied-piping relation with a noun having a human property. When *inda* is combined with a noun expressing a human property (34), it gives a meaning of 'what kind of' rather than expressing the meaning of the noun out of a subset of many of its kind.

[17] The pictures used in this experiment were the same pictures used in Plunkett & Pavlou (in progress) with the exception of one or two pictures that were slightly modified to serve the purposes of the experiment. For example, some animals were replaced to avoid repeating the same words. Some verbs were also replaced because they were not applicable for Cypriot Greek (see Appendix C.1.1).

[18] The latter are wh-questions formed with the Cypriot-specific element *inda mbu* 'what' and are ambiguous because *inda mbu* does not carry any overt inflection. This means that when given in the correct context, it can function either as a subject or an object question. This type of questions will not be analyzed or discussed here, but an example is given below:

(2) Inda mbu thori to gurunaki?
what looking.3SG the pig?
'What is the pig looking/ What is looking at the pig?'

Possible Answer: The white horse (object)/ the brown horse (subject)

(39) Inda athropos ise esi?

What man are.2SG you.NOM

'What kind of person are you?'

Pcos, on the other hand, is compatible with both human and non-human animate items (35). In CG, animals would namely be referred to as *ti* 'what' or *pco* 'what/which' and depending to the case and the gender of the animal would be inflected as *pca* or *pco*.

(40) Pcos ithopios ise esi?

Which actor are.2SG you.NOM

'Which actor are you?'

In this adaptation made for CG, both '+HUMAN, +ANIMATE' and '–HUMAN, +ANIMATE' properties were controlled and with the use of *pcos* 'which' formed grammatical questions.

The experiment involved 8 D-linked questions and 8 fillers, which were randomized to avoid any effects in children's responses (for randomization see Appendix C.1). The 8 D-linked questions involved an equal number of subject and object questions (36a & 36b). The 4 subject and 4 object-questions groups were each divided into an equal number of '+HUMAN, +ANIMATE' and '-HUMAN, +ANIMATE questions (36c & 36d correspondingly). There were also 2 Warm-up pictures, which were used to prevent the comprehension of easier wh-questions.

(41) a. Pcon zoon trava ti zembra?

which animal.NOM pulling.3SG the zebra.ACC

'Which animal is pulling the zebra?'

b. Pcon alogo thori i zembra?

which animal.NOM looking.3SG the zebra.ACC

'Which animal is the zebra looking at?'

c. Pcon agori sproxni tin korua?

which boy.NOM pushing.3SG the girl.ACC

'Which boy is pushing the girl?

d. Pcon zoon vura i zembra?

Which animal.ACC running.3SG the zebra.NOM

'Which animal is the zebra chasing?'

The materials used were a file with A4-size pictures and a score-sheet to note down the answers. A video-camera was used during the testing session with each child to ensure that the speech produced by the child could be analyzed later and that any features that might facilitate the understanding of any patterns would be reported.

3.3.3 Material and Procedure

This task was a simple picture-based comprehension task, where children were shown pictures and asked questions related to the pictures. More specifically, a picture targeting a D-linked question would show three animals, for example, with the middle character doing an action (e.g. looking, pulling etc.). The other two characters on the

picture were set up in a way that one of them could appear as the one performing an action to the middle character and the other character as the one receiving the action of the middle character (see Appendix C.2 for an example of subject and object D-linked question). In this way, when a subject D-linked question was asked, the child needed to define verbally or point at the character performing an action to the middle character. Had the child responded incorrectly, then s/he would have pointed to the character receiving the action from the middle character.

The procedure followed was the same for all children tested and each child was introduced to it individually. The researcher and the child played the game in a quiet area of the kindergarten in order to facilitate the concentration of the child on the game. Every time, the researcher would sit at a table next to the child. The file with the pictures was on the table. The researcher would introduce the task to the child by explaining that s/he will be shown pictures and that she would ask questions related to the pictures. The child was told that s/he could either respond verbally or point to the picture.

As noted above (Section 3.3.2), the test had 16 questions with 8 of them investigating D-linked questions. In the warm-up tokens, the researcher asked both simple and D-linked questions and if the child responded successfully in the D-linked question, then the research would proceed to the target questions.

Each picture was compatible with either a subject or an object question so that if the child could not understand the question, there would be another option to provide a link to his/ her answer. An example, for both a subject and an object question, is provided below. The questions below could change into a subject or an object questions, when the case of the nouns corresponding to the characters change.

Researcher: Pcon agori sproxni i korua?

which boy.NOM pushing.3SG the girl.ACC

'Which boy is the girl pushing?'

Child: To agorin me tin prasinin fanela

the boy.NOM with the green t-shirt.ACC

'The boy with the green t-shirt.'

Researcher: Pcon zoon trava tin zembra?

which animal.ACC pulling.3SG the zebra.NOM

'Which animal is pulling the zebra?'

Child: To yondari.

the lion.ACC

'The lion'

The test finishes when all pictures have been shown to the child.

3.3.4 Results

The video-files were used to enter each child's responses into a spreadsheet. The spreadsheet was modified to provide an item analysis for the 4 age groups and the adults group.

D-linked questions were scored based on the successful responses of the children. Children's responses were coded as target, not-target, other or no response. The 'Other' category involved irrelevant responses, such as mentioning or pointing to irrelevant item on the picture.

A control group of adults scored at ceiling in the comprehension of subject and object D-linked questions.

Overall, the children responded to the expectations of the experiment and showed no difficulty in following the methodology. The results in Figure 11 showed that there is development by age and this is a path observed often in acquisition studies. No special idiosyncrasies were observed and children showed performance close to ceiling by age 6, as shown in the Figure below. Non-target responses were also observed. A 33% of non-target responses was observed in the youngest children, but decreased in the older groups to 21% (4 yr), 18% (5 yr) and 5% (6 yr).

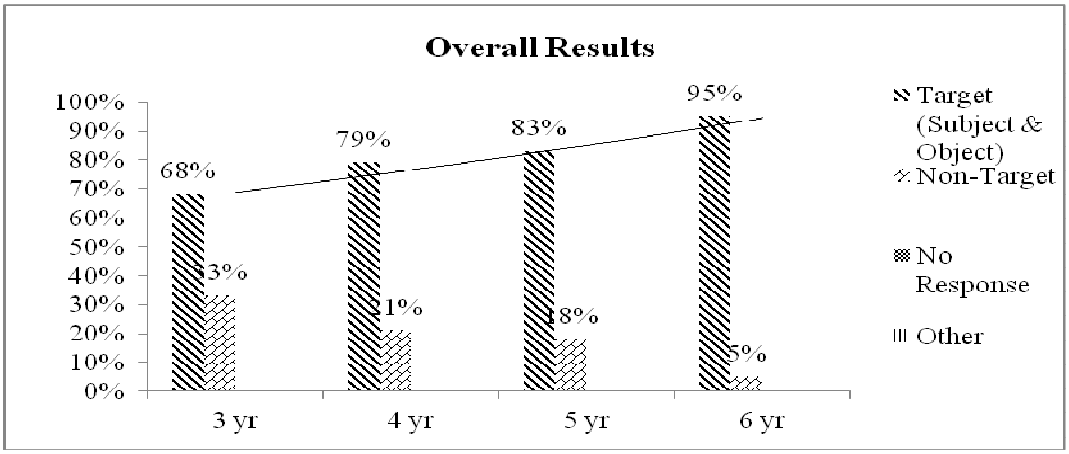


Figure 10 Comprehension of D-linked questions

Figure 12 masks differences between the comprehension of D-linked subject and object questions, based on the percentages shown in Figure 11 above, which can be further divided as below.

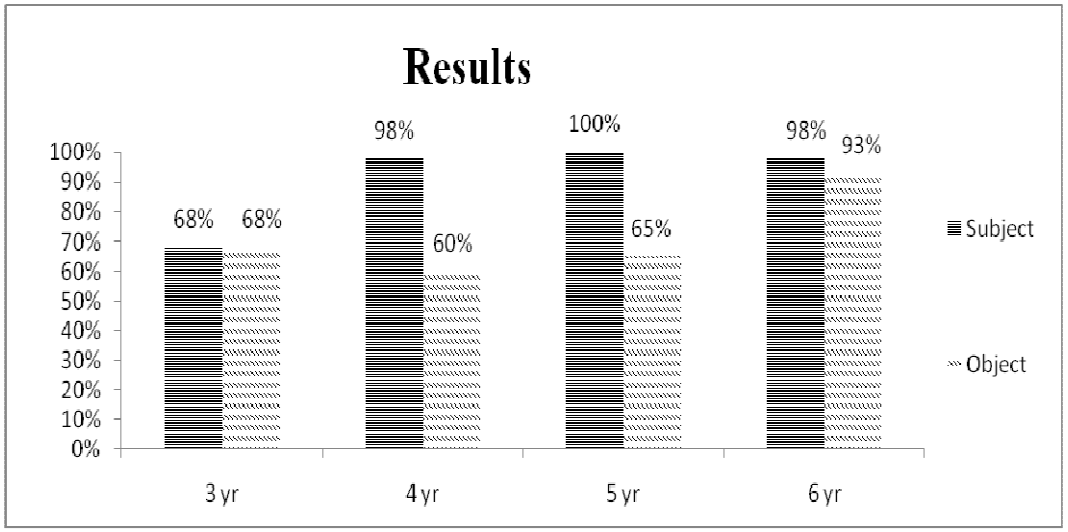


Figure 11 Comprehension of Subject vs. Object D-linked questions

Figure 11 shows the percentages for the comprehension of subject and object D-linked questions separately. The comprehension of both types of questions appears at the same percentages in the 3 yr group. Comprehension of subject D-linked questions appears to be acquired earlier than comprehension of object questions (see Section 3.4 for further discussion). The comprehension of object D-linked question remains at almost the same percentages at the 3 yr, 4 yr & 5 yr groups but increases in the 6 yr group (for a statistical analysis, see also Table 10).

Another possible effect related to the comprehension of D-linked questions and any difficulties observed is the animacy (Kidd, Brandt, Lieven, and Tomasello, 2007) since objects are mostly inanimate. The experiment's design controlled for human vs. animal, but both of these are considered animate. These were controlled in the experiment so that each type (Subject/object) D-linked question would have 2 '+ANIMATE', '+HUMAN' and '+ANIMATE', '-HUMAN' to account for any additional factors that can show any effect in the results.

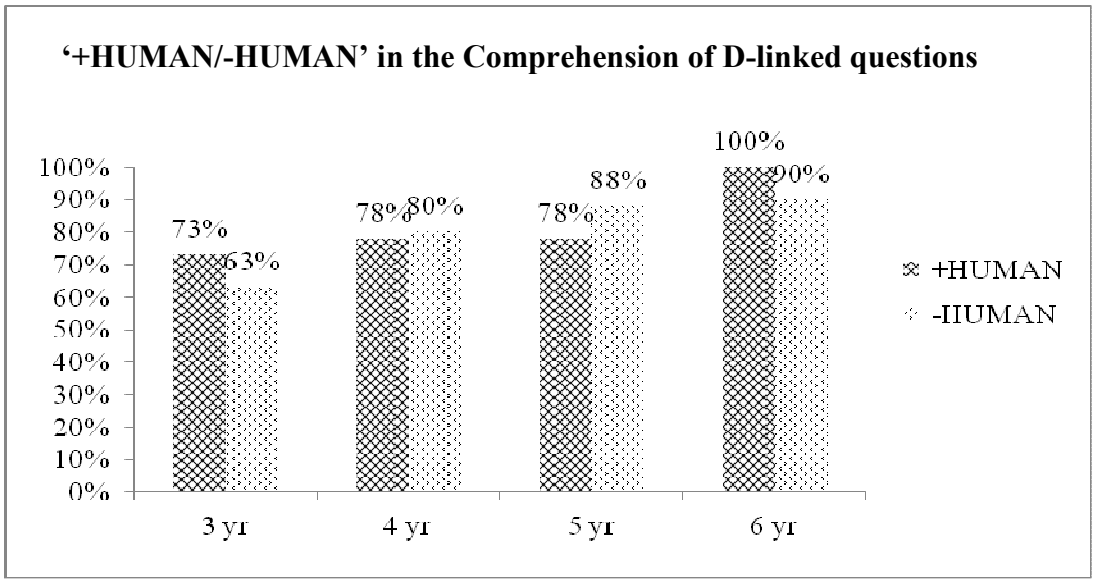


Figure 12 +HUMAN/-HUMAN in the comprehension of D-linked questions

Figure 12 shows that the youngest children perform better in the comprehension of '+HUMAN, +ANIMATE' D-linked questions. That percentage remains almost the same up until the age of 6, when performance gets to ceiling. The comprehension of '–HUMAN, +ANIMATE' D-linked questions, which was tested with the use of animals, starts from lower percentages and does not get as high as '+HUMAN, +ANIMATE' percentages at the age of 6. None of the percentages shown above differ significantly from chance based on a chi-square for goodness of fit; the p-values are x^2= p>0.001, p-value = 0.5862 (3 yr), x^2= p>0.001, p=0.8997 (4 yr), x^2= p>0.001, p=0.6225 (5 yr) and x^2= p>0.001, p=0.6464 (6 yr). The analysis of the factor +HUMAN/-HUMAN' in subject and object D-linked questions is given below:

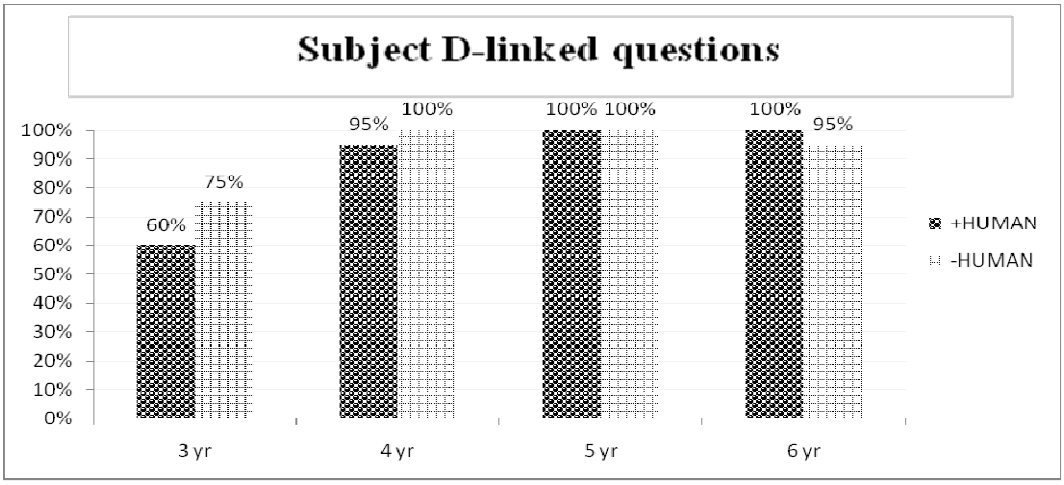


Figure 13 + HUMAN/-HUMAN in the comprehension of subject questions

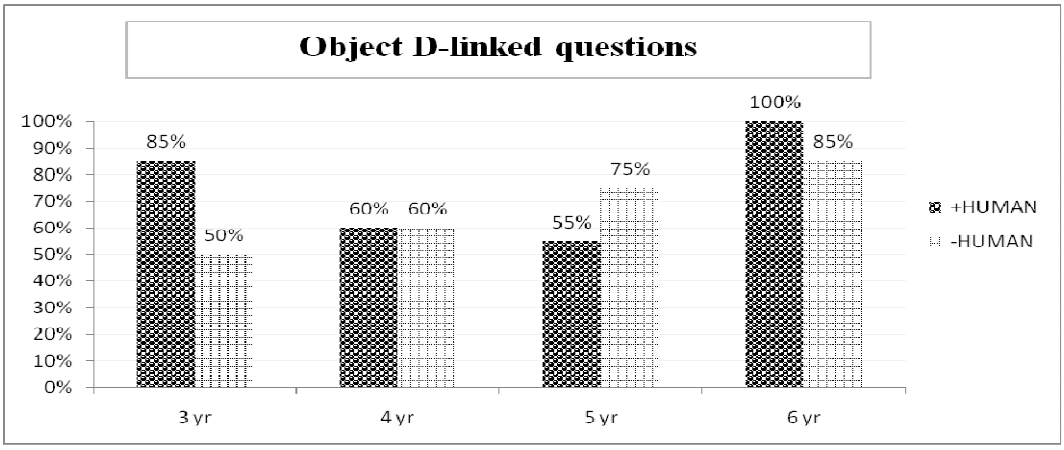


Figure 14 +HUMAN/-HUMAN in the comprehension of object questions

Figure 13 shows that children in the '3 yr' group had more difficulty interpreting a '+HUMAN' subject D-linked question. Children appeared to give more successful interpretations of an object D-linked question when that was referring to a '+HUMAN' character on the picture. More specifically, children in the '3 yr' and '6 yr' group' performed better in '+HUMAN' object D-linked questions (Figure 14). A chi-square for goodness of fit showed that only the percentage of 50% in the interpretation of object D-linked questions (-HUMAN) ($p=0.1779$) and the percentage of 75% in the '5 yr' group (-HUMAN) ($p=0.4328$) differ significantly from chance.

Further statistical analysis was provided for the results of the experiment. Due to the difference in the design of the experiment between the Guess What Game and the comprehension task, a different statistical test was applied. What was considered as significant in this case was to statistically measure the percentage in the sample, and provide a confidence interval for the percentages previously calculated.

Comprehension of subject and object D-linked questions was measured separately to provide a confidence interval for the percentages. The table below presents the percentages on the basis of three arguments: (a) the number of instances counted (b) the number of the expected responses and (c) a statistical argument for the non-application of a continuity correction. Based on Table 10 below, there is 95% confidence that the true percentages of the 3 yr group out of all the instances is between 52.01% and 79.91% for the comprehension of each the subject and object D-linked questions. In the 4 yr group, the percentages are between 87.11% and 100% for subject questions and 49.50% and 77.86% for object questions. The percentages in the 5 yr group are between 91.23% and 100% for subject questions 49.50% and 77.86% for object questions. Last, the percentages in the 6 yr group are between 87.11% and 99.55% for subject questions and 80.13% and 97.41% for object questions.

CONFIDENCE ("conf. level"= 0.95)				
AG	**SUBJECT D-LINKED**		**OBJECT D-LINKED**	
3 YR	0.5201775	0.7991550	0.5201775	0.7991550
4 YR	0.8711863	0.9955732	0.4459589	0.7365167
5 YR	0.9123784	1.0000000	0.4950588	0.7786547
6 YR	0.8711863	0.9955732	0.8013577	0.9741640

Table 10 Confidence intervals for the comprehension of D-linked questions

In other words, a change appears in the 4 yr old children in Subject D-linked questions and in the 6 yr old children in Object D-linked questions. Further discussion with regard to the significance of the results reported for the comprehension task and the comparison of these with the results calculated from the production task will be provided in the Discussion (Section 3.3.6).

3.3.5 Discussion

The comprehension task was analyzed for the purposes of this dissertation following the literature on the difficulty of the comprehension of object D-linked questions (Goodluck, 2005). Goodluck (2009) shows that 47 English speaking children aged 4;0-5;0 scored 72% (mean percentage) in subject D-linked questions and 58% (mean percentage) in object D-linked questions. As initially analyzed, results showed that comprehension of subject and object D-linked questions is at 68%, which does not differ greatly from Goodluck's findings. The population in the aforementioned study was older than the children tested in this experiment. The percentage of 68% was found for the '3 yr' group of Greek Cypriot children.

A significant pattern, however, appears in the older groups, when children perform close to ceiling with the interpretation of subject D-linked questions. This rapid increase of percentages from one age group to another shows that a percentage of '68%' may not be adequate to argue for an age of acquisition. The difference in pace of acquisition of the two types surely supports a difficulty in the comprehension of object D-linked questions.

By analyzing the data according to any other controlled factors, it appeared that the '3 yr' and '5 yr' group did worse than expected in object D-linked questions, when that involved an animal character.

Goodluck (2005) showed that the specificity of the noun can be relevant for the comprehension of a D-linked question. Based on this, the following results show the specificity on the D-linked noun in the comprehension experiment administered to Greek Cypriot children:

	Generic (2 items)	**Specific (6 items)**
3 yr	70%	67%
4 yr	90%	27%
5 yr	80%	38%
6 yr	80%	50%

Table 11 Results in the comprehension experiment based on the specificity of the noun

This was a factor which was not controlled during the design of the experiment and due to this there were 2 questions with a generic item and 6 questions with a specific noun. Children perform much better with a generic noun in a D-linked wh-question.

To sum up, children seem to start at the age of 3 with percentages that are above chance, but acquisition of subject D-linked is only succeeded at the age of 4 and acquisition of object D-linked is achieved by the age of 6. The specificity of the noun appears to play a role for the successful responses. Both conclusions validate previous research in the field (Goodluck, 2005 and 2009).

3.4 Elicitation task vs. Comprehension task

Two experiments were carried out to collect data for the acquisition of D-linked questions in CG and observe any idiosyncrasies with regard to the phenomenon of pied-piping in language. One tested the production of D-linked questions with the assistance of pictures and a carefully designed game between two puppets and the child. The other experiment tested the understanding of D-linked questions by asking questions children about actions illustrated in pictures.

Based on the results and the statistical analysis provided, the production of these questions shows significant patterns and idiosyncrasies. By dividing the results with a set used with the wh-phrase *ti* 'which' and a set formed with *inda* 'which', there can be observed important differences between them. That is, the frequent number of errors observed to occur with *ti* and the limited number of them with *inda*. Whether this is an accidental fact of the study, or something that is related to the multi-linguistic environment of Cyprus will be discussed later on (Section 3.5).

With regard to the target performance between the two experiments, it is obvious that acquisition of comprehension is acquired much earlier than production of D-linked questions.

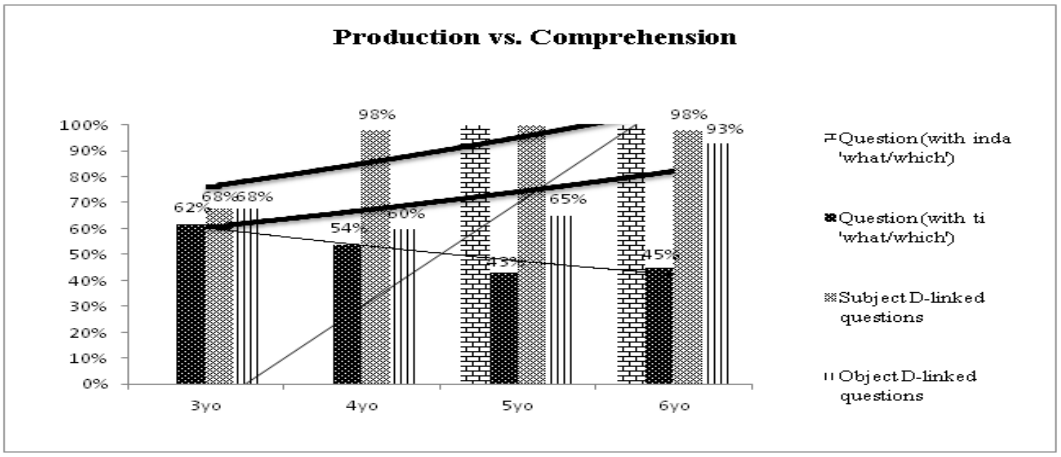


Figure 15 Comprehension vs. Production

The bolded lines on Figure 16 show the trend observed based on the data from the comprehension task. While they seem to follow a normal development by age, they exhibit major differences with the non-bolded trend lines on the same figure. Those lines show the trend as calculated from the results in the production task. One of them, showing *inda* production, starts from the bottom line (3 yr) and shows a rapid development from 0% to 100% for the successful production of targets. The other non-bold line, which shows the performance with *ti*, goes opposite to the other trend-lines showing lower successful responses by age.

The successful target responses for the production of D-linked questions with *ti* and the comprehension of subject and object D-linked questions start from almost the same percentages in both experiments in the '3 yr' group. This can offer the grounds to argue that even though the two start out similarly, the path of acquisition related to comprehension is quicker than the one of production. The percentage appearing for the production of *ti* in D-linked questions in the '3 yr' group was decreased later on. In addition, there were no instances of production of the Cypriot-specific *inda* 'which' up to the age of 4, but after that all the instances found showed successful production of pied-piping.

3.5 D-linking and pied-piping

The possibility of experimental effects and external factors has been discussed above as a possible explanation to the phenomenon studied. The comparison, however, of the results given from the production and elicitation task provide the grounds to discuss the D-linking factor, which has been assumed by previous studies to be the factor determining the late acquisition of D-linked questions.

The percentages of successful pied-piping with *ti* are generally low. An assumed explanation could be that the difficulty given from D-linking affects the acquisition. That is, the collaboration of syntax and semantics, with syntax playing the usual role and semantics, setting a restriction in which an X is selected out of a set of X's. When a question, such as 'which apple are you eating is uttered', it offers the idea that there is a set of apples, out of which one is being eaten.

This restriction has been considered by other studies to be the factor for the apparent difficulty in acquisition by children. Comparing the results above with the ones calculated based on the comprehension task it can be argued that this is not the case. Children were tested for the same structures in specific ages involving this kind of restriction in this type of structures. It is the case, however, that children seem to understand the D-linking restriction, even though at the same ages they seem to have difficulties with it. If the semantics of the structures was the difficult part for children, then this difficulty should be evident in the comprehension of D-linked questions as well.

In addition to this, the errors belonging to the category 'lack of movement of the noun' illustrate very clearly that children understand the restriction set between the operator and the noun and for this reason exactly, they pronounce it, even though in its base position.

To sum up, it is argued that the D-linking factor and more specifically, the semantic restriction in D-linked questions does not play the most important role in the late acquisition of these structures and that this difficulty appears at the derivation of the structure related only to the syntactic component of language.[19] The next chapter

[19] The connection between comprehension and syntax is also emphasized by Avrutin (2011), who explains that comprehension lies timely with syntax and it needs to come up with a result on time.

provides the syntactic account for the explanation of the difficulty and the errors appearing in children's speech.

Chapter 4: Understanding children's wh-movement

In the previous chapter, we were introduced to pied-piping in children's speech and examined how Greek Cypriot children perform in related acquisition experiments. A strong observation that was emphasized focuses on the sub-extraction phenomena in such structures. Having already said that this child language phenomenon can be seen from different point of views, we will focus on a structural approach to explain the pattern observed in this chapter.

Previous accounts for the sub-extraction of a wh-phrase from a complex DP have focused sometimes on typological differences and language characteristics and other times on the landing position of a moved element rather than an understanding of the syntactic mechanisms and relations involved.

Gavruseva and Thorton (1999) examined the wh-extraction of the possessor in long distance questions, and proposed that the medial C provides an alternative checking domain for the Case of the wh-possessor in English. This successive-cyclic wh-movement is in line with previous theories, but focuses more on the medial position, rather than the source position from which the possessor is extracted.

The morphological approach explored by Gavarró and Solà (2004) linked children's errors with the morphological requirements of adult speech. The morphological or syntactic richness of languages can be relevant for this kind of structure, as the presence or absence in the adjectival predicates with a wh-phrase seems to play a role. Split Case licensing cannot be considered as the main factor for the sub-extraction in children because these errors appear also in complex DPs of the type wh-NP-NP, where this fixed order predicts no movement out of the complex DP

to any Case-related projection. Given that such input was not produced by parents, split Case-licensing should not be expected. In addition, CG does not appear to allow any cases of Split Case-licensing, even though this needs to be studied in detail separately, and in the cases where a possessor can be extracted then it receives a Dative Case (for more discussion, see Chapter 2, Section 2.1):

(42) *Pca egorases vivlia?
which bought.2SG books.ACC
'Which books have you bought?'

(43) *Posa egorases vivlia?
how-many bought.2SG books.ACC
'How many books have you bought?'

(44) Pcu ta vivlia egorases?
whose.GEN the books.ACC bought.2SG
'Whose books did you buy?'

(45) Pcu egorases ta vivlia?
whom.GEN bought.2SG the books. ACC
'For whom did you buy the books?'

As seen in (40), the interpretation given requires dative case, which illustrates a different structure than (39), where the wh-phrase behaves as the determiner of a complex DP.

Last, van Kampen's (PF/LF convergence in acquisition, 1996) analysis is in line with the direction of the current proposal with regard to the relevance of the Convergence Principle (Chomsky, 1995) as will be discussed below. However, this

proposal focuses on identifying the mechanism that targets convergence in the syntactic component without making any reference to the other modules of the language faculty.

4.1 An overview of wh-movement

Wh-movement is a well studied phenomenon in syntax and has provided arguments for the understanding of the GB and the Minimalist framework during the passing of the years. These arguments ranged between the different positions taken in a GB context (Chomsky, 1981) for A'-movement expressed with wh-movement to the understanding of feature existence as a fundamental factor for movement under a Minimalism perspective (Chomsky, 1995). Following this, the focus of wh-movement in previous years was driven from the position of the wh-phrase in the clause whereas this has changed to be the kind of features that a wh-movement would satisfy in a clause.

Following Hornstein (2001) and the comparison between the EPP features of CP and TP (p. 119), wh-DPs and +WH C_0s bear uninterpretable features that need to be checked. Checking is done through the MOVE operation, as argued in Hornstein (2001), which is a modified version of Chomsky's proposal (1993), which sets wh-movement as a combination of COPY and MERGE. MOVE, in this sense, involves a MERGE driven by feature checking.

In the following sections, movement will follow the assumptions outlined above (Hornstein, 2001) and explore the kind of wh-movements related to complex DPs of the type wh-NP (Section 4.2) and complex DPs of the type wh-NP-NP (Section 4.3). The similarities of the structures where children showed sub-extraction

between different structures and examples leads to the formulation of a hypothesis and further theoretical implications, explained in Section 4.4.

4.2 Complex DPs of the type wh-NP

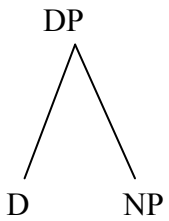
It has long been argued that structures of the type wh-NP involve a wh-phrase on a D head and an NP phrase as its complement. A main argument for this derives from the ungrammaticality of words like 'what' and 'which' co-occuring with an article (41b).

(46) a. Which book did you read?

b.* Which the book did you read?

Following this, the structure of a wh-NP would be the result of merge of the wh-word in the position of the determiner and the NP:

(47)



As we saw in Chapter 1, where a complex DP moves to a higher projection in the clause, such movement is identified as pied-piping (Ross, 1967). As also explained in Chapter 1, there are languages, where pied-piping is not obligatory. Following a feature-checking hypothesis for movement made hitherto (Hornstein 2001), it is assumed that C is carrying [WH, EPP] features that trigger movement of the XP 'which book' to Spec, CP.

(48) [$_{CP}$ which book[$_{C'}$ did$_{[\sout{WH, EPP}]}$ [$_{TP}$ you[$_{T'}$ ~~did~~[$_{vP}$ ~~you~~[$_{v'}$ read[$_{VP}$ ~~read~~[$_{DP}$ ~~which book~~]]]]]]]]

In the example above, *book* merges with *which* to form a DP, which is triggered by the unintepretable features in C to undergo movement to Spec, CP and check the features [WH, EPP].

A further question to be addressed is whether the features carried by the fronted wh-phrase are found on the wh-word or are inherited, through a feature-percolation procedure (Chomsky, 1973) to the XP^{MAX}. In other words, it is unclear by simply assuming an XP movement, whether the features targeted are found on the head of the projection, which in this case is a wh-phrase that is inherently carrying the relevant features or whether these features are percolated to the maximal projection. While this appears to be the case at a first glance, other structures that require pied-piping and movement do not support this claim. Radford (2004) provides the argument that in example (44), originally used in Chomsky (1995: 263), *whose* cannot be the head of *whose car* because it carries genitive Case and *whose car* is the complement of the transitive verb *borrow*, which means that it should have Accusative Case.

(49) Whose car did he borrow?

This is a claim provided against feature percolation, where features are assumed to be inherited from the head of the constituent to other lexical elements.

Radford (2004) provides a modified version of Chomsky's *Convergence Principle*[20] (1995), which explains that the [WH] feature on C attracts the smallest constituent containing a word carrying a [WH] feature. Following Ross's (1976) Left Branch Condition (LBC), the smallest constituent in example (44) will be *whose car*. Donati (2005) explains that movement of a wh-word alone is movement of a head and the projection of all its features, included D. Based on that, LF convergence selects the minimalist way or projects into a phrase. Further discussion on the application of this condition will be provided in the following sections.

4.2.1 Wh-extraction from a complex DP of the type wh-NP

As presented in Chapter 1, there are languages that allow optional extraction of the wh-word from a complex DP and stranding of the NP. This optionality has been a puzzle addressed in many studies with a number of different approaches. Fanselow and Caver (2002) proposes a non-strict theory of deletion, Starke (2001) and Kayne (2002) a special kind of movement and Butler and Mathieu (2005) a visibility requirement in syntax.

Following the discussion provided in Section 4.1, a [WH] feature on C attracts the smallest constituent which contains a word carrying a [WH] feature. This condition, which is complementary with the Stranding Constraint (Chomsky, 1995) and the LBC (Ross, 1967) offers an understanding for the obligatory pied-piped elements in a wh-movement.

At the same time, the combination of these conditions provides an understanding for the possibility of extraction. Once LBC sets the condition to every

[20] A more general assumption, as explained in Hornstein et al. (2005), is that grammatical derivations only converge if they are legible in both levels of PF and LF.

language that allows or not extraction of the wh-phrase from the complex DP, the Convergence Principle specifies what the smallest constituent that can undergo movement is. It is, however, unclear how the Convergence Principle could account for the optionality of pied-piping or not in languages that allow both. In the following section, we will explore syntactically the sub-extraction from complex DPs by children.

4.2.2 Sub-extraction of a wh-phrase in complex DPs by children

While setting the grounds towards understanding wh-movement in children speech through exploration of relevant theories, further details need to be mentioned to explain the phenomenon of wh-phrase sub-extraction.

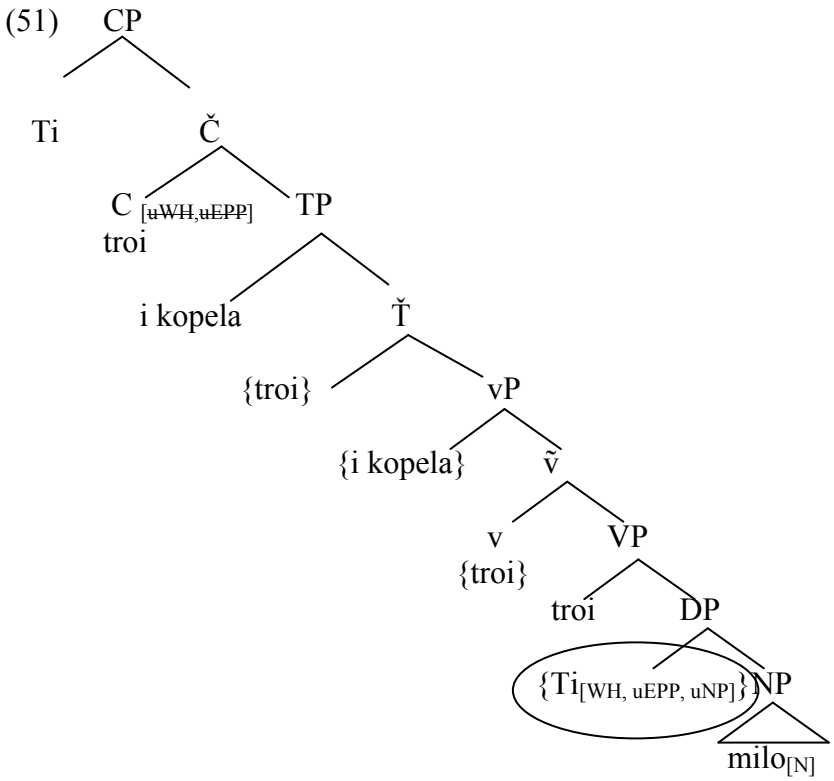
In many languages, sub-extraction can be grammatical as it follows the adult language, where Split-DPs and optional movement are possible. To start with, children appear to move only the operator and strand the noun in complex wh-phrases and this has been found in CG with the current study, but also in MG (Stravrakaki, 2006; Asproudi, 2011), in Dutch (van Kampen, 1997), in Catalan (Gavarró, A. & Solá, 2004a and 2004b) and in English (Chen, Yamane and Snyder 1998). An example of this type of LBC violation in CG is:

(50) *Ti troi I kopela milo?
which.ACC eating.3SG the woman.NOM apple.ACC
'Which apple is the woman eating?'

In order to understand the mechanisms of wh-movement in its early stage, without making any reference to parameter setting in the early years, the minimalist notions of *contain* and *c-command* will be explored. Both of these are ideas observed in locality contexts and agreement relations in the GB framework (Hornstein, Nunes and Grohmann, 2005), but have come in today's generative assumptions to play a greater role in understanding any kind of movement, which can be linked to features.

When children sub-extract from a wh-NP, they basically choose to move the head of the constituent, which carries any [WH] features. However, an assumption supporting the idea that children target head movement with the errors observed cannot be claimed, since children produced errors with the movement of XPs as sub-extracted elements from more complex DPs (Section 4.3). Following what has been said so far, consider the following:

(51)



The wh-feature carried by the wh-phrase is on D, which is immediately contained by the maximal projection DP. Based on the errors that children gave, it is assumed that C has unintepretable [WH] features and looks into its C-command domain and attracts the element that is immediately contained in the maximal projection that contains the relevant feature.

This assumption is in line with the data reported on the sub-extraction of possessors across languages and more specifically in English:

(52) who did you see's book

(Gavruseva and Thornton, 2001)

It has been argued that *who* is at Spec, DP and that ‘‘s’ is in D. Following the data in CG, C attracts *who* because *who* is immediately contained in the maximal projection DP. To formulate this in better words, the following condition is hypothesized to express the understanding of wh-movement in children:

(53) Immediate Move Hypothesis

Move the lexical item that is immediately contained by the maximal projection where the relevant feature is to be found.

In this way Chomsky’s Convergence Principle (1995) correctly predicts that wh-movement involves movement of whatever is necessary for convergence. However, the size of the element moved is not the absolute condition, as we will

discuss later on. The notion of "shortest" under a Minimal Link Condition[21] (Chomsky, 1995) is relevant. Given that C 'looks' at its C-command domain to attract the relevant feature, it is then expected that the first element that will satisfy the hypothesis made above will be subject to movement.

Children's syntax reveals a fundamental idea of the Minimalist program (Chomsky, 1995) and that is the Economy principle and the sole need to apply the idea of movement in language in the minimalist way. If children need only move whatever is immediately contained in the maximal projection of a relevant feature, then pied-piping should be considered as an over-cost procedure. In the following section, further arguments will be provided towards supporting the Immediate Move Hypothesis in children's syntax and the expression of Economy following Minimalism's thinking.

4.3 Complex DPs of the type wh-NP-NP in children's responses

Apart from *which*-NP structures, there is another more complex possible structure involving the wh-phrase *ti/inda* 'which' and pied-piped items in CG. As we saw in Chapter 3, (49) was not successfully produced by all children. Before considering the kind of operation that triggered the movement in children's errors, we first need to explore the internal structure of this complex DP.

[21] Miyagawa (1993) explains that Minimal Link Condition is assumed to be the case when a position β contains an element with an unchecked feature and another element with the same feature cannot move across it to a position α for purposes of feature-checking.

(54) Ti xroma milo troi I kopela?

which colour.ACC apple.ACC eating.3SG the woman

'What colour apple is the woman eating?'

In (49), two NPs are pied-piped and moved along with the wh-phrase. Interestingly, this kind of complex structure was also identified in children's errors, where pied-piping was partially successful. Some of the children's utterances are given below:

(55) *Ti xroma vasta I kopela milo?

which colour.ACC holding.3SG the woman.NOM apple.ACC

'What colour apple is the woman holding?'

(56) *Ti xroma krata doro o andras?

which colour.ACC holding.3SG present.ACC the man.NOM?

'What colour present is the man holding?

(57) *Ti xroma fori o andras to kapelo?

which colour.ACC wearing.3SG the man.NOM the hat.ACC

'What colour hat is the man wearing?'

In the next section, we will explore the possibility of a different and more complex structure for this type of structures.

4.3.1 DP-internal predication in complex wh-phrases of the type wh-N-N

This DP appears to differ from any other DP discussed so far in the sense that it involves two pied-piped nouns. Complex DPs, in this sense, can hide a more complex structure. Den Dikken (2006) explains in Aristotle's words how the term *kategoroumenon* is used to designate a constituent denoting a property assigned to the subject. In a predication relation, the subject usually offers old information and the object new information.

In this sense, *ti xroma* 'which colour' assigns a new color property to *tsenda* 'bag' in (53).

(58) Ti xroma tsenda
which colour bag

This creates a predication relation between *tsenda* 'bag' and *ti xroma* 'what colour'. The idea of a predication relation in a nominal phrase is not a new one. Bennis, Corver and Den Dikken (1998) provide a detailed analysis of the *wat voor* nominal structures (54), as examples of a predicate relation. In the example below, *auto* 'car' is the external argument and *wat* 'what' is the nominal predicate in the predication relation assumed.

(59) [Wat voor 'n auto] heb je gekocht
what for a car have you bought
'What kind of car did you buy?'

(Corver and van Koppen, 2011)

Predication relations in nominal expressions, such as the one above have been argued (Bennis, Corver and Den Dikken, 1998, Corver and van Koppen, 2011) to derive a DP-internal small clause configuration (hence, SC), which forms a functional type of clause. Den Dikken (2006) proposes that a RELATOR establishes the relationship between the predicate and its subject in this kind of structures. It is often the case that displacement can be observed even in this functional type of clause and this has often been called *predicate inversion* (Den Dikken, 2006). Predicate inversion, Den Dikken explains, involves A-movement of the predicate to the subject position

In the example in (55), the nominal predicate *wat* undergoes Predicate Inversion and moves to the Spec of a projection FP. The article *'n* adjoins to the function head F and a final movement, called *Predicate Fronting*, (Bennis, Corver and den Dikken, 1998) moves the inverted *wat* to a Spec, DP, as shown below:

(60) $[_{DP}$ wat$_j[_{D'}$ voor $_{[+WH]}$ $[_{FP}$ t'$_j[_{F'}[_X$ n'$]_i$+F$[_{XP}$ boeken $[_{X'}$ t_i $t_j]]]]]]$

(Corver and van Koppen, 2011)

This final movement is taken to be the 'lexicalization of [+WH] operator D-head. The head of the DP projection gives the interrogative force in the nominal structure and the movement to the Spec, DP provides the possibility for wh-movement out of the SC to yield a discontinuous structure as in (56).

(61) Wat heeft niemand [t voor n' boeken] gekocht?

what had no one – for a books bought

'what kind of books did one buy?'

Considering the above, I argue that similar syntactic procedures can also apply at the Cypriot complex DP of the type wh-N-N, which involves an interrogative wh-phrase. In the case of Cypriot wh-N-N, a phonologically null RELATOR [be] is assumed in the functional structure to establish the predicate relation between the subject and the nominal predicate.

(62) [$_{DP}$ ti xroma[$_{D'}$D[$_{FP}$ ~~ti xroma~~[$_{F'}$ F[$_{TP}$ milo[$_{T'}$ T (en)[$_{VP}$ ~~milo~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~ti xroma~~]

Given in a more detailed analysis than the Dutch example above, it can be assumed that the derivation of (56) is given with the predicate inversion of *ti xroma* from an object position to the Spec, FP and then to Spec, DP to satisfy any uninterpretable [WH] features. The DP projection is argued here to correspond to a clausal CP (see Abney's formulation of the DP-hypothesis (1987) for the possibility of such a projection within the DP), and therefore carries the features that could be met in C in a clause. For purposes of uniformity with the aforementioned analysis (Bennis, Corver and Den Dikken, 1998), the CP will be referred as DP. The subject of the small clause, in this case *milo*, checks Case in a Spec-head configuration with T, since following Burzio's generalization (1986) the assumed copula is unable to assign Accusative Case (for more detailed discussion, see Moro, 1997). The uniformity of this structure in DP-internal predication offers the linearization observed and satisfies syntactic criteria.

It should be noted, however, that there is no independent evidence for the movement of the wh-constituent to Spec, FP. Given that the type of question

produced is a wh-object question, we can assume that the wh-phrase originates as a predicative object of the copula. In order for a wh-phrase or wh-constituent to move, there needs to be a certain trigger and this is taken to be [WH] feature in D. So, the wh-constituent moves both for linearization purposes and to satisfy these features. The unnecessary assumption of an FP projection, which enters the derivation to provide a functional role as the landing position of the displaced inverted nominal predicate is not expected in this derivation. As mentioned in Den Dikken (2006), the following type of structure, which is called an adjectival predicate, has direct A'-movement:

(63) How big a problem do you think this is?

(Den Dikken, 2006, p. 236)

Based on the above and to reduce the number of movements in a minimalist framework (Chomsky, 1995), which requires a trigger for any kind of movement, I argue that the FP projection does not appear in the derivation of the Cypriot structure of the type wh-N-N and instead movement from the object position of the nominal predicate is triggered by the uninterpretable features on the head of the DP projection. This DP projection corresponds to the common CP projection of the clause, following Abney's (1987) correlation of the DP and clause structure:

(64) [$_{DP}$ ti xroma[$_{D'}$ (en)[$_{TP}$ milo[$_{T'}$ (~~en~~)[$_{VP}$ ~~milo~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~ti xroma~~]]]]]]]]

In this case, the nominal predicate *ti xroma* which bears [+WH] features moves to the Spec, DP of the SC to satisfy the [WH] features of the D. This movement is typical of

wh-movement in a matrix clause, thus supporting the idea that the structure of the DP can be thought similar to the structure of the clause.

This kind of predicate structure is also found in English and has been discussed for its lack of restrictions to question extraction in comparison with 'how':

(65) [What size steak] would you prefer it if we ordered t_i?

[How big a steak] would you prefer it if we order t_i?

(Postal, 1998, p. 49)

Apart from this type of wh-NP-NP, there are structures in Cypriot Greek that appear to function differently from other structures of this complexity in other languages. Consider the following German examples from Reis (1989:132), cited in Heck (2008) in comparison with the Cypriot examples in (60):

(66) a. Fritz weiß, [a wie schön]$_3$ man [a t_3 geschrieben]$_4$ haben
Fritz knows how well one written have
Muss, um eine Eins zu bekommen
must in-order a one to get
'Fritz knows, how well one must have written to get an A'

b. weiß, [a wie schön geschrieben]$_4$ man t_4 haben muss
Fritz knows how well written one have must
um eine eins zu bekommen
in-order a one to get
'Fritz knows, how well one must have written to get an A'

(Heck, 2008, p.159)

(67) a. I Maria kseri poso kala en ta makaronia psimena
The Maria knows how well is the past cooked
'Mary knows that is it very nice when the pasta is cooked'

b. I Maria kseri poso kala psimena en ta makaronia
The Maria knows how well cooked is the pasta
'Mary knows that the pasta is well-cooked'

While in German, a split between the 'wie schön' and 'geschrieben' is possible, the split in CG alters the meaning. Interestingly, the examples in (61) are not grammatical with just 'was geschrieben'.

4.3.2 Wh-extraction from an adjectival predicate

Complex wh-phrases of the type wh-N-N, identified as adjectival predicates (Den Dikken, 2006) have been argued to show a SC structure with a predication relation. To proceed to the next step, we need to examine the kind of wh-extraction that can appear in the specific structure. Moro (1997), who discusses SC in the clause, explains that only one DP can be wh-extracted from a small clause on the basis of the following examples:

(68) [which picture]$_i$ do you think [$_{IP}$ t_i was[SC t_i[$_{DP}$ the cause of the riot]]]?

*[which picture]$_i$ do you think [$_{IP}$ [$_{DP}$ the cause of the rioti was [$_{SC}$ t_i t_i]]]?

In his words, wh-movement from a SC can only happen if the DP is extracted from its in-situ position in inverse copular sentences, as extraction from an inverted subject in the SC yields ungrammaticality:

(69) *[which wall]$_i$ do you think [$_{DP}$ the cause of the riot]$_j$ was [$_{SC}$[$_{DP}$ a picture of t_i]t_j]]]]

(Moro, 1997, p. 51)

Under this scenario, Moro argues that 'what' is always extracted from the complement of D and contrary to the conclusion drawn above, no movement is needed. In the same way, a which-NP would be extracted from a SC from its in-situ position.

With regard to wh-extraction from a DP and following the Cypriot structure wh-N-N and the linearization of it in the way it appears, it is argued that wh-movement needs to take place within the small clause of the nominal constituent, following Bennis, Corver and Den Dikken (1998) proposal. The fronted wh-phrase or constituent within the SC is then accessible to other checking relations and further wh-movements to a relevant position, if and when a trigger is provided. This kind of movement can be seen from the following example:

(70) To master sta linguistics inda na to kamo
the master.NOM in linguistics.ACC what.ACC to it.ACC do
'What would I do with a Masters in Linguistics?'

(Pavlou, 2010a)

The marginal acceptability of this structure is produced by speakers, who can use the Cypriot-specific *inda* as a wh-object. For a majority of the speakers, this sentence would mean 'Why should I do a master in linguistics', as *inda* 'what' has been

preserved only in some minorities of Cyprus[22]. In this example, there is movement of the subject and object of the copula, contrary to the condition discussed above.[23] The structure derived from this example would be:

(71) [$_{TopP}$ To master sta linguistics [$_{CP}$ inda [$_{C'}$ na[$_{TP}$ (ego)[$_{CliP}$ to[$_{T'}$ kamo[$_{VP}$ milo[$_{v'}$ ~~kamo~~[$_{VP}$ ~~kamo~~ [$_{DP}$ ~~inda~~[$_{D'}$ (en)[$_{TP}$ ~~to~~ [$_{T'}$ (~~en~~)[$_{VP}$ ~~to~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~inda~~]

Inda 'what' originates as the predicative object from a predication relation with *to* 'it'. The accusative case is not assigned by the copula, but by the matrix[24] verb. The possibility for a DP to carry accusative case in the SC is also obvious from examples such as *I Maria ipe ton Yanni ilithio* 'Mary called John stupid', where John is checked with ACC Case. *Inda* is triggered by the [uWH] features on the matrix C and moves to Spec, CP and *to* 'it' moves to a higher projection. [25] *Na* 'to' is positioned on C for the purposes of this example[26], although a more complex structure might also be possible.

Following the above, it should be expected that there will be ungrammaticality when there is wh-extraction of a single wh-phrase out of the constituent wh-N-N. Consider the following examples:

[22] For further discussion on these issues and the syntactic behavior of each one of these wh-phrases, see Pavlou (2010).
[23] Given that this is only one example, the possibility or not of extracting two DPs out of a SC will not be further elaborated.
[24] 'Matrix' is used here to refer to the higher projections outside of the SC structure.
[25] The trigger for clitic movement will not be discussed here, although it can be assumed that the possibility of a preverbal projection in interrogative contexts might be the key.
[26] Roussou (2007) distinguishes between a lower C position, related to mood distinctions and a higher C with operational features, since *na* has both modal and clausal characteristics. She specifically mentions that negation with 'min' and object clitics, as in this example, can intervene between *na* and the verb.

(72) *Ti/Inda krata I kopela xroma tsenda

which holding.3SG the woman.NOM color.ACC bag.ACC

'What colour bag is the woman holding?'

The example in (67) is ungrammatical since movement of *ti* 'what' is a Left Branch Violation (LBC) (Ross, 1967) of the fronted DP *ti xroma* 'what colour', which forms a constituent. Given that the standard order of the wh-N-N type is wh-word+ property+ noun, and not wh-word+ noun+ property, any other assumption is restricted. In this way, the example in (68) is ungrammatical for the exact same reasons that the following is ungrammatical in Cypriot:

(73) *Ti/Inda krata I kopela tsenda?

which holding.3SG the woman.NOM bag.ACC

'Which is the woman holding bag?'

So far, two types of single wh-phrase movement have been presented and the conclusions made are the following:

(a) Extraction of a wh-word from a DP-internal predication is allowed

(b) Extraction of a wh-word from an adjectival predicate structure of the type wh-N-N is not allowed

A third type of wh-movement that could happen from the SC is XP-movement. Moro (1997) explains that A'-movement of the post-verbal subject of an inverse copular sentence is not allowed:

(74) (you think that) [$_{IP}$[$_{DP}$ the cause of the riot]$_j$ was [$_{SC}$ [$_{DP}$ a picture of the wall] t_j]]

*[which picture[j do you think [$_{IP}$ [$_{DP}$ the cause of the riot]$_j$ was [$_{SC}$ t_i t_j]]?

(Moro, 1997, p.45)

However, wh-movement of an XP from a SC is possible:

(75) [which picture]$_I$ do you think [IP t_i was [SC t_i [DP the cause of the riot]]?

(Moro, 1997, p. 45)

Extraction of a wh-XP from a SC in a predication relation is not restricted in CG:

(76) Inda xroma na to kamo?

which colour to it do?

'What colour should I do it?

Following the analysis of wh-movement out of a SC as explained above, the complex wh-phrase can undergo the same movement without meeting any restrictions. The wh-movement is illustrated below:

(77) [$_{CP}$ inda xroma [$_{C'}$ na[$_{TP}$ (ego)[$_{CliP}$ to[$_{T'}$ kamo[$_{vP}$ (~~ego~~)[$_{v'}$ ~~kamo~~[$_{VP}$ ~~kamo~~ [$_{DP}$ ~~inda xroma~~[$_{D'}$ (en)[$_{TP}$ ~~to~~ [$_{T'}$ (~~en~~)[$_{VP}$ ~~to~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~inda xroma~~]

Two kinds of extractions happen out of the SC. The first one is the wh-movement triggered by the [WH] features in the matrix C and the second one is the extraction of

the subject of the small clause, the acc clitic *to* 'it', to a higher pre-verbal position. Wh-movement out of the SC can also happen without any other movement observed:

(78) [$_{CP}$ inda xroma [$_{C'}$ na[$_{TP}$ (ego)[$_{T'}$ kamo[$_{vP}$ (~~ego~~)[$_{v'}$ ~~kamo~~[$_{VP}$ ~~kamo~~ [$_{DP}$ ~~inda xroma~~[$_{D'}$ (en)[$_{TP}$ to kadro[$_{T'}$ (~~en~~)[$_{VP}$ ~~to kadro~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~inda xroma~~]

In this case, the subject of the SC is not moved because there is no higher projection to trigger any movement operation. To sum up:

a. Extraction of a wh-word from a DP-internal predication is allowed

b. Extraction of a wh-word from an adjectival predicate structure of the type wh-N-N is not allowed

c. Extraction of a wh-constituent XP from a DP-internal predication relation of the type wh-N-N is allowed

A last question to be addressed is the idiosyncrasy with regard to the wh-extraction from the adjectival predicate of the type wh-N-N. As observed above, wh-extraction of the XP is not allowed in the specific type of wh-N-N, even though generally it is possible. This restriction could be the result of the DP internal structure. For example, the absence or presence of a determiner is not random in most of the structures, as it can serve definiteness or even Case functions. In cases of Qualitative Binominal Noun Phrases (QBNP), such as 'the idiot of a doctor' the definiteness expressed by an article appears to be relevant for the lexical representation of the copula and the overall grammaticality of the structure. More specifically, as Den Dikken (2006)

points out, the RELATOR is spelled out as the nominal copula *de* in Spanish, if a definite article is not present:

(79) el imbecile del doctor
The idiot of-the doctor
*el imbecil de doctor
The idiot of doctor

The assumption following this "definiteness-agreement" is that definiteness play a role in the agreement of a noun in a SC with the copula, which in the case of CG is phonologically null. If agreement of the subject with the copula cannot be established because of its non-lexicalization, then only the article can establish a relation. Following this, the XP can undergo wh-movement in (75), when a definite article appears with the subject in the SC. However, this is not the case when used with an indefinite article (76):

(80) Inda xroma na kamo to kadro?
which color.ACC to do.1SG the frame.ACC
'What color should I do the frame?'

(81) *Inda xroma na kamo ena/ Ø kadro?
which color.ACC to do.1SG one frame.ACC
'What color should I do a frame?'

Based on this, it is not unexpected that the XP in (77) cannot undergo wh-movement given the complete absence of an article:

(82) *Inda xroma krata I kopela valitsa?

which color.ACC holding.3SG the woman.NOM bag.ACC

'What color is the woman holding bag?'

The restriction in the wh-movement for the type of structure wh-N-N is based on the necessity for its presence within the small clause for the establishment of the predication relation with the subject. The role of the internal syntax of the DP, which seems to affect movement operations in the clause, is also supported from a comparison of the structures 'what size steak' with 'how big a steak', which shows that clausal restrictions can be relevant to the DP syntax (Postal, 1998).

To conclude, both wh-extraction of single and complex wh-phrases is possible in complex DPs that configure a predication relation, but not in adjectival predicates of the type wh-NP-NP.

4.3.3 Sub-extraction of XP in adjectival predicates by children

As it has been mentioned above, children's errors involved wh-extraction of an XP that yielded ungrammaticality with the structure of the adjectival predicate. That is, children enormously produced examples like the ungrammatical (78):

(83) *Inda xroma krata I kopela valitsa?

which color.ACC holding.3SG the woman.NOM bag.ACC

'What color is the woman holding bag?'

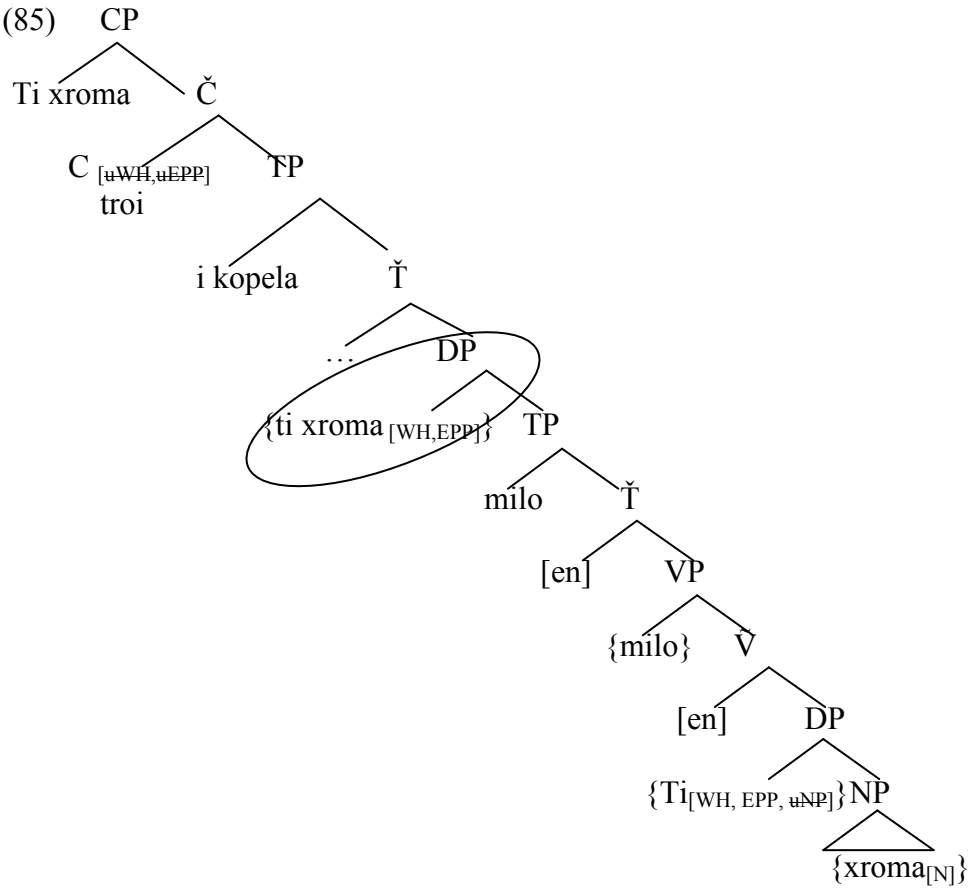
By examining the internal structure of an adjectival predicate of this type in CG, we have concluded that the wh-word forms a constituent with the first (as linearized) NP and moves to a DP-internal Spec, DP (corresponding to a Spec, CP).

(84) [$_{DP}$ ti xroma[$_{D'}$ (en)[$_{TP}$ milo[$_{T'}$ (~~en~~)[$_{VP}$ ~~milo~~[$_{VP}$ (~~en~~)[$_{DP}$ ~~ti xroma~~]]]]]]]

[$_{DP}$ what colour[$_{D'}$ (is)[$_{TP}$ apple[$_{T'}$ (~~is~~)[$_{VP}$ ~~apple~~[$_{VP}$ (~~is~~)[$_{DP}$ ~~what colour~~]]]]]]]

In the structure above, the constituent XP *ti xroma* 'what colour' is immediately contained by the maximal projection DP after movement from an object position within the SC. This can be clearly illustrated as below:

(85)



Following the Immediate Move Hypothesis proposed in Section 4.2.2, children move the item, which in this case is an XP that is immediately contained in the maximal projection involving the relevant [WH] feature, as shown in (80). This shows that Immediate Move does not look at heads only, but also constituents and for this reason, an error in wh-NP-NPs of the type in (81) with a head carrying the wh-features and moving to the outer Spec, CP (81) is not found in children's speech.

(86) *Inda krata I kopela xroma valitsa?
which holding.3SG the woman.NOM color.ACC bag.ACC
'What is the woman holding colour bag?'

Based on this, children sub-extract the lexical element or a set of lexical items, such as a wh-NP constituent that is immediately contained in the maximal projection that has the relevant feature subject to checking. Further discussion regarding the similarity of the sub-extracted elements and the possibility of a unified account is given in the section below.

4.4. MOVE: As little as you can, as much as you need

Based on the data taken from the production experiment, children's errors in D-linked questions are innately-motivated patterns that follow a theoretical reasoning in syntax. It has been proposed so far that the similarity of the structures wh-NP and wh-NP-NP appears to be that both sub-extracted elements have an immediate locality relation with the maximal projection containing them. Given this, the Immediate Move Hypothesis was formulated and repeated below:

(87) Immediate Move Hypothesis

Move the lexical item that is immediately contained by the maximal projection where the relevant feature is found.

While this hypothesis appears correct in predicting the syntactic relation that holds in the sub-extracted items, it does not predict correctly extraction of the elements in both structures. Given that, in children's errors of the type wh-NP-NP only XPs were moved, this is not explained by the hypothesis that lexical item(s) are sub-extracted.

In order to examine other ways of understanding children's sub-extraction, consider the Minimal Link Condition (MLC) (Chomsky1995):

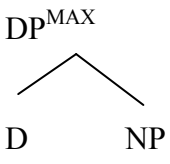
(88) Minimal Link Condition (MLC)

Move the closest XP that contains the relevant feature[27]

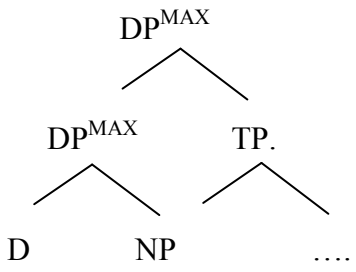
Under this condition, the closest XP to C that contains the [wh] and [EPP] features is the maximal DP that contains both the wh-phrase and the noun in wh-NP structures in (84a) and the outer[28] complex DP of the type wh-NP-NP (84b):

(89)

a.



b.



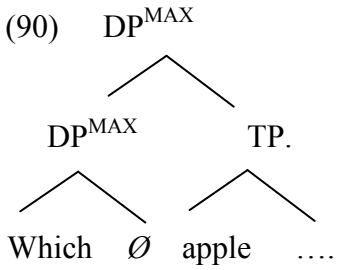
[27] The concept used here does not involve any of the discussion related to interveners between the target and the landing position.

[28] 'Outer' will be used to refer to the maximal projection XP containing another maximal projection XP of the same kind

The idea of C attracting the constituent found in the shortest possible distance is not applicable in the cases of sub-extraction discussed. If this was applicable, then children would necessarily always move the outer DP in both cases of (84a & 84b).

In order to account for the errors appearing in both cases, it can be argued that the structure in (84b) is the actual representation of wh-NP structures and that a wh-NP appears like (85), but with a null NP:

(90)



If the structure in (85) is the underlying representation of wh-NP constituents, then any conclusions drawn for sub-extraction in children need to provide an account for the immediately contained internal[29] DP^{MAX} by the outer DP^{MAX}.

Following the above, a new argument needs to be based on the following conditions:

a) Move as little as you can but,

b) As much as you need.

The mechanism of pied-piping is correctly predicted by (a) above. In languages that do not allow split-DPs, C attracts as little as it can and at the same time satisfying with it any of its needs, which are the uninterpretable features in C. In children's syntax, both conditions above apply separately. While they could move the first DP^{MAX} that

[29] 'Internal' here refers to the maximal XP contained in another maximal XP of the same kind

contains the relevant features to satisfy the condition 'Move as little as you can', they also apply 'Move as much as you need' and therefore ignore the presence of the shortest (in distance) outer DP^{MAX} and move only the internal DP^{MAX}. The idea of the shortest distance, under the MLC, is therefore not supported because of the application of that second condition.

To illustrate the conditions above in syntactic terms, the Immediate Move Hypothesis is re-formulated below:

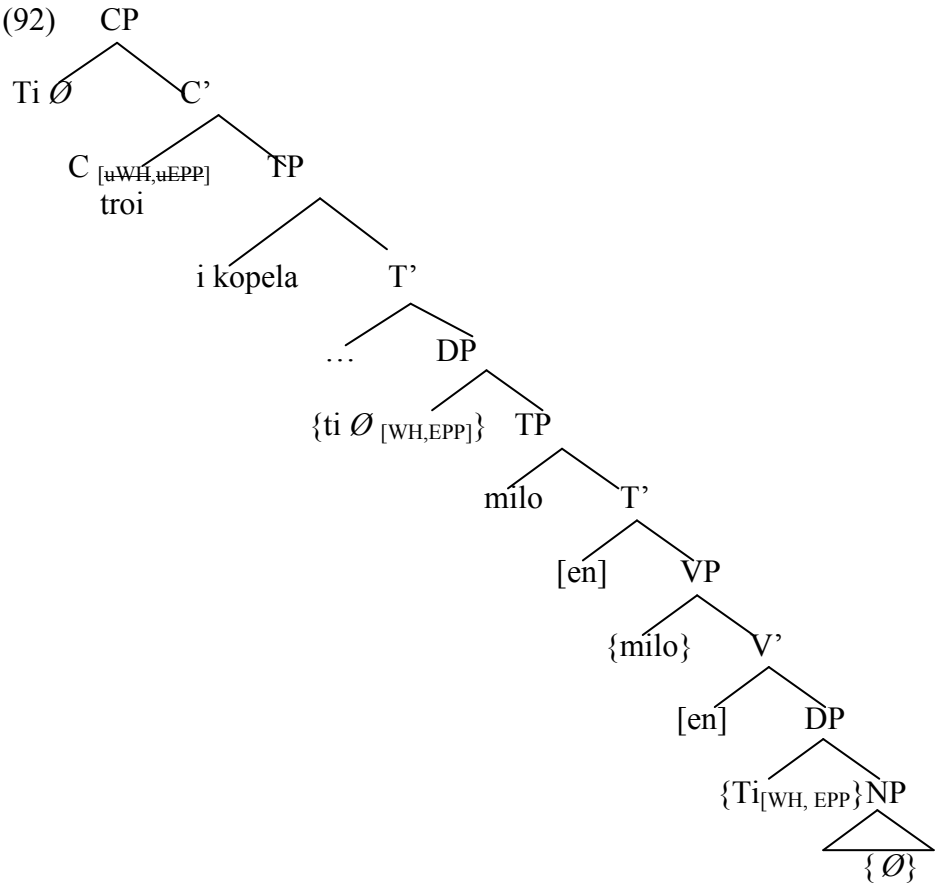
(91) Immediate Move Hypothesis (revised)

Move α iff:

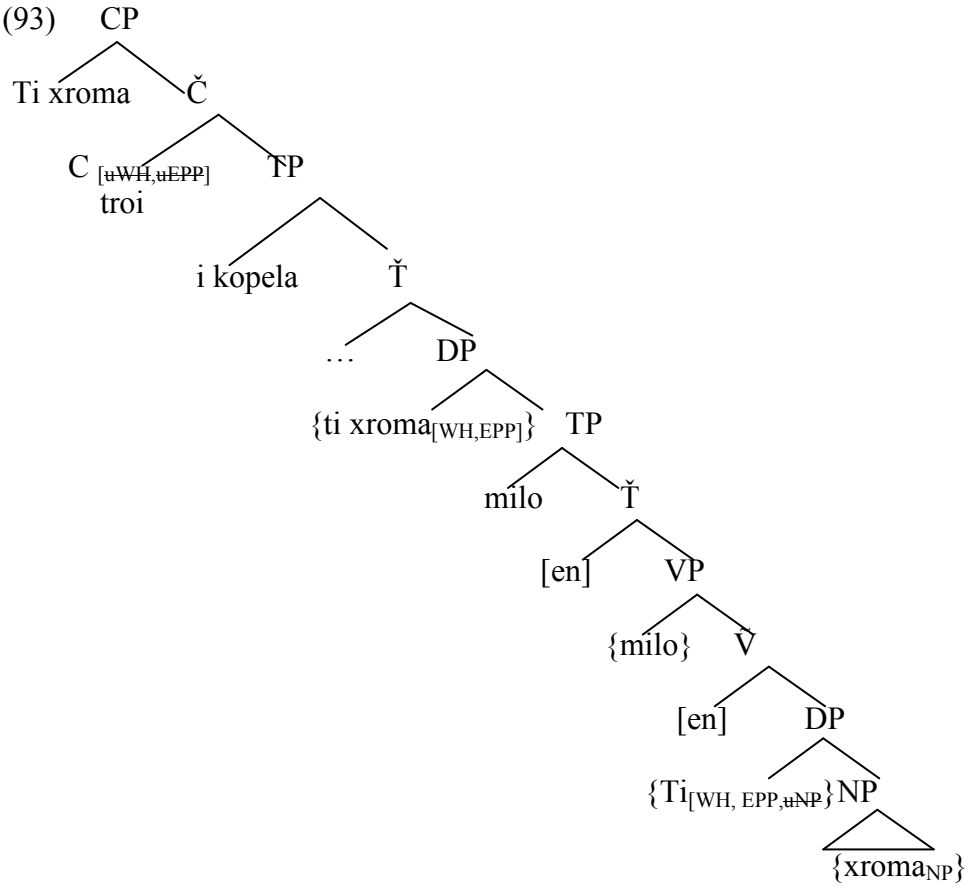
a) α carries the target feature
b) α is immediately contained within the nearest to the probe maximal projection containing the target feature
c) No β is contained in α such that β immediately contains the target feature
d) If α forms an XP, then it must immediately contain the target feature

The revised Immediate Move Hypothesis predicts that in (87) a) the DP *ti Ø* is immediately contained in the maximal projection that contains the relevant feature b) there is no other DP contained in the internal DP^{MAX} such that it contains the target feature and c) the DP *ti Ø* immediately contains the target feature carried by the wh-word. Similarly, the same conditions apply in (88). The DP *ti xroma* 'what colour' is immediately contained in the maximal projection that contains the relevant feature b) there is no other DP contained in the internal DPMAX such that it contains the target feature and c) the DP *ti xroma* immediately contains the target feature found in the wh-word.

(92)


CP
Ti Ø
C'
C [uWH,uEPP]
troi
TP
i kopela
T'
…
DP
{ti Ø [WH,EPP]}
TP
milo
T'
[en]
VP
{milo}
V'
[en]
DP
{Ti[WH, EPP]}NP
{Ø}

(93)


CP
Ti xroma
Č
C [uWH,uEPP]
troi
TP
i kopela
Ť
…
DP
{ti xroma[WH,EPP]}
TP
milo
Ť
[en]
VP
{milo}
V
[en]
DP
{Ti[WH, EPP,uNP]}NP
{xromaNP}

Given the examples illustrated in (87) and (88), the sub-extraction of ‘who’ in (89) is predicted:

(94) "who did you see's book"

(Gavruseva and Thornton, 2001)

Following the Immediate Move Hypothesis, ‘who’ a) is immediately contained by the maximal projection containing the target feature, b) there is no other element contained in ‘who’ that contains the target feature. It is predicted therefore that children will move ‘who’ because it satisfies the conditions of moving as little as they can and as much as they need.

To sum up, Immediate Move Hypothesis was proposed to account for sub-extraction phenomena in D-linked questions and other environments of similar type. It predicts the optionality in pied-piping, expands the syntactic term ‘shortest’ in the Minimal Link Condition and provides a theory of movement based on the minimum possible element satisfying the maximum needs in syntax.

Last, the types of errors produced by children and explored here involve a logical explanation under which fundamental notions of Minimalism, such as Economy, are expressed through different structures. Typologically, similar types of sub-extraction can appear in languages either allowing scrambling or not (Nomura and Hirotsu, 2005) or being considered morphologically rich or not (English wh-possessors sub-extraction) and may follow the Immediate Move Hypothesis proposed here. To conclude, any generalizations defining these errors as speech errors, and not

innately-motivated patterns, as suggested by Nomura and Hirotsu (2005), are not validated.

Chapter 5. Unifying data and theory: Concluding remarks

Child speech is always a revealing way to understand the fundamental theoretical assumptions of a given structure. Error analysis of spontaneous and elicited early speech points exactly at the understanding of complex structures. Theoretical applications can be attested or challenged from these errors or any (ab)normal path of acquisition.

This dissertation is aiming to discuss the phenomenon well-known in the literature of sub-extraction in wh-questions by drawing on data from CG. Four questions have been addressed in the Introduction aiming to provide a complete picture of the acquisition of CG D-linked wh-questions and discuss any idiosyncrasies observed. These questions were addressed with the use of experimental material and procedures and led to a proposal concerning the structure given by children in sub-extraction of operators in D-linked questions.

Greek Cypriot children acquiring CG participated in a production experiment and were identified with low percentages of successful pied-piping in which-NP wh-questions. A significant percentage of non-target responses, were found in their speech, following the literature for other languages. These responses were characterized by the sole movement of the operator and lack of movement of the NP or DP, which resulted to an ungrammatical structure, or complete omission of the NP from the clause. Based on this, CG shows the sub-extraction phenomena just as these appear in Dutch (van Kampen 1997) and romance languages with the stranding of an NP, studies in MG (Asproudi 2011) with the stranding of DPs and complete omission of the NP (Stavrakaki 2006). A difference, falling under the question related to differences and similarities between CG and other languages is the existence of two

D-linked wh-phrases in CG, where the sub-extraction phenomena appear to be distributed differently.

Assuming a possible bi-*x* context in Cyprus (Grohmann, 2011), the analysis showed a different age of acquisition between the MG and CG wh-phrases in the specific structure. Namely, *inda* 'which' was found to be acquired later than *ti* 'which'. Production of the MG wh-phrase *ti* 'which' was accompanied by many non-target responses, such as the ones described in Chapter 3. Production of the CG wh-phrase *inda* 'which' at the ages of 5;0 and older did not show any production of non-target responses. This can indicate a difference in the nature of the two wh-phrases, even if both have a determiner status. In addition, this may suggest, though this is not entirely clear that the non-existence of non-target responses with the CG wh-phrase is based on the possibility that children draw a line between the two codes of MG and CG and therefore perform differently.

Data from a comprehension task were used to compare with the results of the production task. Children performed much better in the comprehension of D-linked questions by showing gradual development by age. Further analysis showed that there is a difference in the comprehension of subject and object wh-questions, validating previous research in the field. The comprehension experiment showed that CG followed existing research for other languages.

By comparing the two experiments, it can be concluded that the procedure of comprehension and production are very different and that the one always precedes the other. By considering this, the proposed answer to the questions concerning the role of the D-linking factor in acquisition was that the D-linking factor has been acquired as a semantic restriction and that the apparent difficulty of the structure does not lie on this factor, but on the complexity of the syntactic derivation.

The sub-extraction phenomena and the stranding of the noun showed similar syntactic structure between which-NP and which-NP-NP wh-phrases. It was proposed that children's syntax is based on an Immediate Move Hypothesis, which predicts that the sub-extracted element is immediately contained by the shortest (in distance) maximal projection containing the target feature and that there is no other element contained in the sub-extracted element such that it immediately contains the target feature. The sub-extraction of an XP is also predicted, if it immediately contains the target feature. Sub-extraction from other structures, such as English possession structures is also predicted. Immediate Move Hypothesis explains exactly the 'why' and 'where' the errors in children's speech.

Last, the errors in children speech are argued to provide strong arguments for the Economy in language, as well as the different applications of it for a theory of grammar. Simplicity, in other words, in language acquisition lies at the core of generative theory, as we try to represent a system which requires the minimum effort or procedure in all aspects of language. The issue of simplicity and generality is debatable under the idea that the first entails the second in feature theory and that in the theory proposed here there is overgeneralization of simplicity in structures that do not allow this. It is concluded that the production of the non-targeted and ungrammatical responses to an adult's ear could not have been more natural to a children's mind. Simplicity even drives a wide range of cognitive processes in epistemology, philosophy of science, and mathematical and computational theories.

It is without doubt that any other confounding factors could play a role to the simplicity of cognition, and therefore language. These could range from any memory procedures to other biological functions of the brain that express a simplicity notion.

Without excluding any of these factors, the Economy principle is assumed to exist in language and drive the path of acquisition of the syntax studied.

Following what has been argued, it is expected that such strong phenomena of Economy will be identified in other structures or elements in all aspects of language. Future work remains to provide a uniform picture for the understanding of these either in data found in experimental procedures in language acquisition or cross-linguistic empirical data.

This work could aim to be further expanded with a phonological analysis of the errors in children's speech in order to provide a valid account that could show the existence or not of pauses before the stranded noun. This would immediately exclude any accounts of noun stranding as an extraposition driven by pragmatic factors. It will also show whether the movement of the operator only follows the usual intonation of questions in CG and does not show any strange phonological patterns. In this case, the analysis provided here will be supported and the apparent errors should not be perceived as errors in children's speech, but rather their own simple theory of syntax.

A. Forms

A.1. Information sheet for the parents (Greek version)

THE UNIVERSITY of York

UNIVERSITY OF YORK

Γλωσσική Απόκτηση των π-ερωτήσεων στα Κυπριακά

ΕΝΗΜΕΡΩΤΙΚΟ ΦΥΛΛΑΔΙΟ ΓΙΑ ΓΟΝΕΙΣ ΚΑΙ ΚΗΔΕΜΟΝΕΣ

Το ενημερωτικό αυτό φυλλάδιο δίνεται για να σας υποδείξει τη σημασία της έρευνας που διεξάγεται και να σας ζητήσει να δώσετε τη συγκατάθεση σας για να συμμετάσχει το παιδί/παιδιά σας σε αυτή.

Στόχος της έρευνας

Ο στόχος της έρευνας είναι να μελετήσει τη γλωσσική απόκτηση των ερωτήσεων, όπως εμφανίζονται στα Κυπριακά. Συγκεκριμένα, η μελέτη αποσκοπεί στην κατανόηση γλωσσικών δυσκολιών που υπάρχουν για την παραγωγή των ερωτήσεων από παιδιά.

Η μελέτη έχει τους εξής στόχους:

< Να υποδείξει τη διαδικασία απόκτησης των π-ερωτήσεων σε παιδιά που ακούνε Κυπριακά στο περιβάλλον τους.
< Να αναγνωρίσει οποιεσδήποτε δυσκολίες υπάρχουν στην παραγωγή των ερωτήσεων.
< Να συγκρίνει τα αποτελέσματα με μελέτες από άλλες γλώσσες και να συμπεράνει αν η πορεία απόκτησης των ερωτήσεων ακλουθεί ομαλή ανάπτυξη.

Ποιος κάνει τη μελέτη;

Η μελέτη διεξάγεται από τη Ναταλία Παύλου, η οποία είναι μεταπτυχιακή φοιτήτρια στη Γλωσσολογία, με σκοπό την ολοκλήρωση μεταπτυχιακής μελέτης στο πανεπιστήμιο του York. Η έρευνα δεν τυγχάνει κάποιας χρηματοδότησης αλλά είναι επιλογή λόγου ακαδημαϊκού ενδιαφέροντος από την ερευνήτρια.

Τι πρέπει να κάνω;

Συμπληρώνοντας τα προσωπικά σας στοιχεία, δηλώνεται ότι επιθυμείτε να συμμετάσχετε στη μελέτη. Δηλαδή, δίνεται τη συγκατάθεση σας έτσι ώστε να

επισκεφθεί η ερευνήτρια το παιδί σας στο χώρο και τις ώρες του νηπιαγωγείου, σε συγκεκριμένη ώρα μετά από υπόδειξη της δασκάλας. Το παιδί σας θα συμμετάσχει σε ένα γλωσσολογικό πείραμα με την ερευνήτρια, όπου θα επιδιωχθεί η παραγωγή ερωτήσεων. Το γλωσσολογικό πείραμα αποτελείται από μια σειρά κατάλληλων φωτογραφιών που δείχνουν δυο χαρακτήρες να εκτελούν μια πράξη. Το παιδί/παιδιά σας θα ζητηθεί να κάνει ερωτήσεις σε μαριονέτες σχετικά με τις πράξεις των χαρακτήρων. Στη συνέχεια, θα πάρει ως αντάλλαγμα αυτοκόλλητο αγαπημένων κινούμενων χαρακτήρων. Ο στόχος της συνέντευξης είναι να μετρηθεί η παραγωγή ερωτήσεων και να εντοπισθούν οι οποιεσδήποτε δυσκολίες παρουσιάζονται. Αναμένεται ότι το πείραμα θα διαρκέσει 15 λεπτά και για αυτό δε θα στερήσει στο παιδί σας τις καθημερινές του δραστηριότητες. Η συνέντευξη με το παιδί θα βιντεογραφηθεί για σκοπούς γλωσσολογικής ανάλυσης και για αυτό χρειαζόμαστε τη συγκατάθεση σας. Αν προτιμάτε να μην ηχογραφηθεί, τότε θα παρθούν σημειώσεις.

Γιατί έχω επιλεχθεί;

Έχετε επιλεχθεί γιατί το παιδί/ παιδία σας πληρούν τα κατάλληλα κριτήρια για συμμετοχή στη μελέτη. Συγκεκριμένα, το παιδί σας είναι στις ηλικιακές ομάδες που αποσκοπεί η έρευνα να μελετήσει.

Γιατί να συμμετάσχω στη μελέτη;

Συμμετέχοντας στη μελέτη, θα συνεισφέρετε στη συλλογή δεδομένων που σχετίζονται με τα Κυπριακά και θα συνεισφέρετε στη κατανόηση στοιχείων που χαρακτηρίζουν τη ταυτότητα μας. Με τη μελέτη αυτή, ελπίζουμε ότι θα αναγνωρίσουμε γλωσσικές δυσκολίες στα Κυπριακά.

Πρέπει να δηλώσω συμμετοχή;

Είναι δική σας επιλογή αν θέλετε να συμμετάσχετε στην έρευνα. Αν αποφασίσετε να λάβετε μέρος και αργότερα αλλάξετε γνώμη, μπορείτε να αποσύρετε τη συγκατάθεση σας ανά πάσα στιγμή και χωρίς περαιτέρω εξηγήσεις. Το αν θα λάβετε μέρος ή όχι δε θα επηρεάσει τη συμπεριφορά απέναντι στο παιδί σας.

Τι γίνεται αν αλλάξω γνώμη μετά την διεξαγωγή της έρευνας;

Αν αλλάξετε γνώμη μετά την ολοκλήρωση συλλογής δεδομένων, τα δεδομένα που σας αφορούν θα αποσυρθούν και οι πληροφορίες σας θα διαγραφούν. Αν ανά πάσα στιγμή αποφασίσετε να αποσυρθείτε, αυτό δε θα επηρεάσει την αντιμετώπιση προς εσάς ή το παιδί σας και θα σεβαστούν τα δικαιώματα σας.

Τι θα γίνει με τα δεδομένα;

Όλα τα δεδομένα είναι απόρρητα. Δε θα συζητηθούν με άλλα άτομα και δε θα ενημερώσουμε κανένα ότι συμμετάσχετε στην έρευνα. Η λίστα των συμμετασχόντων και ατομικά δεδομένα δεν θα δοθεί σε κανένα που έχει συμμετάσχει στην έρευνα. Τα

βιντεογραφημένα δεδομένα θα παραμείνουν σε κλειδωμένο ντουλάπι στο πανεπιστήμιο που φοιτά η ερευνήτρια. Αντίτυπα σε ηλεκτρονική μορφή φυλάσσονται σε ασφαλές υπολογιστές με κωδικό πρόσβασης. Τα δεδομένα δε θα ταυτιστούν με ονόματα παιδιών.

Τι θα συμβεί μετά από την έρευνα;

Όταν η έρευνα ολοκληρωθεί, θα δοθεί μια γενική αναφορά στους γονείς, που θα εξηγά τα γενικά αποτελέσματα της έρευνας. Τονίζεται ότι δε θα συζητηθούν εξατομικευμένα αποτελέσματα.

Εάν έχετε περαιτέρω ερωτήσεις, παρακαλώ επικοινωνήστε με τη Ναταλία Παύλου ή τους επιβλέποντες καθηγητές:

Η ερευνήτρια,	**Οι επιβλέποντες καθηγητές**,
Natalia Pavlou	Γιώργος Τσούλας και Bernadette Plunkett
nataliapavlou@gmail.com	george.tsoulas@york.co.uk, bp4@york.co.uk

Ευχαριστούμε για το χρόνο σας!

A.2 Information sheet for the parents (English version)

UNIVERSITY OF YORK

Language Acquisition of *wh*-questions in Cypriot Greek

INFORMATION SHEET FOR PARENTS AND GUARDIANS

This information sheet shows the importance of the research and asks your permission for the participation of your child/children in it.

Aim of the research

The aim of the research is to study the acquisition of questions, as these appear in Cypriot Greek. Particularly, the study aims to the understanding of any language difficulties when your child/children produces questions in his/ her speech.

The study has the following goals:

< To show the order of the acquisition of questions in children which are exposed to Cypriot Greek in their environment
< To identify any difficulties in question production.
< To compare the results with studies from other languages and conclude if the acquisition of the questions follows a course that is similar to that found in other languages.

Who is doing the research?

The research is conducted by Natalia Pavlou, who is a postgraduate student in Linguistics, aiming to the completion of a thesis at the University of York. The research is not funded but it is chosen for its academic interest by the researcher.

What do I have to do?

Your child will participate in an experiment testing their language skills with the researcher, when the production of questions will be attempted. This experiment is made of many pictures that show two characters (a man and a woman) doing an action. Your child/children will be asked to make questions to puppets related to the action presented by the characters. The child will receive in exchange a sticker of his/her favorite cartoon characters. The goal of the interview is to evaluate questions in their speech and to identify any difficulties shown. It is expected that the experiment will last for 15 minutes and it will not affect your child's/ children's daily activities. The interview with the child will be videotaped for linguistic analysis and for this we need your consent. If you prefer your child not to be recorded, then we will take notes.

Consenting for my Child to Participate

By completing your personal information, you accept to participate in the study. So, you give your consent so that the researcher will visit your child/children at the place and time of the kindergarten, but at a specific time that will be pointed out to the researcher by the teacher.

Why should I participate in the research?

By participating in the research, you will contribute to the collection of data related to Cypriot Greek and the understanding of elements that characterize our language. With this research, we hope that we will identify linguistic difficulties in Cypriot Greek.

Why am I chosen?

You have been chosen because your child/ children satisfy the criteria for participation in the study. Particularly, your child/children are in the age groups that the research aims to study.

Do I have to participate?

It is your choice if you want to participate in the research. If you decide to participate and you change your mind later, you can withdraw your consent any time and without further explanations. Participating or not will not affect the behavior to your child.

What will happen, if I change my mind after the completion of the research?

If you decide that you do not wish to participate, after you have given your consent for your child, you can withdraw your consent at any time. If you decide that you do not want to participate after the receipt of a thank you note from the researcher and the information provided about the scheduled day of testing, you may withdraw your application without any consequences to you or your child/children. If you change your mind after the completion of the research, the data that concern your child (including any video- or audio-recordings and written) will be withdrawn and their personal information (name, surname, address etc.) will be destroyed. If you decide to withdraw any time, this will not affect the behavior towards you or your child/children and your rights will be respected.

What will happen to the data?

All data stay anonymous. These will not be discussed with others and we will not inform anyone that you participate in the research. The list with participants and individual data will not be given to anyone who participates in the research. The recorded data will remain in a locked cabinet at the University, where the researcher studies. Copies in electronic form are saved in safe computers with a password. The data will not be identified with children's names.

What will happen after the research?

When the research is completed, a general report will be given to parents and it will explain the general results of the research. It is emphasized that individual results will not be discussed.

Please return all forms to your child's/children's teacher, who is responsible for returning the consent forms in a sealed envelope to the researcher.
If you have any further questions, please contact Natalia Pavlou or the supervisors:

The researcher,	**The supervisors**,
Natalia Pavlou	George Tsoulas & Bernadette Plunkett
nataliapavlou@gmail.com	george.tsoulas@york.co.uk bp4@york.co.uk

Thank you for your time!

A.3. Parental Consent Form (Greek version)

Τίτλος Έρευνας: Γλωσσική Απόκτηση των π-ερωτήσεων στα Κυπριακά

Ερευνήτρια: Ναταλία Παύλου

Φόρμα συγκατάθεσης για γονείς και κηδεμόνες

Αυτή η φόρμα χρησιμοποιείται για να δηλώσετε ότι επιτρέπετε στο παιδί/παιδιά σας να λάβει μέρος στην έρευνα που διεξάγεται για καταγραφή των γλωσσικών ικανοτήτων των Κυπριόπουλων και ανάλυση της Κυπριακής ποικιλίας. Επιπλέον, δίνετε τη συγκατάθεση σας έτσι ώστε το παιδί σας να κληθεί να συμμετάσχει σε γλωσσολογικό πείραμα ή/και να ηχογραφηθεί δεδομένου ότι το υλικό θα χρησιμοποιηθεί μόνο για τους σκοπούς έρευνας από τον υπεύθυνο ερευνητή ή/και εμπλεκόμενους ερευνητές. Τα προσωπικά στοιχεία του παιδιού/παιδιών σας (όνομα, διεύθυνση κ.τ.λ.) δεν θα χρησιμοποιηθούν για άλλους σκοπούς και θα διασφαλιστεί το απόρρητο των προσωπικών δεδομένων.

Τώρα παρακαλώ διαβάστε προσεκτικά και απαντήστε τις ερωτήσεις. Εάν υπάρχει κάτι που δεν καταλαβαίνετε ή θέλετε περισσότερες πληροφορίες, παρακαλούμε επικοινωνήστε με την ερευνήτρια.

Ενότητα 1

Έχετε διαβάσει το ενημερωτικό φυλλάδιο; Ναι ❒ Όχι ❒

Είχατε την ευκαιρία να κάνετε ερωτήσεις? Ναι ❒ Όχι ❒

Καταλαβαίνετε ότι οι προσωπικές πληροφορίες θα μείνουν απόρρητες? Ναι ❒ Όχι ❒

Καταλαβαίνετε ότι μπορείτε να αποσυρθείτε από την έρευνα ανά πάσα στιγμή και για οποιοδήποτε λόγο, χωρίς αυτό να επηρεάσει τις υπηρεσίες που λαμβάνεται; Ναι ❒ Όχι ❒

Καταλαβαίνετε ότι οι πληροφορίες που παρέχεται μπορεί να χρησιμοποιηθούν για μελλοντική χρήση; Ναι ❒ Όχι ❒

Δέχεστε να λάβει μέρος στην έρευνα το παιδί σας? Ναι ❒ Όχι ❒

Αν ναι, συμφωνείτε η συνέντευξη με το παιδί σας να ηχογραφηθεί;
(Μπορείτε να συμμετάσχετε στην έρευνα χωρίς να απαντήσετε ναι). Ναι ❒ Όχι ❒

Παρακαλούμε συμπληρώστε τα πιο κάτω:

Ονοματεπώνυμο παιδιού:
…….

Ημερ. Γέννησης:
……..……

Το παιδί φοιτά (όνομα νηπιαγωγείου/δημοτικού): ……..……...……

Το παιδί μιλά ΜΟΝΟ την Κυπριακή Ελληνική ΝΑΙ ☐ ΆΛΛΟ……

Ονοματεπώνυμο μητέρας:
……...…….

Μόρφωση μητέρας: Δημοτικό / Γυμνάσιο / Λύκειο / Κολλέγιο / Πανεπιστήμιο / Άλλο:
……...…….

Επάγγελμα μητέρας:
…….

Ονοματεπώνυμο πατέρα: ……..……

Μόρφωση πατέρα: Δημοτικό / Γυμνάσιο / Λύκειο / Κολλέγιο / Πανεπιστήμιο /

Άλλο: ……..……

Επάγγελμα πατέρα: ……

Διεύθυνση: ……..……

Τηλ. Επικοινωνίας: ……..……

Ενότητα 2:

ΣΥΓΚΑΤΑΘΕΣΗ ΒΙΝΤΕΟΓΡΑΦΗΣΗΣ

Έχετε διαβάσει και κατανοήσει τις πληροφορίες του ενημερωτικού φυλλαδίου για την αναφερόμενη έρευνα;	Ναι ❒ Όχι ❒
Καταλαβαίνετε ότι μέρος της μελέτης είναι να έχουμε προσωπική συνέντευξη με το παιδί σας; *Οι συνεντεύξεις θα βιντεογραφηθούν και ανώνυμα κείμενα από τις βιντεογραφήσεις θα χρησιμοποιηθούν. Η βιντεογράφηση θα περιλαμβάνει μόνο το παιδί σας και την ερευνήτρια. Η βιντεοκάμερα θα αποφευχθεί μετά από αίτηση. Η βιντεοκασέτα θα φυλαχτεί σε κλειδωμένο ντουλάπι στο Πανεπιστήμιο που φοιτά η ερευνήτρια.*	Ναι ❒ Όχι ❒
Καταλαβαίνετε ότι εάν αποφασίσετε να αποσυρθείτε μετά την ηχογράφηση του παιδιού σας, η ηχογράφηση και όλα τα δεδομένα σχετικά με το παιδί/παιδιά σας και την αξιολόγηση του/τους θα καταστραφούν;	Ναι ❒ Όχι ❒
Καταλαβαίνεται ότι ακουστικό μέρος της ηχογράφησης που θα πάρουμε μπορεί να χρησιμοποιηθεί για παρουσιάσεις σε συνέδρια;	Ναι ❒ Όχι ❒
Δίνεται την άδεια σας να βιντεογραφηθεί το παιδί σας;	Ναι ❒ Όχι ❒
Δέχεστε να λάβετε μέρος στην έρευνα;	Ναι ❒ Όχι ❒

_____ _____ _____

Όνομα γονέα Υπογραφή Ημερ.

_____ _____ _____

Όνομα Ερευνήτριας Υπογραφή Ημερ.

A 4. Parental Consent Form (English version)

Title of research project: Acquisition of wh-questions in Cypriot Greek

Researcher: Natalia Pavlou

Consent form for parents and guardians

This form is for you to declare that you give permission for your child to participate in the research conducted for identifying the linguistic abilities of Greek Cypriot children and analysis of the Cypriot Greek variety. Further, this form requests your consent so that your child can be asked to participate in a linguistic experiment. Specifically, your consent will also be used for the child to be recorded during the experiment session only, by using a video-camera. Alternatively, if you request so, your child will be audio-recorded. The data will only be used for research purposes from the principal researcher or/and any other involved researchers. The personal data of your child (name, address etc.) will not be used for other purposes and the privacy for the personal data will be ensured.

Now please read carefully and answer each question. If there is anything you do not understand, or if you want more information, please contact the researcher.

Section 1

Have you read and understood the information sheet?	Yes ❒ No ❒
Have you had an opportunity to ask questions?	Yes ❒ No ❒
Do you understand that the information you provide will be held anonymously by the research team for both the parent and the child?	Yes ❒ No ❒
Do you understand that you may withdraw from the study at any time and for any reason, without giving any reasons? In this case, all data (video-, audio- and written) and personal information of the parents and the child will be destroyed.	Yes ❒ No ❒

Do you understand that the information you provide may be used in future research? Yes ❒ No ❒

Do you understand that the researcher may re-contact you in the future? Yes ❒ No ❒

Do you agree for your child to take part in the study? Yes ❒ No ❒

If yes, do you agree to your child's interviews being recorded? Yes ❒ No ❒
(Your child may take part in the study without your agreeing to this).

Now please provide the following information:

Child's full name: ……

Date of birth: ……..……..……

The child attends (name of kindergarten/ primary school): ……,,..……...……

The child speaks ONLY Cypriot Greek YES ☐ OTHER……..……..

Mother's (or guardian's) full name: ……..……...……

Mother's education: Primary school / High school / Lyceum / College / University /

Other: ……...……

Mother's profession: …..……

Father's (or guardian's) full name: ……..……..……

Father's education: Primary school / High school / Lyceum / College / University /

Other: ……..……

Father's profession: ……..……

Address: ……..……..……

Contact number: ……..……

Section 2

CONSENT FOR THE VIDEO-RECORDING

Have you understood the information given on the information sheet?	Yes ❒ No ❒
Do you understand that part of your study includes personal interview with your child/children? *All interviews will be videotaped and anonymous transcripts will be used. The video recording will include your child/children and the researcher. The video camera will be avoided, if requested. The video tape will be kept in a locked cabinet at the University, where the researcher studies.*	Yes ❒ No ❒
Do you understand that you can withdraw after the recording has taken place? In this case, the recording of your child and all the data regarding your child and your child will be destroyed.	Yes ❒ No ❒
Do you give your permission so that the audio files from the recordings be used for presentations in conferences?	Yes ❒ No ❒
Do you give permission for your child to be recorded?	Yes ❒ No ❒
Do you accept to participate in the project?	Yes ❒ No ❒

_____	_____	_____
Parent's name	Signature	Date
_____	_____	_____
Researcher's name	Signature	Date

B. The production experiment

B.1. Randomization

Block	Block/Item	Wh-word	R/NR	V	Tr./In.	S1:M/F	S2	Object 1	Object 2 distructor
1	1	inda mbu/nambu 'what'	NR	V1	T	M	F	red bag	Pink box
1	2	inda mbu/nambu 'what'	NR	V2	T	F	M	white bread	Red apple
1	3	inda mbu/nambu 'what'	NR	V3	T	M	F	Pink box	Red bag
1	4	inda mbu/nambu 'what'	NR	V4	T	F	M	red apple	White bread
2	5	inda 'why'		V5	I	M	F	-	
2	6	inda 'why'		V6	I	F	M	-	
2	7	inda 'why'		V7	I	M	F	-	
2	8	inda 'why'		V8	I	F	M	-	
3	9	cleft S	-	V2	T	M	F	red apple	white bread
3	10	cleft S	-	V1	T	F	M	pink box	red bag

3	**11**	**cleft S**	**-**	**V4**	**T**	**M**	**F**	**white bread**	**red apple**
3	**12**	**cleft S**	**-**	**V3**	**T**	**F**	**M**	**red bag**	**pink box**
4	**13**	**inda 'what/which'**	**R**	**V3**	**T**	**M**	**F**	**pink box**	**red box**
4	**14**	**inda 'what/which'**	**R**	**V4**	**T**	**F**	**M**	**red apple**	**green apple**
4	**15**	**inda 'what/which'**	**R**	**V1**	**T**	**M**	**F**	**red bag**	**orange bag**
4	**16**	**inda 'what/which'**	**R**	**V2**	**T**	**F**	**M**	**white bread**	**brown bread**
5	**17**	**inda mbu/nambu 'why'**		**V6**	**I**	**M**	**F**	**-**	
5	**18**	**inda mbu/nambu 'why'**		**V5**	**I**	**F**	**M**	**-**	
5	**19**	**inda mbu/nambu 'why'**		**V8**	**I**	**M**	**F**	**-**	
5	**20**	**inda mbu/nambu 'why'**		**V7**	**I**	**F**	**M**	**-**	
6	**21**	**cleft O**	**-**	**V4**	**T**	**M**	**F**	**white bread**	**red apple**

6	**22**	**cleft O**	**-**	**V3**	**T**	**F**	**M**	**red bag**	**pink box**
6	**23**	**cleft O**	**-**	**V2**	**T**	**M**	**F**	**red apple**	**white bread**
6	**24**	**cleft O**	**-**	**V1**	**T**	**F**	**M**	**pink box**	**red bag**

B.2. Sample Pictures as used in Blocks 1, 2, 3, 5 & 6

Block 1

Block 2

Block 3

Block 5

Block 6

B.3. Pictures of Block 4

Inda milo troi I korua?
'Which apple is the girl eating?'

Inda aftokinitaki vasta I korua?
'Which car is the girl holding?'

Inda kuti/doro anii o andras?
'Which box/present is the man opening?'

Inda milo troi I korua?
'Which apple is the girl eating?'

Inda tsenda vasta o andras?
'Which bag is the man holding?'

Inda psomi kofki I korua?
'Which bread is the woman cutting?'

B.4. Tools used in the production experiment (GWG)

B.5. General Results

General Table (excl. 3 categories)					
		3 yr	4 yr	5 yr	6 yr
Wh-objects	**Inda mbu**	5%	3%	5%	6%
	Ti	74%	77%	91%	94%
Adjunt-questions	**Inda**	0%	0%	5%	0%
	Giati	74%	73%	89%	94%
Subject Cleft	**Cleft**	0%	16%	2%	26%
	- Cleft	84%	60%	40%	53%
Complex wh-phrases	**Inda**	5%	0%	2%	10%
	Ti	46%	57%	66%	56%
Adjunct-questions	**Inda mbu**	0%	0%	5%	0%
	Giati	76%	78%	93%	92%
Object Clefts	**Cleft**	11%	8%	5%	15%
	-Cleft	68%	63%	35%	33%

B.6 Percentages of categorized responses in Block 4

	Category	Warm-up 1	Warm-up 2	Target 1	Target 2	Target 3	Target 4
3 yr	**Inda**	31,6%	36,8%	5,3%	5,3%	5,3%	5,3%
	Ti	47,4%	36,8%	57,9%	36,8%	42,1%	47,4%
	- Question	5,3%	5,3%	15,8%	31,6%	21,1%	15,8%
	Null	5,3%	5,3%	5,3%	5,3%	5,3%	5,3%
	Other	10,5%	15,8%	15,8%	21,1%	26,3%	26,3%
4 yr	**Inda**	27,3%	31,8%	0,0%	0,0%	0,0%	0,0%
	Ti	59,1%	50,0%	63,6%	59,1%	54,5%	50,0%
	- Question	4,5%	9,1%	13,6%	31,8%	31,8%	36,4%
	Null	4,5%	0,0%	0,0%	0,0%	0,0%	0,0%
	Other	4,5%	9,1%	22,7%	9,1%	13,6%	13,6%
5 yr	**Inda**	40,9%	45,5%	4,5%	4,5%	0,0%	0,0%
	Ti	59,1%	54,5%	68,2%	68,2%	63,6%	63,6%
	- Question	0,0%	0,0%	4,5%	9,1%	9,1%	13,6%
	Null	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	Other	0,0%	0,0%	22,7%	18,2%	27,3%	22,7%
6 yr	**Inda**	44,4%	38,9%	16,7%	5,6%	5,6%	11,1%
	Ti	55,6%	61,1%	61,1%	55,6%	66,7%	38,9%
	- Question	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	Null	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	Other	0,0%	0,0%	22,2%	38,9%	27,8%	50,0%

B.6.1 Number of responses in Block 4 for each participant

	3 yr					**4 yr**					**5 yr**					**6 yr**				
	inda (ref)	**ti/pco**	**(-)Q**	**Null**	**Other**	**inda (ref)**	**ti/pco**	**(-)Q**	**Null**	**Other**	**inda (ref)**	**ti/pco**	**(-)Q**	**Null**	**Other**	**inda (ref)**	**ti/pco**	**(-)Q**	**Null**	**Other**
1	0	3	1	0	0	0	1	0	0	3	0	4	0	0	0	3	1	0	0	0
2	0	1	1	0	2	0	4	0	0	0	0	2	1	0	1	0	2	0	0	2
3	0	1	1	0	2	0	0	3	0	1	0	4	0	0	0	0	4	0	0	0
4	0	4	0	0	0	0	0	4	0	0	0	4	0	0	0	0	4	0	0	0
5	4	0	0	0	0	0	0	3	0	1	0	1	2	0	1	1	3	0	0	0
6	0	0	4	0	0	0	0	4	0	0	0	1	0	0	3	0	0	0	0	4
7	0	0	3	0	1	0	1	2	0	1	0	3	0	0	1	0	4	0	0	0
8	0	0	0	0	4	0	3	0	0	1	0	4	0	0	0	0	3	0	0	1
9	0	1	0	3	0	0	0	4	0	0	2	0	0	0	2	0	0	0	0	4
10	0	0	0	1	3	0	3	1	0	0	0	4	0	0	0	0	0	0	0	4
11	0	1	3	0	0	0	2	1	0	1	0	4	0	0	0	2	0	0	0	2
12	0	2	1	0	1	0	3	0	0	1	0	0	0	0	4	0	1	0	0	3
13	0	4	0	0	0	0	2	0	0	2	0	0	0	0	4	1	1	0	0	2
14	0	4	0	0	0	0	4	0	0	0	0	1	0	0	3	0	2	0	0	2
15	0	1	0	0	3	0	4	0	0	0	0	4	0	0	0	0	3	0	0	1

16	0	3	0	0	1	0	0	2	0	2	0	0	4	0	0	0	4	0	0	0
17	0	2	2	0	0	0	4	0	0	0	0	4	0	0	0	0	4	0	0	0
18	0	4	0	0	0	0	4	0	0	0	0	2	1	0	1	0	4	0	0	0
19	0	4	0	0	0	0	4	0	0	0	0	4	0	0	0	-	-	-	-	-
20	-	-	-	-	-	0	4	0	0	0	0	4	0	0	0	-	-	-	-	-
21	-	-	-	-	-	0	4	0	0	0	0	4	0	0	0	-	-	-	-	-
22	-	-	-	-	-	0	3	1	0	0	0	4	0	0	0	-	-	-	-	-
	4	**35**	**16**	**4**	**17**	**0**	**50**	**25**	**0**	**13**	**2**	**58**	**8**	**0**	**20**	**7**	**40**	**0**	**0**	**25**

B.7 Expected frequencies

Results	**age**	**target**	**lackofnp**	**nomovement**
Age	44.07092	16.96454	13.27660	3.687943
Target	59.32624	22.83688	17.87234	4.964539
LackofNP	70.06147	26.96927	21.10638	5.862884
Nomovement	65.54137	25.22931	19.74468	5.484634

B.8 Pearson residuals

Results	**age**	**target**	**lackofnp**	**nomovement**
age	-0.01068329	0.9797655	-0.8992480	-0.3582288
target	-0.56167786	0.8711654	-0.2063456	0.4647231
lackofnp	-0.48522502	-0.3792015	1.7181819	-0.7693610
nomovement	1.04482176	-1.2401880	-0.8427325	0.6470590

C. The comprehension task

C.1. Randomization

Randomization					
Test questions	**Wh-word**	**D-linked/Non D-linked**	**ANIMATE/NON-ANIMATE**	**HUMAN,-HUMAN**	**SUBJECT/OBJECT**
1	WARM-UP				
2	WARM-UP				
1	Inda mbu	Non-D-linked	ANIMATE	-HUMAN	S/O
2	Pcon	D-linked	ANIMATE	+HUMAN	S
3	Inda mbu	Non-D-linked	NON-ANIMATE	-HUMAN	S/O
4	Pcon	D-linked	ANIMATE	-HUMAN	O
5	Inda mbu	Non-D-linked	ANIMATE	-HUMAN	S/O
6	Pcon	D-linked	ANIMATE	+HUMAN	O
7	Inda mbu	Non-D-linked	NON-ANIMATE	-HUMAN	S/O

8	Pcon	D-linked	ANIMATE	-HUMAN	S
9	Inda mbu	Non-D-linked	ANIMATE	-HUMAN	S/O
10	Pcon	D-linked	ANIMATE	+HUMAN	S
11	Inda mbu	Non-D-linked	NON-ANIMATE	-HUMAN	S/O
12	Pcon	D-linked	ANIMATE	-HUMAN	O
13	Inda mbu	Non-D-linked	ANIMATE	-HUMAN	S/O
14	Pcon	D-linked	ANIMATE	+HUMAN	O
15	Inda mbu	Non-D-linked	NON-ANIMATE	-HUMAN	S/O
16	Pcon	D-linked	ANIMATE	-HUMAN	S

C.1.1 Verbs used

VERBS USED	
Sproxno	Push
Lerono	Dirty
Zografizo	Paint
Vrexo	Wet
Travo	Pull
Vuro	Run after
Kinigo	Hunt
Vlepo	Look
Karkalo	Tickle
Akolutho	Follow
Thoro	Look (CG)
Akkano	Bite
Kuvalo	Carry
Fakko	Hit
Kundo	Push (CG)
Tzizo	Touch

C.2. Pictures used for D-linked questions in the Comprehension Task (pictures are taken from Plunkett & Pavlou in progress)

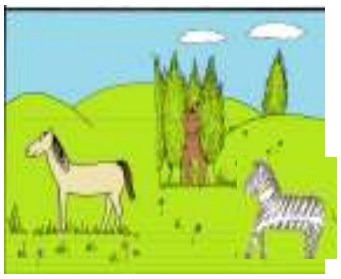
Pcon agori sproxni tin korua?
'Which boy is pushing the girl?'

Pcon zoon vura I zebra?
'Which animal is the zebra chasing?'

Pcon agori leroni I korua?
'Which boy is the girl dirtying?'

Pcon zoon trava ti zembra?
'Which animal is the zembra pulling?'

Pcos mathitis zografizi ti kopela?
'Which student is painting the woman?'



Pcon alogo vlepi i zebra?
'Which animal is the zembra looking?'

Pcon pedaki vreshi o andras?
'Which child is the father wetting?'

Pcos elefandas kiniga ti kamiloparadali?
'Which elephant is chasing the giraffe?'

C.3. General Results

General Results					
		3 yr	**4 yr**	**5 yr**	**6 yr**
Ambiguous	Subject	25%	23%	18%	25%
	Object	73%	74%	80%	73%
D-linked	Target	68%	79%	83%	95%
	Non-Target	33%	21%	18%	5%

C.4. Results for D-linked questions in the Comprehension task

		Subject D-LINKED 2	**Object D-LINKED 4**	**Object D-LINKED 6**	**Subject D-LINKED 8**	**Subject D-LINKED 10**	**Object D-LINKED 12**	**Object D-LINKED 14**	**Subject D-LINKED 16**
3 yr	Target	50,0%	40,0%	0,0%	80,0%	70,0%	60,0%	30,0%	70,0%
	Non-Target	50,0%	60,0%	100,0%	20,0%	30,0%	40,0%	70,0%	30,0%
4 yr	Target	100,0%	20,0%	70,0%	100,0%	90,0%	60,0%	10,0%	100,0%
	Non-Target	0,0%	80,0%	30,0%	0,0%	10,0%	40,0%	90,0%	0,0%
5 yr	Target	100,0%	40,0%	60,0%	100,0%	100,0%	10,0%	30,0%	100,0%
	Non-Target	0,0%	60,0%	40,0%	0,0%	0,0%	90,0%	70,0%	0,0%
6 yr	Target	100,0%	30,0%	0,0%	90,0%	100,0%	0,0%	0,0%	100,0%
	Non-Target	0,0%	70,0%	100,0%	10,0%	0,0%	100,0%	100,0%	0,0%

C.4.1 Number of responses of D-linked questions for each participant

	3 yr				4 yr				5 yr				6 yr			
	Target	Non-Target	Null	Other	Target	Non-Target	Null	Other	Target	Non-Target	Null	Other	Target	Non-Target	Null	Other
1	7	1	0	0	6	2	0	0	6	2	0	0	8	0	0	0
2	1	7	0	0	7	1	0	0	7	1	0	0	7	1	0	0
3	3	5	0	0	7	1	0	0	7	1	0	0	6	2	0	0
4	6	2	0	0	7	1	0	0	8	0	0	0	8	0	0	0
5	5	3	0	0	5	3	0	0	7	1	0	0	8	0	0	0
6	7	1	0	0	6	2	0	0	7	1	0	0	8	0	0	0
7	8	0	0	0	6	2	0	0	6	2	0	0	8	0	0	0
8	6	2	0	0	6	2	0	0	6	2	0	0	8	0	0	0
9	5	3	0	0	7	1	0	0	6	2	0	0	7	1	0	0
10	6	2	0	0	6	2	0	0	6	2	0	0	8	0	0	0
TOTAL	54	26	0	0	63	17	0	0	66	14	0	0	76	4	0	0

C.4.2 Number of responses for each participant (SUBJECT/OBJECT)

	3 yr		4 yr		5 yr		6 yr	
	SUBJECT	OBJECT	SUBJECT	OBJECT	SUBJECT	OBJECT	SUBJECT	OBJECT
1	3	4	4	2	4	2	4	4
2	0	1	4	3	4	3	4	3

3	0	3	4	3	4	3	3	3
4	3	3	4	3	4	4	4	4
5	3	2	4	1	4	3	4	4
6	4	3	4	2	4	3	4	4
7	4	4	4	2	4	2	4	4
8	3	3	3	3	4	2	4	4
9	4	1	4	3	4	2	4	3
10	3	3	4	2	4	2	4	4
TOTAL	27	27	39	24	40	26	39	37

C.4.3 Number of responses for each participant (SUBJECT/OBJECT- +HUMAN/-HUMAN)

	3 yr				4 yr				5 yr				6 yr			
	Subject Questions		Object Questions		Subject Questions		Object Questions		Subject Questions		Object Questions		Subject Questions		Object Questions	
	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN	+HUMAN	-HUMAN
1	1	2	2	2	2	2	1	1	2	2	2	0	2	2	2	2
2	0	0	1	0	2	2	2	1	2	2	1	2	2	2	2	1
3	0	0	2	1	2	2	1	2	2	2	2	1	2	1	2	1
4	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2
5	2	1	1	1	2	2	1	0	2	2	1	2	2	2	2	2
6	2	2	2	1	2	2	1	1	2	2	1	2	2	2	2	2
7	2	2	2	2	2	2	1	1	2	2	1	1	2	2	2	2
8	1	2	2	1	1	2	1	2	2	2	0	2	2	2	2	2
9	2	2	1	0	2	2	2	1	2	2	1	1	2	2	2	1
10	1	2	2	1	2	2	1	1	2	2	0	2	2	2	2	2
TOTAL	12	15	17	10	19	20	12	12	20	20	11	15	20	19	20	17

Glossary

Burzio's generalization
A generalization according to which verbs that do not have a thematic role are unable to assign structural case

C-command
A syntactic relation which defines that a constituent X c-commands its sister constituent Y and any constituent Z which is contained within Y

Contain(ment)
A category α contains a category β iff some segment of α dominates β

Convergence Principle
A head which by attracting a constituent that contains a target feature, it attracts the smallest accessible constituent containing the target feature that can complete the derivation

DP-hypothesis
A hypothesis suggesting the similarity between the structural representation of sentences and nominal phrases

Economy Principle
A principle stating that movement occurred only if triggered (for example, by features) for economical reasons

Immediate Contain(ment)
A syntactic relation which defines that a category α contains β iff α immediately dominates β

Kategoroumenon
A constituent denoting a property assigned to the subject

Left Branch Condition
A condition explaining that the left part of a nominal, adjectival or adverbial phrase cannot be extracted

Maximal projection
A syntactic object which has no c-selectional features to be checked

Minimal Link Condition
K attracts α only if there is no β, β closer to K than α, such that K attracts β.

Predicate Fronting
The movement of the predicate to another position in the Determiner Phrase

Predicate inversion
The displacement observed in a functional clause (SC)

RELATOR
The linker between the subject and its predicate in a Small Clause

Small clause
A functional type of clause, usually expressing a predication relation between the two interacting nouns

Sub-extraction
A violation of the condition constructing the possibility of moving the leftmost part of complex phrases

Abbreviations

[EPP]	=	Extended Projection Principle feature
[Foc]	=	Focus feature
[WH]	=	Wh-phrase feature
ACC	=	Accusative Case
C	=	Complementizer
CG	=	Cypriot Greek
COM	=	Completive aspect
CP	=	Complementizer Phrase
D	=	Determiner
DAT	=	Dative Case
D-linked	=	Discourse-linked
DOC	=	Double Object Construction
DP	=	Determiner Phrase
GB	=	Government and Binding
GWG	=	Guess What Game
L	=	Lexical element
LBC	=	Left Branch Constraint
LF	=	Logical Form
LMax	=	Maximal projection of a lexical element
MG	=	Mainland Greek
NP	=	Noun phrase
P	=	Possessed form
PF	=	Phonological Form
PPI	=	Pied-piping with Inversion
Q	=	Particle
QBNP	=	Qualitative Binominal Noun Phrases
SC	=	Small Clause
VP	=	Verb Phrase
Wh	=	Wh-phrase or question
XP	=	X Phrase
yr	=	years old

References

Abney, S. P. (1987). *The English Noun Phrase in its Sentential Aspect*. Ph.D. thesis, MIT, Cambridge, MA.

Asproudi, E. (2011). *Non-Target Long-Distance Wh-Questions. Crosslinguistic Typological Distinctions in Early L1 Production*. Unpublished paper presented at 20th International Symposium on Theoretical and Applied Linguistics (ISTAL 20). Aristotle University of Thessaloniki, Thessaloniki 1-3 April.

Avrutin, S. (2000). Comprehension of Wh-questions by children and Broca's aphasics. In Y. Grodzinsky, L. P. Shapiro & D. A. Swinney, eds. *Language and the brain: Representation and processing*, San Diego: Academic Press, pp. 295-312.

Avrutin, S. (2001). Linguistics and Agrammatism. *GLOT International*, 5(3), 3-11.

Avrutin, S. (2011). Language disorders. Unpublished paper presented at UMINHO summer school in Neuro- and Psycholinguistic Approaches to Language Processing. Braga, University of Minho, 18-22 July.

Bennis, H. J. and Corver, N. and Dikken, M. den. (1998). Predication in Nominal Phrases. *The Journal of Comparative Germanic Linguistics*.1, 85-117.

Bennis, H. J., Corver, N. and Dikken, den M. (1998). Predication in Nominal Phrases. *The Journal of Comparative Germanic Linguistics*, 1, pp. 85-117.

Broadwell, G. A. & Key M. P. (2004). *Pied-piping with inversion in Copala Trique.* Society for the Study of the Indigenous Languages of the Americas, Boston.

Burzio, L. (1986). *Italian Syntax*, Dordrecht: Reidel.

Butler, A. & Mathieu, E. (2005). Split-DPs, generalized EPP, and visibility. *MIT Working Papers in Linguistics*, 49, 49-57.

Cable, S. (2008). *There is no such thing as Pied-Piping*. Ms., MIT.

Chen, D., Yamane, M. & Snyder, W. (1998). Children's left-branch violations: Evidence for a non-parametric account. *22nd Annual Boston University Conference on Language Development*, Somerville, MA: Cascadilla Press.

Chomsky, N (1981). *Lectures On Government And Binding*, Foris, Dordrecht.

Chomsky, N (1995). *The Minimalist Program*, MIT Press.

Chomsky, N (2000). Minimalist Inquiries: The Framework. In R. Martin, D. Michaels & J. Uriagereka, eds. *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*. MIT Press, Cambridge, Massachussetts, pp. 89-156.

Chomsky, N. (1973). Conditions on Transformations. In S. Anderson & P. Kiparsky, eds. *A Festschrift for Morris Halle.*Academic Press, New York, pp. 232-286.

Corver, N. & Koppen, M. van. (2011). Micro-diversity in Dutch interrogative DPs: A case study in the (dis)continuous 'wat voor 'n N'-construction. In P. Sleeman & H. Perridon, eds. *The Noun Phrase in Romance and Germanic: Structure, Variation and Change*. Amsterdam/Philadelphia, John Benjamins, pp. 57-88.

Corver, N. (1990). The syntax of left branch extractions. PhD Dissertation, Tilburg University.

Dikken, M. den. (2006). *Relators and Linkers: The Syntax of Predication, Predicate Inversion, and Copulas*. Cambridge, MIT Press.

Donati, C. (2005). On Wh-head-movement. In L. Cheng & N. Corver, eds. *Wh-movement on the Move.* Cambridge, MIT Press, pp. 21-46.

Eisenbeiss, S. (2009). Contrast is the Name of the Game: Contrast-Based Semi-Structured Elicitation Techniques for Studies on Children's Language Acquisition. *Essex Research Reports in Linguistics*. 57(7), 6 May.

Fanselow, G. & Cavar, D. (2002). Distributed Deletion. In A. Alexiadou, ed. *Theoretical Approaches to Universals*. Amsterdam, John Benjamins, pp.65-107.

Gallego, A. J. & Uriagereka, J. (2006). Conditions on sub-extraction. *The Coloquio de Gramática Generativa 16*. Universidad Autonoma de Madrid, Madrid 20-22 April.

Gavarró, A. & Solá, J. (2004a). WH-subextraction in child Catalan. *Second Lisbon Meeting on Language Acquisition*, Universidade de Lisboa, 1 June.

Gavarró, A. & Solá, J. (2004b). Subextraction in Romance interrogatives. *Going Romance 2004*, Leiden University, 12 April.

Gavruseva, E. & Thornton, R. (1999). Possessor extraction in child English: A Minimalist account. In J. Alexander, N. R. Han & M. M. Fox, eds. *U. Penn Working Papers in Linguistics*. 6(1).

Gavruseva, E. and .Thornton, R. (2001). Getting it right: acquisition of whose-questions in child English. *Language Acquisition,* 9(3), pp. 229–267.

Goodluck, H. (2005). D(iscourse)-Linking and question formation. In A-M. di Sciullo, ed. *UG and external systems.* Amsterdam: John Benjamins.

Goodluck, H. (2009). Is object extraction subject to child relativized minimality? *Canadian Linguistic Association Meeting*.

Goodluck, H. Stojanovic, D. & Carter, D. (2008). Comprehension of D(iscourse)-Linked questions by aphasics: New Evidence. In *Proceedings of the Annual Conference of the Canadian Linguistics Association,* University of British Columbia, Vancouver, 31May-2 June.

Grohman, K. K. (2011). Some Directions for the Systematic Investigation of the Acquisition of Cypriot Greek: A New Perspective on Production Abilities from Object Clitic Placement. In Esther Rinke & Tanja Kupisch, eds. *The Development of Grammar: Language Acquisition and Diachronic Change — Volume in Honor of Jürgen M. Meisel*. (Hamburg Series on Multilingualism 11.) Amsterdam: John Benjamins, pp. 179–203.

Grohmann, K. K. & Papadopoulou, E. (To appear). Question(able) Issues in Cypriot Greek. *Linguistic Analysis*, 37, pp. 1-31.

Grohmann, K.K., Panagiotidis, P. & Tsiplakou, S. (2006). Properties of Wh-Question Formation in Cypriot Greek. *2nd International Conference on Modern Greek Dialects and Linguistic Theory,* University of Patras, Mytilene, 30 September-3 October 2004.

Hagstrom, P. (1998). *Decomposing Questions*. PhD Dissertation, MIT.

Hagstrom, P. (2008). Concerning Cable (2008) and the (non)existence of pied-piping. The first meeting of the McGill *wh*-enthusiasts, Unpublished Ms.

Heck, F. (2008). On Pied-piping. Wh-movement and Beyond. Berlin: Mouton de Gruyter.

Heck, F. (2009). On Certain Properties of Pied-piping. *Linguistic Inquiry*,1, pp. 75-111.

Hickok, G. and Avrutin, S. (1995). Representation, referentiality and processing in agrammatic comprehension: two case studies,. *Brain and Language*, 50, pp. 10-26.

Hoekstra, T., J. Koster & T. Roeper. (1992) *Left Branch violations in acquisition*. Unpublished paper presented at the Boston University Conference on Language Development. Boston, 24 Octomber.

Hornstein, N. (2001). *Move! A Minimalist Theory of Construal*. Oxford, Blackwell.

Hornstein, N., Nunes, J. and Grohmann, K. K. (2005). *Understanding Minimalism.* Cambridge, Cambridge University Press.

Horrocks, G. and Stavrou, M. (1987). Bounding Theory and Greek syntax: Evidence for wh-movement in NP. *Journal of Linguistics*. 23, pp. 79-108.
Isobe, M. (2008). Language Variation and Child Language Acquisition: Laying Ground for Evaluating Parametric Proposals. *Language Acquisition*.15, pp. 216-218.
Kanikli, A. (2009). *Sluicing and asymmetries in the CG wh-question formation*. 19th International Symposium on Theoretical and Applied Linguistics, Aristotle University of Thessaloniki, Thessaloniki 3-5 April.
Kayne, R. (2002). *On some preposition that look like DP internal: English 'of' and French 'de'*, Ms., NYU.
Kidd, E., Brandt, S. Lieven, E. and Tomasello, M. (2007) Object relatives made easy: A cross-linguistic comparison of the constraints influencing young children's processing of relative clauses. *Language and Cognitive Processes.* 22, pp. 860–897.
Kratzer, A. and Shimoyama, J. (2002). *Indeterminate Pronouns: The View From Japanese*. Manuscript. Availiable at http://www.semanticsarchive.net
Lin, Y. (2006). Against the deficit in computational grammatical hypothesis: A corpus-based study. *Concentric: Studies in Linguistics*. 32(2), pp.59-70.
MacWhinney, B. (2000). *The CHILDES Project: Tools for Analyzing Talk*, Mahwah, NJ, Lawrence Erlbaum Associates. Third Edition. 1, The Format and Programs.
Marinis, T. and der Lely, H. K. J. van. (2007). On-line processing of wh-questions in children with G-SLI and typically developing children. *International Journal of Language and Communication Disorders*. 42(5), pp. 557-582.
Mathieu, E. and Sitaridou, I. (2005). Split WH-constructions in Classical and Modern Greek: A diachronic perspective.In M. Batllori, M-L. Hermanz, C. Picallo & F. Roca, eds. *Grammaticalization and parametric change*. Oxford Scholarship Online, Oxford, pp. 236-250.
Mathieu, E.A. J. (2002). The Syntax of Non-Canonical Quantification: A comparative Study. University College London: Doctoral Dissertation.
Miyagawa, S. (1993). LF Case-checking and minimal link condition. *Case and Agreement II, MIT Working Papers in Linguistics 19*, 213-254.
Moro, A. (1997). *The raising of predicates. Predicative noun phrases and the theory of clause structure*. Cambridge University Press, New York.
Nishigauchi, T. (1990). *Quantification in the Theory of Grammar*. Dordrecht: Kluwer.
Nomura, M. and Hirotsu, K. (2005) The Left Branch Condition in the Acquisition of Japanese. In M. Nomura, F. Niinuma & L.Reglero, eds. *University of Connecticut working papers in linguistics*,13, pp.119-144.
Panagidou, P. (2009). *Clefts and wh-questions in Cypriot Greek*. MA Thesis, University of Utrecht.
Papadopoulou, E. & Pavlou, N. (To appear). What I say, you say!Illustration of Syntactic Priming in Cypriot Greek. Linguists of Tomorrow (LOT). University of Cyprus, Nicosia (May 7-8 2010)
Papadopoulou, E. (In progress). *The acquisition of wh-questions: Evidence from Cypriot Greek*. Phd Dissertation, University of Essex.
Pavlou, N. (2010a). Mbu! On *wh*-objects and true adjuncts of Cypriot Greek. *4th International Conference on Modern Greek Dialects and Linguistic Theory*, University of Patras, Patra, 11-14 June 2009.
Pavlou, N. (2010b). Inda mbu, nambu or ine ti pu? Acquiring Complex Structures in Cypriot Greek. *The ISCA Tutorial and Research Workshop on Experimental Linguistics,* ISCA & University of Athens, Athens, 25-27 August.

Pesetsky, D. (1987). Wh-in-situ: Movement and unselective binding. In E. Reuland and A. ter Meulen, eds. *The Representation of (in)definiteness*. Cambridge, Mass, MIT Press.
Pinker, S. (1994). Language Learnability and Language Development. Cambridge, MA: Harvard University Press.
Plunkett, B. & Pavlou, N. (In progress). *Interpretation of ambiguous wh-questions in French and Cypriot Greek*. Unpublished ms., University of York.
Postal, M. P. (1998). *Three Investigations of Extraction*. MIT Press Cambridge, Massachussets London.
Radford, A. (2004). *Minimalist Syntax. Exploring the structure of English*. Cambridge University Press, Cambridge.
Reich, I. (2002). Pied Piping and the Syntax and Semantics of Complex wh-phrases. In S. Mauck & J. Mittelstaedt, eds. *Georgetown University Working Papers in Theoretical Linguistics*. Georgetown University, 2, pp. 263-286.
Reinhart, T. (1994). Wh-in-situ in the Framework of the Minimalist Program. *OTS Working Papers*, Utrecht University.
Reis, M. (1989). *W-Interrogativsatzbildung und verwandte Erscheinungen. Untersuchungen anhand des Deutschen*. Ms., Universität Tübingen.
Rizzi, L. (1990). *Relativized minimality.* Cambridge, MA: MIT Press.
Roeper, T. & Pérez-Leroux, A. (1997). The interpretation of bare nouns in semantics and syntax: inherent possessive, pied piping, and root infinitives. *MIT Occasional Papers in Linguistics 12*. MA: MIT Press.
Ross, J. R. (1967) *Constraints on variables in syntax*. Doctoral dissertation, MIT
Rousou, A. (2007). Greek Control revisited. *7th International Conference in Greek Linguistics (ICGL 7),* CD - Rom Publication, University of York.
Rullmann, H. & Beck, S. (1998). *Presupposition Projection and the Interpretation of which-questions*. Unpublished paper presented at 8th Semantics and Linguistic Theory Conference MIT, 8-10 May.
Schaeffer, J. (1991). *The Italian child C-system*. Ms. University of Venezia.
Simeonidis, C. P. (2006). *Ιστορία της Κυπριακής Διαλέκτου* (History of the Cypriot Greek Dialect), Holy Monastery of Kykkos Centre of Research, Nicosia.
Smith Stark, T. (1988). Pied-piping con inversion en preguntas parciales. Ms. Centro de estudios lingüísticos y literarios, Colegio de México y Seminario de lenguas indígenas.
Soare, G. (2007). A Cross-linguistic Typology of Question Formation and the Antisymmetry Hypothesis. In G.C. Ellison & G. Soare. *Generative Grammar in Geneva*, 5, pp. 107-131.
Starke, M. (2001). *Move dissolves into Merge: A theory of Locality*. Doctoral Dissertation, University of Geneva.
Stavrakaki S. (2006). Developmental perspectives on Specific Language Impairment: Evidence from the production of wh-questions by Greek SLI children over time. *Advances in Speech-Language Pathology*, 8, pp. 384–396.
Stavrakaki, S. (2004). Wh-questions in Greek children with Williams syndrome: A comparison with SLI and normal development. In S. Bartke & J. Siegmüller, eds. *Williams syndrome across languages*, Amsterdam, John Benjamins, pp. 295–318.
Stechow, A von (1996). Against LF pied-piping, *Natural Language Semantics*, 4, pp. 57-110.
Thornton, R. & Gavruseva, E. (1996). *Children's split "Whose-questions" and the structure of possessive NPs*. Unpublished paper presented at the 21st Annual Boston University Conference on Language Development, Boston, United States.

van der Lely, H. K. J. & Battel, J. (2003). Wh-movement in children with grammatical SLI: a test of the RDDR Hypothesis, *Language*, 79, pp. 153-181.
van der Lely, H. K. J. (1994). Canonical linking rules: Forward vs Reverse linking in normally developing and specifically language impaired children. *Cognition,* 51, 29-72
van Kampen, J. (1994). The learnability of the Left Branch Condition. In R. Bok-Bennema & C. Cremers, eds. *Linguistics in the Netherlands* 1994. 83-94. Amsterdam: John Benjamins.
van Kampen, J. (1996). PF/LF convergence in acquisition. In K. Kusumoto, ed. *Proceedings of the NELS* 26, pp. 149-163.
van Kampen, J. (1997). *First Steps in Wh-movement* Delft: Eburon.
van Kampen, J. (2000). *Left branch extraction as operator movement: Evidence from child Dutch*. In S.M. Powers & C. Hamann, eds. *The Acquisition of Scrambling and Clitization.* Kluwer, Norwell, pp. 479-503.
Yeo, N. (2010). Unifying Optional Wh-movement. University of York: Doctoral dissertation.