Specificities of Syntactic Movement in Early Speech

Elena Papadopoulou* & Natalia Pavlou

University of Essex, University of Cyprus* & University of York*

epapadb@gmail.com, nataliapavlou@gmail.com

Abstract

This paper discusses syntactic errors and strategies found in child speech in an attempt to outline the linguistic development in early speech. The focus lies on children's ungrammatical utterances appearing to violate the Pied-piping condition in D-linked wh-questions as these are found in two different elicitation methodologies. The violation of grammatical constraints, such as the one discussed, supports the role of Economy in languages with a relevant discussion on the syntactic dependencies involved. The study targets the understanding of Movement specificities in Greek Cypriot children in order to identify the errors in these structures and the specificities of the variety.

Keywords: Cypriot Greek, Economy, Movement, pied-piping, wh-questions

1. Introduction

The study of errors or non-target responses in child speech can reveal the development of language and more specifically the order of the acquisition of syntactic phenomena. In first language acquisition (L1), it is assumed that certain structures are late acquired either because of their syntactic or semantic complexity. The complexity involved in a structure is surely a determining factor for the toddler, but the errors produced in the process of acquiring that complexity can indicate children's simple understanding of syntax in their mastering of language.

With focus on a specific variety, Cypriot Greek (CG), data were drawn from two different experiments (Papadopoulou, in progress; Pavlou, 2010b) at different times of testing, where children of roughly the same ages participated. The specificities observed involved a series of similar patterns found in the acquisition of D-linked

questions, which are syntactically assumed to show pied-piping (Ross 1967), as indicated below:

(1) [Inda milo] kofki I kopela?
Which apple-ACC cutting-3SG the girl-NOM
'Which apple is the girl cutting?'

Following the different errors and non-target responses observed in the two experiments, we argue that these are syntactically-motivated patterns, which are driven by syntactic reasons and thus appear even at 6 years old (yo) children.

In this paper, we aim to briefly discuss the background literature with regard to errors found in the acquisition of D-linked questions in several languages in order to list the different error patterns involved. In Section 2, we will give an overview of wh-questions and their formation in Cypriot Greek (CG). Data were drawn from a syntactic priming experiment, presented in Section 3 and an elicitation task, presented in Section 4. Section 5 focuses on decomposing the errors observed in the experiments and providing an explanation, supporting Economy in syntax and illustrating a clearer picture for specificities in early speech.

1.2 Background literature

To start with, pied-piping in D-linked questions is generally assumed to involve a wh-word, which is a determiner that moves to the target position and pied-pipes the NP along with it (1). The study of pied-piping (Ross 1967) in D-linked questions and other structures has been a matter of many studies (Butler & Mathieu 2005; Cable

2008; Fanselow & Cavar 2002; Heck 2008; Mathieu 2002 among others) for decades with focus on the optionality or not of pied-piping in a certain language.

A recent acquisition study of ninety pre-school children (4;0-7;0) in Standard Modern Greek (SMG) reported error findings related to sub-extraction of wh-phrases (Asproudi, 2011). 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). In her conclusions, she argues that the morphological richness of SMG is a key factor to the possibility of sub-extraction of wh-phrases in child speech.

Another study on SMG (Stavrakaki 2006), which had 8 SLI children with 2 control children for each one tested, showed that even though children acquired the formation of wh-questions by age 4, they still produced errors. First, this study indicates that there was frequent omission of the NP in D-linked subject and object questions. According to Stavrakaki, these errors may have been the consequence of the phonological similarity between *pjos* 'which' and *pjos* 'who'. Second, SLI children showed a tendency of converting a non-D-linked question into D-linked question or a non-D-linked who-object question to a D-linked which-object question. Most importantly though, this study reports *gap-filling* errors which are characterized by splitting of the wh-phrase and the NP. 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 (Avrutin 2000).

Van Kampen (1994, 1996 and subsequent work) argues that there is a PF/LF discrepancy in child language (see van Kampen 1996 for a detailed discussion) when children produce this kind of errors. 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. Nomura and Himoru (2005) showed in their study with 15 Japanese-speaking children (4;4-5;2) that unlike Dutch (van Kampen 1997) and English (Chen et al. 1998), their participants did not violate the Pied-piping condition (Ross 1967).

Catalan (Gavarró & Solà 2004a; Gavarró & Solà 2004b) is another language showing errors in the acquisition of pied-piping in D-linked questions. Gavarró & Solà (2004) argue that errors, such as sub-extractions in child speech is explained by Kayne's (2002) remnant movement, which is determined by Case requirements.

Last, 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. For example, errors appear in wh-possessor questions (also see Gavruseva & Thornton 2001; Thornton & Gavruseva 1996), 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.

It appears that errors in the acquisition of pied-piping are met often in other languages as well. To sum up, consider Table 1 below:

CG	Pavlou 2010, in progress	Sub-extraction of *wh*s
SMG	Asproudi 2011	Sub-extraction of *wh*s
	Stavrakaki 2006	Sub-extraction of *wh*s, NP omission
Dutch	van Kampen 1997	Sub-extraction of *wh*s
Japanese	Nomura & Himoru 2005	No errors
Catalan	Gavarró & Solà 2004	Sub-extraction of *wh*s
English	Gavruseva & Thornton 2001	Sub-extraction of possessors

Table 1 Studies that report errors in the acquisition of D-linked questions

The specificities found in the acquisition of D-linked questions appear in different languages that belong to different language groups and follow different structures and/or rules. We turn in the next section to examine the syntactic distribution of questions in Cypriot Greek.

2. Wh-questions in CG

In this paper, we explore only one type of question, namely, the *Referential* (or D-linked) *pco/inda/ti* 'which' question ((2) below).

(2) Pco /Inda vivlio diavazi o andras?
Which book-ACC reading-3SG the man-NOM
'Which book is the man reading?'

With regard to CG question formation, this shows morphological resemblance to SMG with minor pragmatic-semantic and morpho-phonological differences (Newton 1972) as well as substantial formation differences with respect to the *embu* 'is-it-that' strategy and *inda mbu*[1] 'what/why' wh-phrases.

Inda[2] 'what/which'is invariant in gender, number, and case and it is used either prenominally ('what/which NP') or pronominally (simple 'what'). *Inda* was considered to have two phonologically reduced forms *a* and *nda*, which are still used rarely mainly in the village variety of the dialect known as "*xorkatika*" (Newton 1972:19). For a summary of the SMG and CG wh-phrases, consider the Table below:

[1] Pavlou (2010a), contra to Papadopoulou (in progress) argues that *inda mbu* has a complex syntax with *inda* being the wh-phrase and *mbu* being on C, following the discussion in Grohmann et al. (2006).
[2] *W*hen *inda* 'what' is adjoined to *embu* 'is-it-that', resulting in *indambu* 'what is-it-that'[2] (Papadopoulou in progress) or *inda mbu* (Pavlou 2010a) four other allomorphs are identified, namely *innambu*, *nambu*, *tambu* and *ambu* (Pavlou 2010a).

SMG	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 2 Wh-phrases in CG and SMG (Pavlou in progress)

A further note on the distribution of *inda* 'what' in D-linked questions is given below. Pied-piping in D-linked questions is not optional and it is characterized by movement of the noun along with the operator (3).

(3) Inda milo troi i kopela?
Which apple-ACC eating-3SG the woman-NOM
'Which apple is the woman eating?'

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 (4b).

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

(4a) Inda vivlion θkiavazi o Nikos?

which book.ACC reading.3SG the Nick.NOM

'Which book is Nick reading?'

(4b) O Nikos θkiavazi inda vivlion?

the Nick.NOM reading.3SG which book.ACC

'Nick is reading which book?'

Split-DPs in complex wh-phrases, 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 SMG appears only in wh-constructions that involve a possessor marked with genitive Case (Table 3).

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

Table 3 Wh-phrases that allow(ed) Split-DPs (Pavlou, in progress)

CG does not allow any split-DPs in wh-constructions except in the case that a possessor element is involved. *Tinos* 'whose' appears in Split wh-constructions today in both SMG and CG, but as Pavlou (in progress) argues 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 (5b) for SMG. When *tinos* is separated from *to vivlio*, as in (5b), the same interpretation is possible. Even though CG also employs *tinos*-phrases, when the reading in (6) is available, the reading corresponding to (5b) becomes unavailable.

(5a) Tinos to vivlio eferes?
whose.GEN the book.ACC brought.2SG

(5b) Tinos eferes to vivlio?
whose.GEN brought.2SG the book.ACC
'Whose book did you bring?' (MG)

(Horrocks and Stavrou, 1987, p.89)

(6a) Tinos to vivlio eferes?
whose.GEN the book.ACC brought.2SG
'Whose book did you bring"

(6b) Tinos eferes to vivlio?
to whom.ACC brought.2SG the book.ACC
'To whom did you bring the book?'

(Pavlou, in progress)

Cypriot Greek does not allow any Split-DPs in questions in adult speech, so children are expected not to show any patterns of split wh-constructions in their acquisition of questions. We will consider relevant cases in the first experiment discussed in the next section.

3. Syntactic Priming in CG

Syntactic Priming experiment in Cypriot Greek (Spe-CG) (Papadopoulou, in progress) was conducted with a hundred three monolingual native speakers-children of CG, aged 2;8 - 6;5. All children attended kindergartens around the area of Larnaca and Limassol district and were distributed in three age groups (Table 4 below) [4].

Age group	Age range	Number of participants	Mean age	Standard deviation
AG1	2;8–3;11	22	3;4	3 months
AG2	4;0–4;11	26	4;3	2 months
AG3	5;0–6;5	45	5;7	3 months

Table 4: *SPE-CG participants*

3.1 Material and Procedure

The experiment involved thirty sentences of a prime (P) and a target (T), with a different verb, agent and patient for each P and T. Three *wh*-words were tested, namely, *pco* 'which' referential, *ti* 'what' non-referential and the dialectal element *inda* 'which' referential, each in 10 sentences. Test sentences were distributed across the topicalization or not of the subject and appearance of *embu* 'is-it-that'following (7) and (8) below respectively; which in accordance with the appearance or not of *embu* 'is-it-that' result in four main conditions which were distributed in between groups.

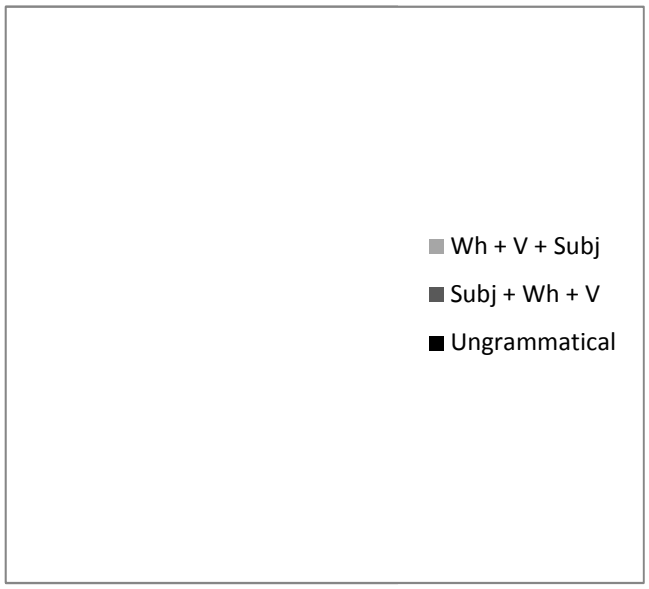
[4] Detailed description of procedure, methodology and the participants' profile can be found in Papadopoulou (in progress) and in Papadopoulou & Pavlou (forthcoming).

(7) O andras pco vivlio **(embu)** Θkiavazi?
the man-NOM *which book*-ACC *(is-it-that) read*-3SG
'Which book is the man reading?'

(8) Pco vivlio **(embu)** Θkiavazi o andras?
which book-ACC *(is-it-that) read*-3SG *the man*-NOM
'Which book is the man reading?'

3.2 Results

Due to full pushing for priming children did not deviate much from the expected priming questions, even at a very young age. As depicted in Figure (1) below children perform at almost 100% when they are primed with the word order Wh + V + Subj. Age group three performs the same irrespective of the word order condition provided (Figures 1 and 2). In contrast Age group two seems to perform slightly less (84%) when they are given the topicalized word order as prime; Subj + Wh + V. The younger group (AG1) seems to have great difficulty with the topicalized word order condition. They performed at 47% following the target word order and reversed to the non-topicalized word order at 52% of the cases.



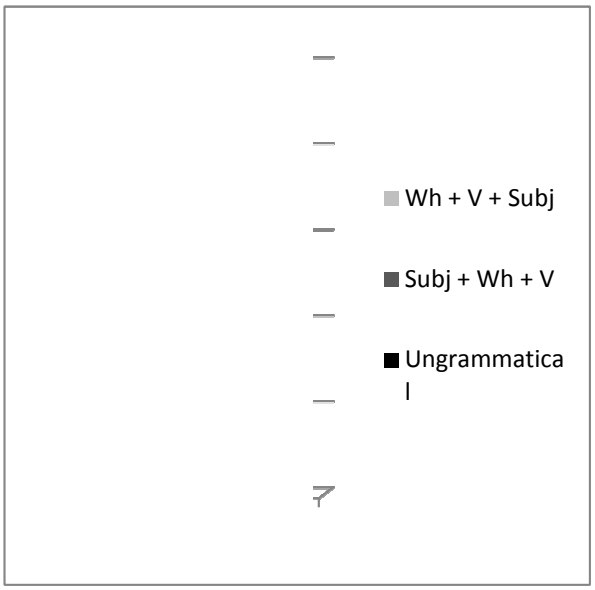


Figure 1: *SPE-CG Wh+V+Subj results* ***Figure 2:*** *SPE-CG Subj+Wh+V results*

Concentrating on specificities of syntactic movement in early speech failing to be primed by the topicalized word order condition suggests possible difficulties to move the subject at a topic position for AG1 (see inter allies Papadopoulou (in progress), Papadopoulou & Pavlou (in progress)). Results above do not refer to the priming effects or not of *embu* 'is-it-that', since it was not highly primed and its priming –or not- was not related to syntactic movement difficulties, given that it is generated at Spec-CP hence, not moved at that position (see again Papadopoulou in progress for an in depth investigation).

Overall, children across all age groups made a few ungrammatical errors, failing to obey the primed word order; only at 5.1% across age groups. The majority of the errors made referred to the inability to obey pied-piping conditions ((-)Pied Piping) resulting in a split DP with the *wh*-word correctly moved to Spec CP but, with the noun remaining VP-internally resulting in examples like (9) instead of providing the supposed target (10) below.

(9) *Pco kaΘarizi i kopela piato?

which clean-3SG *the girl-NOM plate* -ACC

'Which plate is the girl cleaning?'

(10) Pco piato kaΘarizi i kopela?

which plate-ACC *clean*-3SG *the girl*-NOM

'Which plate is the girl cleaning?'

Children have also produced sentences with both the *wh*-object phrases and the overt object by moving on the one hand the *wh*-word to Spec, CP but at the same time pronouncing the NP in the VP as in (11) below rather than (12).

(11) *O andras ti aniγi *ðoro*?

the man-NOM *what* open-3SG *present*-ACC

'Which present is the man opening?'

(12) O andras ti anigi?

the man-NOM *what* open-3SG

'What is the man opening?'

Even though these utterances are limited in number, a greater number of these errors are found in the Guess What Game discussed in the next section.

4. The Guess What Game

Similarly to SPE-CG, data were collected from Greek Cypriot children who were attending either public or private kindergartens in Limassol, the southern town in Cyprus. Participants were distributed in four age groups, as summarized in Table 5.

Age group	Age range	Number of participants	Mean age	Standard deviation
AG1	3;0–3;11	19	3;7	3 months
AG2	4;0–4;11	22	4;7	3 months
AG3	5;0–5;11	22	5;5	3 months
AG4	6;0–6;11	18	6;2	1 month

Table 5: *GWG participants*

4.1 Material and Procedure

The materials used were two puppets, a baby frog and a baby lion, so as to provide enthusiasm to the children. The procedure followed was the same for all children tested and each child was introduced to it individually. The researcher would introduce the child to the idea that they were going to play a game and the game was to collect chickens with baby lion and baby frog and see who can collect the most chicks. The one who would collect the most chicks would be the winner and would win a prize at the end. What the child needed to do was to ask a question about each picture shown. The child believes that s/he is competing with the puppets, but by manipulating the way that the puppets respond, the child always wins the game.

The test had 24 items in six sections with each one investigating a different syntactic structure. In this paper, we will discuss the findings for block 4, which involved D-linked questions. Each set of test items was preceded by two warm up items. In the warm up items, the child simply copied the adult's questions but then s/he was told that s/he must go ahead to ask the questions directly. 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 for.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?'

(Pavlou, in progress)

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

4.2 Results

A control group with 10 adults also participated in the experiment and interestingly, provided the target responses with a high percentage.

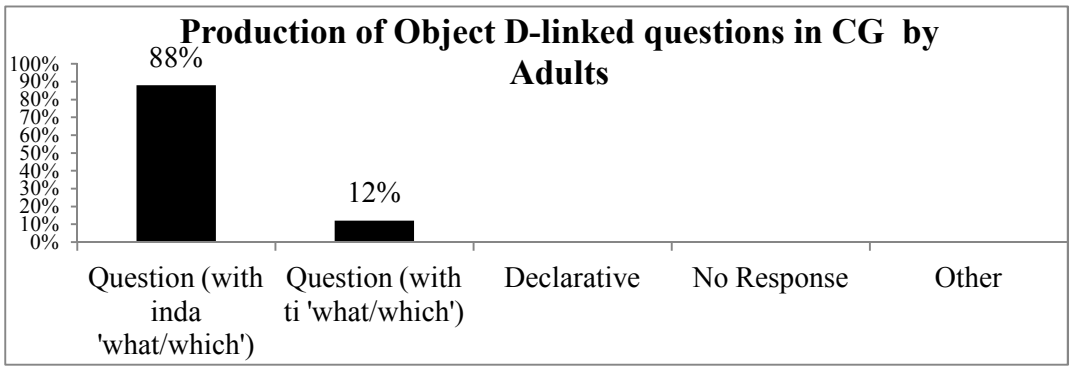


Figure 3 Production of Object D-linked questions in CG by Adults

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 4. D-linked questions had the lowest percentages in comparison with the elicitation of the other wh-questions in the experiment.

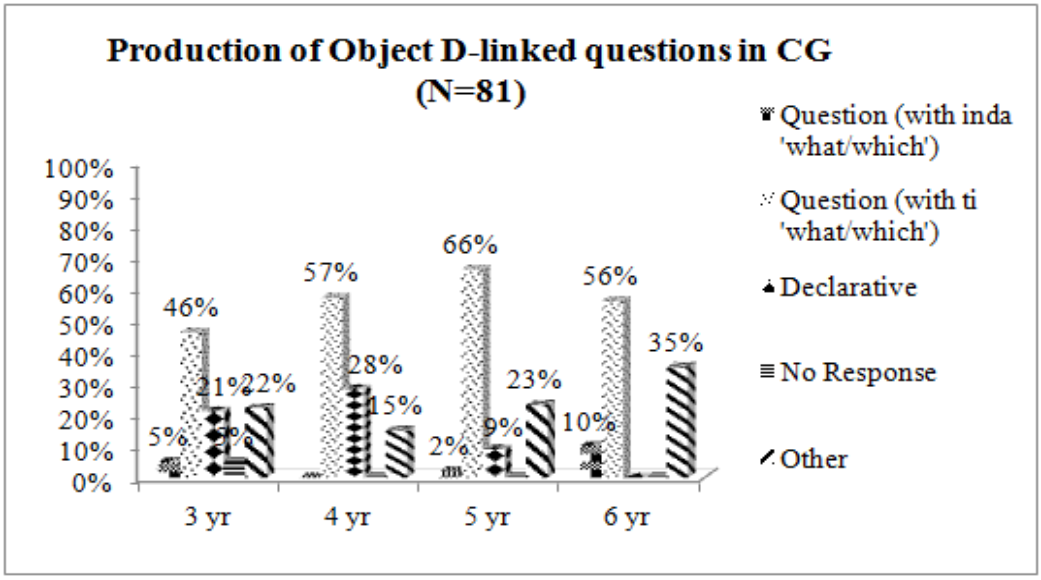


Figure 4 Production of D-linked questions: Overall results

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).

The percentages shown in Figure 4 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.

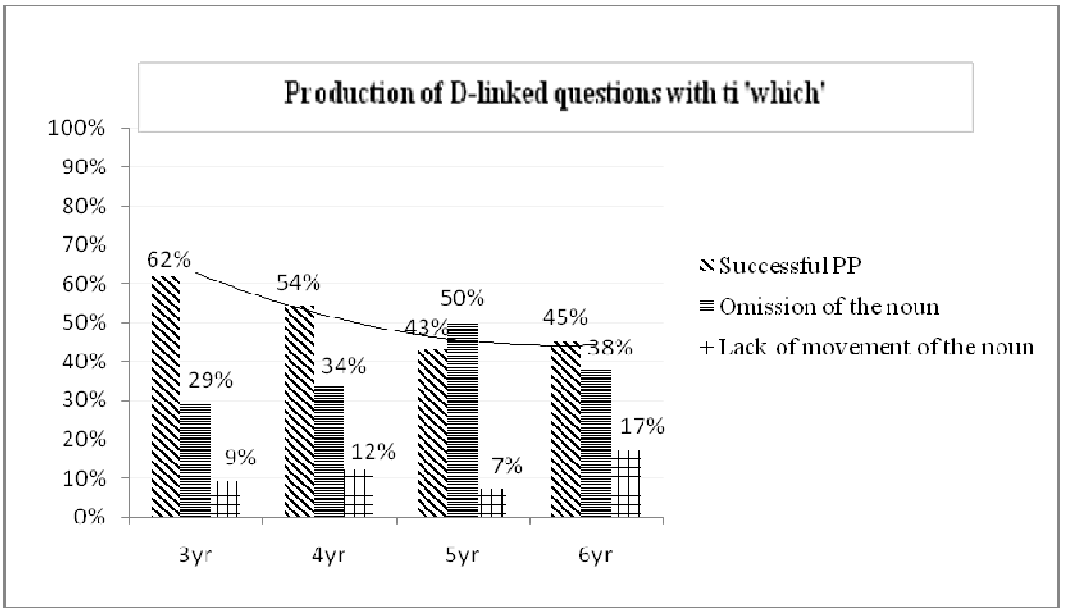


Figure 5 Sub-types of responses to D-linked questions

Figure 5 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.

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, but most importantly it also appeared in complex wh-phrases of the type 'what colour car', as in (14).

(13a) * Inda fori o andras kapelo?
which wearing.3SG the man.NOM hat.ACC
'Which hat is the man wearing?'

(13b) * Ti anigi kutin o andras?
which opening.3SG box.ACC the man.NOM
'Which box is the man opening?'

(14a) * 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?'

(14b) * 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?'

Figure 6 below shows responses from children when attempting to produce a question with *inda* 'which'. The breakdown of response patterns can be seen to differ substantially from the pattern seen in Figure 5.

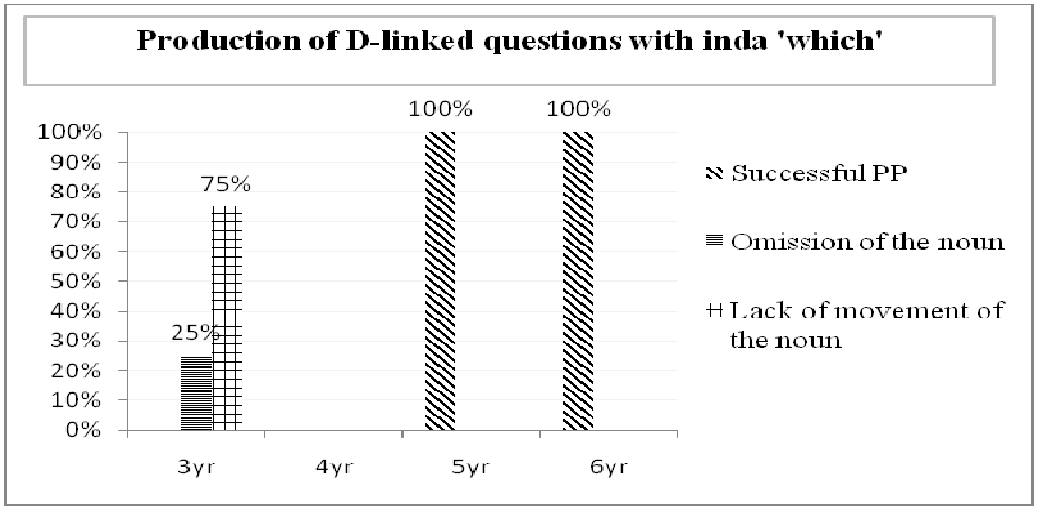


Figure 6 Successful pied-piping and errors with *inda* 'which' in Block 4

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.

5. Discussion

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. Based on the data taken from the two experiments discussed above, children's errors in D-linked questions appear in similar ages and are not affected by any specific methodology. It is evident that full pushing for priming minimized errors but it did not prevent them. Our analysis supports that the errors are not speech errors, but innately-motivated patterns that follow a theoretical reasoning in syntax.

We adopt the Immediate Move Hypothesis (Pavlou in progress), as outlined in (15), based on two crucial characteristics of the errors presented. Children move as little as they can in their production of D-linked questions, but as much as they need. This analysis predicts that when children produce these errors, C attracts the goal as follows:

(15)
Immediate Move Hypothesis
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

(Pavlou, in progress)

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 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}.

To sum up, Immediate Move Hypothesis was proposed to account for sub-extraction phenomena in D-linked questions and other environments of similar type. 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.

5.1 Conclusion: Children's production

Two experiments were discussed in order to outline similar patterns appearing in children production of D-linked questions. Children participating in a syntactic priming experiment produced a number of utterances showing sub-extraction of the wh-phrase from a complex wh-phrase. A similar type of errors was also found in an elicitation game targeting production of wh-questions in the same variety. This type of errors is found cross-linguistically without following a strict path of acquisition.

These particular errors in child speech provide strong arguments for the Economy in language as well as its different applications on 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.

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