Early Phases in the Development of Greek Verb Inflection

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Abstract

In this paper we study the earliest phases of verb morphology in two children acquiring a highly inflectional-fusional language, Greek. We compare the inflectional development of a Greek boy from the age of 1;7.11 to the age of 2;1.27 to that of a rather precocious girl between 1;9.17 and 1;9.26. A verb-by-verb analysis of early inflectional forms shows that the grammatical categories of the Greek verb, i.e. aspect, mood, and tense as well as person and number, first develop in a lexicon-based way. Although acquisition seems to be piecemeal in the 'premorphological' phase, there is some systematicity inherent in the grammatical categories the children choose from the input already in the very beginning of development. Depending on the criteria applied, verbal inflectional categories appear to become productive quite early. A comparison of the children's speech to that of their mothers points to a strong connection of the cognitive, linguistic, and communicative characteristics of the input to the children's linguistic development.

Keywords

Greek, morphology, inflection, verbs

1. Theoretical considerations

Basing themselves on the considerable linguistic achievements of the young bonobo Kanzi in comprehending spoken English, Savage-Rumbaugh et al. (1998:73) conclude that "language is learned, not through speaking, but by coming to understand what others say to us." If this is true, the nature of the linguistic input children receive and "cultural (imitative) learning is more important in language development, especially in the early stages, than has traditionally been recognized" (Tomasello 2000:71). In the light of usage-based theories of language acquisition, Jakobson's characterization of early language development in children as "creative imitation" regains special appeal:

> *Was hier stattfindet, ist weder eine mechanische Übernahme noch eine wunderbare Schöpfung aus dem Nichts. Das Nachahmen öffnet den schöpferischen Kräften des Anfängers weite Möglichkeiten. Das vorhandene Muster gestattet eine Auslese der vollbrachten Entlehnungen und deren gesetzmäßige Reihenfolge, der zudanken das Kind anfangs das eine und dann erst das nächste sich anzueignen weiß* (1977:8).

On the basis of recent findings, "the assumption of a unidirectional and determinative relationship between cognitive and language development as it was conceived in the Piagetian tradition seems no longer tenable" (Behrens 2001:458). As opposed to the Cognition Hypothesis,[1] the Language Specificity Hypothesis[2] "emphasizes the child's productive analysis of the form-function patterns of the target language " (ib.) and "crosslinguistic diversity in patterns of grammaticization points to adult communicative practices as the most plausible source of form-function mappings in human languages, rather than prototypical events in infant cognition" (Slobin 2001:412).

In this view, it seems reasonable to assume that the following general principles of learning posited by Bybee's (1991:89) model of the acquisition of inflectional morphology may account for the acquisition of much of linguistic structure: (1) "The most often repeated experiences (in production and perception) have the strongest representation" and (2) "new experiences are analyzed and stored in terms of existing representations." What makes this model of language acquisition so attractive is "that it allows us to establish a relation between the way language is used – that is, how forms actually appear in natural discourse – and the way language is represented mentally" (ib.).

One of the basic tenets of usage-based models of language acquisition is that young children want to use language to communicate. They therefore "begin by imitatively learning specific pieces of language in order to express their communicative intentions, for example, in holophrases and other fixed expressions," trying to use language the way they have heard it used by mature speakers in their environment (Tomasello 2000:70ff.). It is only sufficient experience with particular events of linguistic usage that will enable them to gradually induce ever more abstract linguistic regularities. Usage-based approaches to language acquisition thus "stress the *dynamic* properties of linguistic knowledge", not only the learner's ability " to induce categories and schemas", but also to restructure them continually in response to both changes in the input and pressure exerted by the growth of other categories in the learner's system" (Bowerman & Choi 2001:498).[3] Although linguistic categories and schemas are at first only local, it seems necessary to posit that similar communicative functions play a major role in establishing linguistic categories from the very beginning (Mandler 1997, Tomasello

[1] See, for example, Slobin (1973; 1979).
[2] See Bowerman (1985), Choi & Bowerman (1991), Gopnik & Choi (1995).
[3] See also Bybee (1985, 1991), MacWhinney (1987) and Dressler & Karpf (1995).

2000:73). Once morphological patterns become larger, applying to an ever increasing number of lexical items, the corresponding schemas gain in strength and may attain the status of categorical rules (Bybee 1991:86).[4]

In usage-based approaches to language acquisition, both type and token frequency of expressions occurring in the input serve important, but different goals: While the token frequency of an expression tends to "entrench" it, "enabling the user to access and fluently use the expression as a whole", "type frequency of an expression (i.e., the number of different forms in which the language learner experiences the expression or some element of the expression) determines the creative possibilities, or productivity, of the construction" (Tomasello 2000:72).[5] Type variation of parts of an expression leads to the abstraction of linguistic patterns (Tomasello 2000:76f.).

Since Greek is a language with a strict noun-verb distinction and the verb is especially rich in inflectional forms specific to this syntactic category, there is evidence for the grammatical category of verb, as opposed to the noun, early on in Greek child language (Stephany 1997a). Greek children develop inflected forms of verbs (and nouns) rather early due to the inflectional-fusional character of the language they are acquiring and to the perceptual salience of inflectional endings[6] (Stephany 1985, 1997a; see also section 2). In the early developmental stages, the inflectional categories of tense and aspect as well as person are tied to certain conglomerations of semantico-grammatical categories and only later generalize to all verbs. Thus, aspect and tense strongly depend on *aktionsart* and person is controlled by mood to a certain extent (Stephany 1981, 1985, 1997a).

Mastery of the rich inflectional system of the Greek language proceeds gradually and seems to be guided by semantic simplicity as well as frequency in the input, with the latter being a function of communicative needs and the way of "thinking for speaking" (Slobin 1990) peculiar to Greek culture. Guided by communicative needs and the endeavor to be understood by their immature interlocutors, Greek mothers present a subset of the grammatical forms contained in the inflectional paradigms of verbs to their young children, which results in a manageable number of inflectional types of each verb lemma on the one hand and a considerable repetitiveness of verb form tokens on the other (Stephany 1985:183ff.; see also section 4).

The traditional word-and-paradigm model in which grammatical morphology "concerns relations among words" (Bybee 1991:70) and "morphological patterns emerge through the comparison of words within and across paradigms" (op. cit., p. 68), fits the morphological structure of an inflectional-fusional language like Greek especially well, since words do not have to be "pulled apart" in order to grasp their structure. In this view, "both the word and the paradigm to which it belongs are part of the grammar" rather than "derived by the grammar" (ib.). Accordingly, the task of the child in acquiring inflectional morphology is to learn "many different words" and to develop "the ability to make more words" (op. cit., p. 70).

Since the acquisition of inflectional morphology is lexicon-based, it seems more appropriate to postulate a phase model of linguistic development than a stage model. Adapting Karmiloff-Smith's model of "Representational Redescription" to the development of morphology it may be hypothesized that achievements in the mastery of verbal paradigms "occur recurrently within microdomains throughout development" rather than involving "fundamental changes

[4] Work on distributional learning by Lieven, Pine & Baldwin (1997) and Pine, Lieven & Rowland (1998) mainly supports the views expressed in usage-based approaches to language acquisition.
[5] See also Bybee (1991) and the references quoted by Tomasello (2000).
[6] Especially as far as verbs are concerned.

across the entire cognitive system" as postulated by "stage models" (Karmiloff-Smith 1992:18).

In this chapter, we will present a lemma-based, verb-by-verb analysis of early verb forms of the two children studied in order to show how the inflectional categories of the Greek verb, i.e. aspect, tense, and mood as well as person and number, emerge and become productive. As far as productivity is concerned we will show to what extent inflectional categories are learned piecemeal and to what degree more general patterns of usage can be documented.[7]

2. Greek verbal morphology

Greek verbal morphology is one of the richest among European languages and considerably more complex than the inflection of the Greek noun.

The grammatical categories expressed inflectionally by the Greek verb are mood, aspect, tense, and voice, as well as person and number. Modern Greek has no infinitive. There are three persons, both in the singular and plural. In finite verb forms, aspect is marked on the stem, while person and number are expressed by the verb ending, together with mood and/or tense (see below). Active and medio-passive voice are marked on the verb ending as well as the stem. Nearly all verbs formally distinguish between an imperfective and a perfective verb stem.[8] The main temporal opposition is past/non-past. Since the medio-passive is irrelevant for early verb development it will not be considered here. Table (1) exemplifies the main inflectional categories of the verb *líno* (1S) 'to solve, untie' in the active voice.

Table 1. The main inflectional categories of the Greek verb in the active voice

Mood	**Tense**	**Aspect**	
		Imperfective	**Perfective**
Indicative	**Non-past**	líno	-
	Past	élina	élisa
	Future	tha líno	tha líso
Subjunctive		na líno	na líso
Imperative		líne	líse

In Greek there are two main conjugational classes: class 1, bearing stress on the stem (e.g. *lín-o* 'solve:IPF-NONPAST:1S') and class 2, bearing stress on the ending (e.g. *aghap-ó* 'love:IPF-NONPAST:1S'). Most class 1 verbs form a sigmatic perfective active stem ending in *–s-* (e.g. *lín-o* 'solve:IPF-NONPAST:1S' → *é-lis-a* 'AUGM-solve:PFV-PAST:1S'). The rest of Class 1 verbs form an asigmatic perfective stem by various morphophonemic processes (e.g. *mén-o* 'stay:IPF-NONPAST:1S' → *é-min-a* 'AUGM-stay:PFV-PAST:1S'). All class 2 verbs form sigmatic perfectives, but most of them insert an *-i-* before the *-s-* (e.g. *aghap-ó* 'love:IPF-NONPAST:1S' → *aghápis-a* 'love:PFV-PAST:1S'). Since the past tense forms of most verbs are stressed on the antepenultimate syllable, syllabic augment (*é-lin-a* 'AUGM-solve:IPF-PAST:1S' vs. *lín-ame* 'solve:IPF-PAST:1P') is obligatory in the singular and third person plural forms of two-syllabic verbs.

[7] On this approach, see also Lieven et al. (1997) and Gathercole et al. (1999).
[8] Exceptions are the auxiliaries *exo* 'to have' and *ime* 'to be' and a few other verbs like *ksero* 'to know', *kano* 'to do' and *pao* 'to go'.

The only difference between the two verb classes as far as their endings are concerned occurs in the imperfective non-past.[9] Class 2 comprises two subclasses which differ in the endings of the imperfective non-past (table 2).

Table 2. Verbal endings of the indicative and the imperative in the active voice[10]

PERS/ NUM	**PFV:NON-PAST**	**IPF:NONPAST**		**PAST**	**PFV:IMP**	**IPF:IMP**	
	Class 1/2	Class 1	Class 2	Class 1/2	Class 1/2	Class 1	Class 2
1S	-o		-(a)o	-a			
2S	-is		-as/-is	-es	-e		-a
3S	-i		-a(i)/-i	-e			
1P	-ume		-ame/-ume	-ame			
2P	-ete		-ate/-ite	-ate	-(e)te		-ate/-ite
3P	-un(e)		-an(e)/-un(e)	-an(e)			

3. Data

Two kinds of data have been analyzed for the present study: the longitudinal observation of the boy Christos from 1;7.11 to 2;1.27 and the more selective observation of the girl Mairi between 1;9.17 and 1;9.26.[11]

The longitudinal data of Christos consists in 25 (almost) weekly recordings of (approximately) 20 min. of (semi-)spontaneous speech (table 3). Recordings took place at the boy's or his grandparents' home while he was playing or looking at picture books familiar to him. Adult interlocutors were his mother and grandmother as well as other family members. Christos was then the only child of a Greek upper middle class family and is growing up monolingually in Athens. From a linguistic point of view, the boy may be characterized as an analytic ("referential") child, since formulaic and frozen forms are rare in his speech.

Table 3. Christos' longitudinal data

Recordings	**Age**	**Utterances**
1	1;7.11	162
2	1;8.21	114
3	1;9.3	23
4	1;9.12	85
5	1;9.24	111
6	1;10.1	86
7	1;10.9	237
8	1;10.24	81
9	1;11	162
10	1;11.10	104
11	1;11.13	80
12	1;11.19	108
13	1;11.27	109
14	2;0.4	150
15	2;0.7	214
16	2;0.15	145
17	2;0.16	97

[9] For different views concerning the segmentation of verb endings cf. Mackridge (1985:174), Kleris & Babiniotis (1999:132), and Holton, Mackridge & Philippaki-Warburton (1997:119).
[10] The endings of the future and the subjunctive coincide with the endings of the non-past indicative.
[11] Computer-assisted coding and analysis were effected within the CHILDES Project (MacWhinney 2000).

Recordings	Age	Utterances
18	2;1.2	115
19	2;1.9	96
20	2;1.14	213
21	2;1.22	54
22	2;1.23	200
23	2;1.26	168
24	2;1.27	83
Total:		2,997

The verb forms occurring in the speech of the linguistically most advanced of the five children studied by Stephany (1985, 1997a) at an age comparable to that of Christos will be reanalyzed in the present study in order to show that Greek children may differ considerably in the rate at which their language develops. The child Mairi was first recorded between 1;9.17 and 1;9.26 with utterances analyzed amounting to 1,995 (MLU (words/utt.) 2.166). She was the only child of a lower middle class family at that time and grew up monolingually in Athens. She may be characterized as a "referential" child. Although at 1;9 her case system is barely beginning to emerge, she contrasts singular and plural forms of ten nouns (N = 107). Verbal inflection is much more advanced since two to seven different grammatical forms occur with more than half of her 64 verbal lemmata spontaneously and correctly used formally as well as functionally (see below).

4. Emergence of verb forms

4.1 Quantitative analysis

The verb is an extremely important category in Greek discourse and children encounter this syntactic category very frequently in the speech addressed to them even before the end of their second year. Thus, 85% to even 100% on average of the two mothers' utterances addressed to their children aged 1;8 and 2;0 (subject Christos) and 1;9 (subject Mairi), respectively, contain a verb form (table 4).[12]

Table 4. Number of verbal lemmata, types and tokens of grammatical verb forms, and percentages with respect to the number of analyzed utterances in child-directed speech

Subject	Input at age	Analyzed utterances	Verbal lemmata	Types	Tokens	Lemmata/ utterances	Types/ utterances	Tokens/ utterances
Christos	1;8	812	53	131	727	6.55%	18.00%	89.55%
Christos	2;0	1,293	94	234	1,102	7.25%	21.25%	85.20%
Mairi	1;9	1,792	110	337	1,817	6.14%	18.81%	100%

Comparing the children's speech to their input it becomes clear that they receive a much higher input in both verbal types (lemmata and grammatical forms) and tokens than they themselves produce in the data studied (compare table 4 with tables 5a and 5b). These differences between the input and child speech are more pronounced with the less advanced child Christos than with Mairi. Also, Mairi uses verb forms in 39% of her utterances already at 1;9,

[12] The high average percentage of utterances containing a verb in the child-directed speech of Mairi's mother is due to the fact that besides utterances without a verb she uses many utterances containing two or even three verb forms (e.g. *ja na pai o thios na su pari to tilefono na milisis me ton papuli sto tilefono* PTL PTL go:SUBJ:3S the uncle PTL you:GEN take:SUBJ:3S the telephone PTL speak:SUBJ:2S with the grandfather on.the telephone 'Uncle shall go and bring you the phone so that you can speak to grandfather on the phone').

while the child studied longitudinally arrives at nearly 33% of utterances containing a verb only by 2;1. One reason for this difference seems to be that in the first recordings Christos was particularly preoccupied with car brands so that these data are accordingly richer in nouns than verbs.

Table 5a. Number of verbal lemmata, types and tokens of grammatical verb forms in Christos' speech and percentages with respect to the number of analyzed utterances (with incorrect forms indicated in parentheses)

Age	**Analyzed utterances**	**Verbal lemmata**	**Types**	**Tokens**	**Verbal lemmata/utt.**	**Types/ utterances**	**Tokens/ utterances**
1;8	276	7	8 (3)	12 (4)	2.54%	2.90%	4.35%
1;9	219	10	11 (2)	21 (3)	4.57%	5.02%	9.59%
1;10	404	8	8 (2)	46 (2)	2.00%	1.98%	11.39%
1;11	563	20	29 (9)	77 (16)	3.55%	5.15%	13.68%
2;0	606	23	36 (13)	90 (17)	3.80%	5.94%	14.85%
2;1	929	47	97 (34)	304 (48)	5.06%	10.44%	32.72%
Total:	2,997	115	189 (63)	550 (90)	3.84%	6.30%	18.35%

Table 5b. Number of verbal lemmata, types and tokens of grammatical verb forms in Mairi's speech and percentages with respect to the number of analyzed utterances

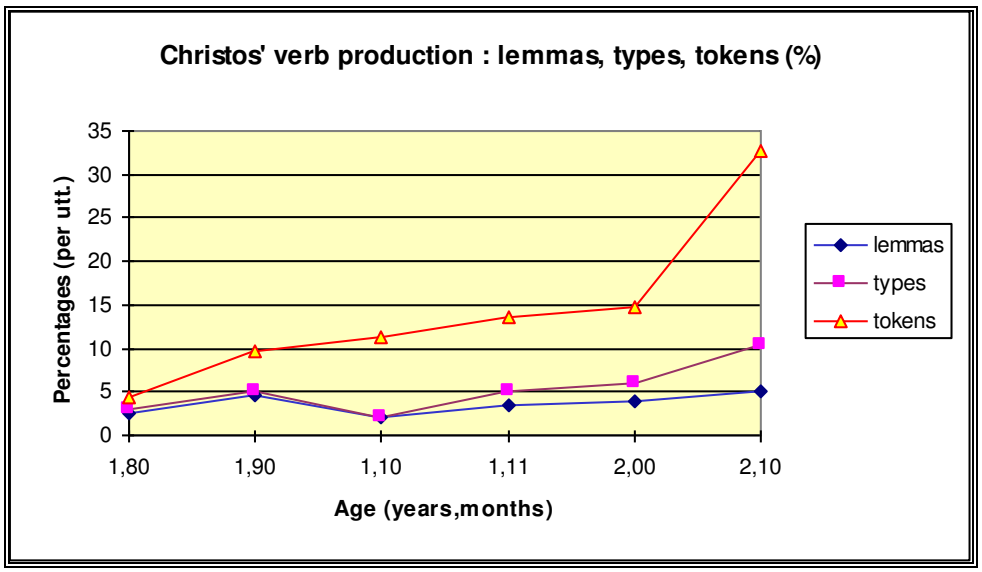
Age	**Analyzed utterances**	**Verbal lemmata**	**Types**	**Tokens**	**Verbal lemmata/utt.**	**Types/ utterances**	**Tokens/ utterances**
1;9	1,995	64	148	780	3.21%	7.42%	39.10%

Since the subject Mairi of Stephany's data was observed at only one point before the end of her second year, early developmental aspects can only be considered for the boy Christos. Fig. 1 shows that by age 1;8, when he was first recorded, he had already started to produce verbs.[13] His use of verbs increases steadily until the age of 2;0, when verb tokens rise from about 15% to 33% within one month.[14] The percentages of verbal lemmata and verb types momentarily drop at age 1;10 because in the recordings taken during this month, Christos uses the verb form *théli* 'want:IPF:NONPAST:3S*=1S' ('he wants' instead of 'I want') extremely often.

[13] Age 1;8 comprises Christos' first two recordings at 1;7.11 and 1;8.21 (see table 3a).

[14] The absolute numbers corresponding to fig. 1 are indicated in table (5a).

Fig. 1 Christos' verb production: lemmas, types, and tokens (%)



4.2 Inflectional categories of the verb: Form and function

4.2.1 Introduction

In this section we will first study the system of the two children's grammatical categories of the verb and compare this to the input they receive. We will next examine the productivity of inflectional verb forms and address the question in how far the children's knowledge of Greek grammatical categories expressed inflectionally is systematic or piecemeal.

We are aware of the fact that, especially in early child speech, the categorization of child forms according to grammatical categories of the adult language is problematic. One main reason for using such categories in the description of child speech is to be able to identify the formal categories the child uses. In studying the children's language systems we will show in how far their categories differ from the target language both formally and functionally. Our approach is both synchronic (child-centered) and diachronic (goal-centered) and thus allows to account for the structure and function of children's linguistic systems at a given time as well as for the development of their language towards the target.

4.2.2 Grammatical categories of the verb in early Greek child speech as compared to child-directed speech

In order to better understand the early development of the syntactic category of the verb and the morpho-syntactic categories it expresses, we will sketch Christos' development of verb forms from 1;7.11 through 2;1 beginning with predecessors of verbs (pseudoverbs) and holo-phrases (frozen forms). Onomatopoetic forms, such as *mam* 'to eat, food' (example 1) and *nani* 'to sleep, sleeping', which have both a nominal and and a verbal function, as well as the pseudoverb *bum* 'fell' already occur in the first recording.

(1) SOU: *ti kani edho to scilaci?* 'What is the doggie doing here?'
what does here the doggie
CHR: *mam.* 'Eating'.

Interestingly, between the ages of 1;8 and 1;10, the form *bum* develops into a pseudo-past form *bume* 'it fell'. This form can be interpreted as a kind of blend of the pseudoverb *bum* and the verb form *epese* (fall:PFV:PAST:3S) 'it fell/has fallen' and probably results from his mother's numerous corrections of Christos' form *bum* by *epese*. There will be 17 instances of this blend before the boy starts using the verb form *epese* in a more systematic way.

Since Christos is a non-formulaic child, there is little evidence for frozen forms[15] in his early speech from 1;8 to 1;10. The forms *cine* (for *eci ine* 'there is') and *tine* (for *ti ine* 'what is') are unanalyzed holophrases based on adult utterances comprising the verb form *ine* 'is/are'. At least until the emergence of two-member paradigms at 1;11, Christos' use of verb forms is lexically based since there is only a single form per lemma (examples 2 and 3).

(2) (a) *cita!* 'Look!'
IMP:2S

(b) *epese.* 'It has fallen.'
fall:PFV:PAST:3S

(c) *pai*. 'Over/gone.'[16]
go:IPF:NONPAST:3S

Three other lemmata used in the imperfective non-past 3rd singular from 1;8 to 1;9 seem to be context-bound, since they occur as (standard) reactions whenever Christos is asked to describe pictures in the books looked at during recording sessions (examples 3). Until 1;10, these forms are not always properly used as far as the category of number is concerned. In spite of the fact that Christos hears the contextually adequate 3rd singular or 3rd plural forms in the questions he is asked, he himself sticks to the form corresponding to the standard 3rd singular in his answers to both types of questions.

(3) (a) *troi*. 'He is eating.'[17]

(b) *vrechi*. 'It is raining.'

(c) *clei*. 'He is crying.'

At the age of 1;10.9, Christos mostly uses the 3rd singular *theli* (want:IPFV:NONPAST:3S) instead of the 1st singular *thelo* to refer to himself. This form also occurs in two-word constructions with different nominal and adverbial complements expressing the boy's needs and wishes (examples 4).

(4) (a) *theli nero*. 'He wants water.'

(b) *theli ghala*. 'He wants milk.'

(c) *theli pano*. 'He wants (to get) up.'

[15] For definitions of frozen forms see Tomasello (2000:65) and Kilani-Schoch, this volume.
[16] These uses of the verb form *pai* are also characteristic of Greek baby talk.
[17] The progressive aspect is not expressed by the Greek forms.

Christos first begins to use subjunctive forms at the age of 1;11. Although these forms occurring with three lemmata are not yet properly formed, they clearly contrast with the present indicative by vowel lengthening (example 5a) or reduplication (example 5b).[18]

(5) (a) *koopi*. 'You shall cut (it).'
cut:PFV:NONPAST:3S
for: *na kops-is*
MOD:PTL cut:PFV-NONPAST:2S

(b) *kakani.* 'You shall do (it).'
do:NONPAST:3S
for: *na kan-is*
MOD:PTL do-NONPAST:2S

Moreover, at the age of 1;11, Christos' system of person-number categories develops and, except for the 2nd plural, all person-number combinations occur (almost across the three tense-aspect-mood categories past/non-past indicative and subjunctive). However, the 3rd singular remains dominant in these three tense-aspect-mood categories (henceforth TAM categories) and continues to be overgeneralized (see below). The secondly preferred person in Christos' speech is the 1st plural, but this is mainly used in the subjunctive mood serving a conative function.

Christos' development of the grammatical categories of the verb between 1;8 and 2;1 seems to divide into two periods the first of which lasts from 1;8 to 1;10 with the second setting in at 1;11. Up to 1;10, Christos uses three different tense-aspect-mood categories, namely the imperfective non-past ('present'), the perfective past, and the imperative (table 6a). The perfective subjunctive only emerges at 1;11 and the imperfective subjunctive first occurs with two lemmata at 2;1, but a contrastive use with the perfective subjunctive cannot yet be attested. While, up to 2;0, Christos uses the subjunctive exclusively in main clauses in order to express deontic modality, after 2;0 he starts using it in subordinate clauses as well (16 tokens from 2;0 to 2;1).[19]

Table 6a. Types/tokens of Christos' adequately and inadequately used tense-aspect-mood and person-number categories[20]

Age	**IPF:NONPAST**				**PFV:PAST**			**IMP**	**PFV:SUBJV**		
	1S	**3S**	**1P**	**3P**	**1S**	**3S**	**3P**	**2S**	**1S**	**3S**	**1P**
1;8		6/8 (3/4)						2/4			
1;9		8/16 (1/2)				1/3 (1/1)		2/2			
1;10		7/41 (2/2)				1/5					
1:11	1/2	11/43		2/3		2/6	1/1	3/3	1/4 (1/1)	6/10 (6/10)	2/5 (2/5)
2;0	1/2	12/50		3/3 (1/1)		7/15 (2/2)		2/5	2/2 (1/1)	5/5 (5/5)	4/8 (4/8)
2;1	6/11 (1/1)	20/115 (1/2)	3/9	1/1	2/2(1/1)	14/81 (4/5)		8/20 (2/2)	3/3	30/43 (19/26)	10/19 (6/11)

[18] The modal particle *na* is incorporated into the verb by reduplication until the age of 2;2.
[19] In standard Greek, the subjunctive is used both in main and subordinate clauses and can serve the expression of epistemic or deontic modality (see Philippaki-Warburton 1992 and Kleris & Babiniotis 1999: 82ff).
[20] The subsets of forms inadequately used are indicated in parentheses; frozen forms have been excluded.

In the period between 1;8 and 1;10, the categories of person and number are limited to the 3rd singular in the indicative (past/non-past) and the 2nd singular in the imperative, while the 1st singular and the 3rd plural begin to develop at 1;11 and the 1st plural emerges at 2;1. While, from the very beginning, there are almost no inadequacies in the use of TAM categories, the categories of person and number develop out of the 3rd singular more slowly and Christos continues to overgeneralize this person/number combination for quite some time (see below). An explanation for these developmental differences may be found in the peripheral status of person/number as compared to TAM categories, which are semantically more central to the verb (Bybee 1991:80f.). Since both person/number and tense (and mood) are marked by the verbal ending, only aspect is formally more central to the Greek verb than tense (and mood).

The four main inflectional categories of the Greek verb, namely the imperfective non-past ('present'), the perfective subjunctive, the perfective past, and the imperative are all amply represented in Mairi's speech already by 1;9 (table 6b). There are a few (recognizable) imperfective subjunctive verb forms (5 types/9 tokens) differing from the respective indicative non-past forms by the presence of a modal particle (see table 1 above). Except for the verb *vlépo* 'see', these are not contrasted to perfective forms, however. But even with this verb, it is not clear whether the child semantically distinguishes between the perfective form *na dhúme* 'let's see' and the imperfective *na vlépume* 'let's see.' The imperfective past only occurs with the verb *káno* 'do', which usually makes no aspectual distinction. As with Christos, the TAM categories are nearly always adequately used. Since each of the three categories is only wrongly used in one or two tokens, these do not constitute systematic errors.

Table 6b. Types/tokens of Mairi's adequately used tense-aspect-mood and person-number categories at 1;9[21]

IPF:NONPAST					**PFV:PAST**				**PFV:SUBJ**				**IMP**
1S	**2S**	**3S**	**1P**	**3P**	**1S**	**2S**	**3S**	**1P**	**1S**	**2S**	**3S**	**1P**	**2S**
14/93	9/30	28/185	3/6	1/1	4/4	1/1	5/19	2/2	19/52	7/12	10/34	16/49	20/147
10.1/ 14.6%	6.5/ 4.7%	20.1/ 29.1%	2.6/ 0.9%	0.7/ 0.2%	2.9/ 0.6%	0.7/ 0.2%	3.6/ 3.0%	1.4/ 0.3%	13.7/ 8.2%	5.0/ 1.9%	7.2/ 5.4%	11.5/ 7.7%	14.4/ 23.2%

Unlike Christos, who, at 1;9, has only mastered verb forms corresponding to the standard 3rd singular, Mairi uses all person-number combinations except the 2nd plural.[22] As with Christos, when he begins to use the 1st plural mainly in the subjunctive, person-number combinations are not evenly distributed among the TAM categories of non-past, past, and subjunctive in Mairi's speech either. While the girl uses the 3rd singular most widely in the indicative mood ('present' and past) and the 3rd plural is restricted to the non-past, she prefers the 1st person singular and plural in the subjunctive. Still, the 1st person singular is already quite productive also in the present tense. The development of the categories of person and number will be studied in more detail below.

If the two children's verb forms are ranked according to the four TAM categories of the imperfective non-past, perfective past, perfective subjunctive, and the imperative, disregarding person-number distinctions, it becomes clear that the categories expressing deontic modality (subjunctive and imperative) play a much greater role in their utterances than the past (tables 7a and 7b).[23]

[21] N = 139 types, 635 tokens (excluding 127 tokens of *íne* 'is, are')
[22] The second person plural will have developed one year later at 2;9 (Stephany 1985).
[23] The perfective past is also much less used than the other three TAM categories by the other three children studied at 1;8, 1;9, and 1;11 by Stephany (1985:115).

Table 7a. Ranking of aspect-tense-mood categories in Christos' speech from 1;11 to 2;1 (only formally and functionally correct forms)

TAM categories	**Number of types**	**%**	**TAM categories**	**Number of tokens**	**%**
IPF:NONPAST	57	40.42	IPF:NONPAST	235	51.31
PFV:SUBJ	53	37.58	PFV:SUBJ	99	21.61
PFV:PAST	20	14.18	PFV:PAST	98	21.39
IMPERATIVE	11	7.80	IMPERATIVE	26	5.67
Total	141			458	

Table 7b. Ranking of aspect-tense-mood categories in Mairi's speech at 1;9 (only formally and functionally correct forms)

TAM categories	**Number of types**	**%**	**TAM categories**	**Number of tokens**	**%**
PFV:SUBJ	59	40.69	IPF:NONPAST	443	57.09
IPF:NONPAST	53	36.55	PFV:SUBJ	159	20.49
IMPERATIVE	20	13.79	IMPERATIVE	147	18.94
PFV:PAST	13	8.97	PFV:PAST	27	3.48
Total:	145		Total:	776	

Although the precedence of the semantically unmarked imperfective non-past remains stable during the whole period for which Christos' speech has been analyzed and is also valid for Mairi at 1;9, the main contrasts among the early TAM categories are those of modal vs. non-modal forms (perfective subjunctive and imperative vs. imperfective non-past and perfective past) on the one hand and imperfective vs. perfective indicative forms (imperfective non-past vs. perfective past) on the other. As pointed out by Stephany (1997a:245) this verb-form inventory as well as the use to which it is put (...) is evidence that aspect is a more fundamental category than tense in child Greek as it is in the standard language (Seiler 1952, Stephany 1981, 1985)." While mood and aspect are the two fundamental verbal categories of early child Greek, "tense is initially only implicit" (Stephany 1997a:249). The imperfective non-past occurs foremost with atelic-durative or stative verbs and typically refers to ongoing situations.[24] The perfective past is used more often with telic than with atelic verbs and characteristically has a resultative function implying pastness as far as the actions or events expressed are concerned (Stephany 1985:141).[25] Since the future as it is used by young children has a more strongly modal rather than a temporal meaning most the time, the categories of future and subjunctive are even more closely semantically related in early child Greek than in the standard language. While the opposition of past and non-past begins to develop in the indicative mood with the emergence of the imperfective past, the future gradually evolves from the subjunctive (Stephany 1997a:249; see also Stephany 1985, 1992).

Comparing the TAM categories of the verb used by Christos up to 2;1 and by Mairi at 1;9 to those of standard Greek the main difference is the following: The children's systems of verbal categories mostly consist of synthetic verb forms. They neither use the present nor the past perfect (both constructed with the auxiliary *éxo* ‚have')[26] and their differentiation of the future/subjunctive from the 'present' indicative mainly relies on the synthetic part of the verb form (perfective stem + non-past ending) while the future and modal particles *tha* and *na* are often missing, sometimes not distinguished (*a* for both *na* and *tha*), or indicated by fillers

[24] For details on the functions of the imperfective non-past in early child Greek see Stephany (1985:130-139).
[25] For details on the functions of the perfective past in early child Greek see Stephany (1985:139-148).
[26] In Katis' (1984) extensive longitudinal data of one Greek girl as well as in her cross-sectional data, both the present and past perfect remain exceptionally rare until about 3;2.

(schwa, reduplication, or vowel lengthening). Mairi marks the difference between the future and the subjunctive in only 49% of the respective tokens (Stephany 1985:96).

More illuminating than a comparison of the children's inventories of verb forms with that of standard Greek is a study of the relation between the input they receive and their own speech, both as far as verb form types and their use (tokens) are concerned. Not only do the inventories and ranking of TAM categories occurring in Christos' and Mairi's mothers' speech directed to their children in the second half of their second year closely correspond both type- and tokenwise (tables 8a and 8b), but there are also interesting relations between child-directed and child speech. Since Greek verbs comprise more than 130 different verb forms each, it can be seen that not only early child Greek but also Greek child-directed speech are severely limited in their inventories of TAM categories consisting of the communicatively most important of these.[27]

Table 8a. Ranking of aspect-tense-mood categories in the child-directed speech of Christos' mother at 1;8 and 2;0

TAM categories	**Number of types**	**%**	**TAM categories**	**Number of tokens**	**%**
IPF:NONPAST	179	49.58	IPF:NONPAST	1,213	66.83
PFV:SUBJ/FUT	76	21.05	IMPERATIVE	217	11.95
PFV:PAST	66	18.28	PFV:SUBJ/FUT	202	11.12
IMPERATIVE	40	11.08	PFV:PAST	183	10.08
Total	361		Total	1,815	

Table 8b. Ranking of aspect-tense-mood categories in the child-directed speech of Mairi's mother at 1;9

TAM categories	**Number of types**	**%**	**TAM categories**	**Number of tokens**	**%**
IPF:NONPAST	121	36.34	IPF:NONPAST	892	49.58
PFV:SUBJ/FUT	112	33.63	PFV:SUBJ/FUT	384	21.35
PFV:PAST	65	19.52	IMPERATIVE	384	21.35
IMPERATIVE	35	10.51	PFV:PAST	139	7.73
Total	333		Total	1,799	

Although until 1;10 Christos' ranking of TAM categories differs from that of his mother's child-directed speech due to the fact that he does not yet use the subjunctive, after the emergence of the subjunctive at 1;11 the boy's ranking coincides with that of his mother's speech typewise. Tokenwise there is a clear preference of both the subjunctive and the perfective past as compared to the imperative in the child's speech while in his mother's speech the three categories of the imperative, the perfective subjunctive/future, and the perfective past are more evenly distributed (see tables 7a and 8a). The high percentage of subjunctive tokens in Christos' speech as compared with imperative forms can be explained by his tendency to use subjunctive forms in imperative contexts (see below).

The TAM categories used by Mairi closely correspond to those occurring in her mother's child-directed speech, not only as far as the inventory of verb forms goes, but also concerning its use (tokenwise ranking) (tables 7b and 8b). It is interesting to note that the two most important verb-form categories occurring in Mairi's mother's speech are almost evenly distrib-

[27] A comparison of the child-directed speech of four Greek mothers to their adult-directed speech shows that not only the inventory of verb form categories is much larger in adult-directed speech as compared to child-directed speech, but also that the rankings differ, especially as far as the imperative and the perfective past are concerned (Stephany 1985:185, table 8.2).

uted typewise so that the child has a large opportunity to deal with different forms of the imperfective non-past and the perfective subjunctive as well as with the perfective past, which the girl herself does not yet use much at 1;9 but will in her third year (Stephany 1985:115).

Let us now turn to the development of the category of person/number in more detail. As mentioned above, Christos exclusively uses verb forms corresponding to the standard 3rd singular imperfective non-past and perfective past, respectively, until the age of 1;10 (table 6a). It seems reasonable to interpret these verb forms as finite verb forms for the following reasons: The speech directed to the young Greek child nearly exclusively comprises finite verb forms.[28] The 3rd person singular imperfective non-past cannot possibly be interpreted as the (non-finite) *aparemfato* (Babiniotis & Kontos 1967) or "perfect formant" since the latter is "identical to the third person singular of the perfective non-past active or passive" (Mackridge 1985:170; emphasis added, A.C. & U.S.) and therefore differs from the 3rd person singular imperfective non-past aspectually. Another reason to interpret the 3rd singular imperfective non-past as finite is the fact that this form emerges simultaneously with the 3rd singular perfective past in Christos' speech. Thus, Bybee's assumption "that a finite form is the basis of a verbal paradigm" (1991:74), seems to be fully born out.[29] According to the criteria of markedness or semantic simplicity (Bybee 1991:76) and frequency of use (Gathercole, Sebastian & Soto 1999:155) the 3rd person singular may be considered as a kind of basic verb form in Greek. It does not refer to the participants of the communicative event and therefore has more constant reference than the 1st and 2nd person. In child-directed speech, it is amply available,[30] since shifters tend to be avoided, and it therefore "has a stronger representation in the mental lexicon" (Bybee 1991:73).

The 3rd person singular also has a special status as far as overgeneralizations are concerned since it continues to be the only category which is overgeneralized even after other person/number combinations have entered Christos' language (table 9a). Although in the beginning (1;8-1;9) the 3rd person singular is overextended to the 3rd person plural in the imperfective non-past, from 1;10 to 2;0 it is overused for the 1st person singular both in the indicative and the subjunctive mood in 39.53% of tokens. Since Greek is a pro-drop language we will not judge the child's overgeneralizations of the third person in terms of agreement but rather in terms of avoiding shifters.

[28] The present perfect comprising the non-finite *aparemfato* is nearly absent from child-directed speech in the early phases. Of the four mothers studied by Stephany only one uses it at all, but extremely rarely (1985:187).
[29] We consider Varlocosta's and associates' (1998) interpretation of the early Greek child forms which we describe as perfective and imperfective non-past 3rd person singular finite verb forms as non-finite 'root infinitives' at least as empirically unfounded (see also Hyams in press).
[30] In the child-directed speech of Christos' mother 63% of the imperfective nonpast categories are in the 3rd person singular at the age of 1;8 and even 73% at the age of 2;0. - Mairi's mother uses the 3rd person singular with nearly 60% of (non-imperative) verb form tokens in child-directed speech, while the 1st person singular occurs in 9.7% and the 2nd person singular in 18.7% of tokens. The 1st and 3rd person plural occur in 7.5% and 4.3% of tokens, respectively, and the 2nd person plural is not used at all (N = 1,431 non-imperative verb form tokens).

Table 9a. Types/tokens of person/number categories inadequately used by Christos

Age	**PERSON***		
	3S*=1S	**3S*=2S**[31]	**3S*=3P**
1;8			½ 14.28%/16.66%
1;9			½ 10.00%/8.69%
1;10	2/27 22.22%/57.44%		
1;11	3/5 15.78%/8.47%	5/10 26.31%/16.94%	1/1 5.26%/1.69%
2;0	5/8 20.83%/11.42%		
2;1	19/46 29.68%/19.24%	4/11 6.25%/4.60%	1/1 1.56%/0.41%

In the examples in which Christos uses the third person instead of the first he refers to himself by using his name along with a verb correctly agreeing with the subject in person and number (example 6).

(6) *to loo to peticie o Picios*. 'Christos spilled the water.'
the water it throw:PFV:PAST:3S the Christos
for: *to nero to petakse o Christos*

At 1;11, when the subjunctive emerges, Christos also overgeneralizes the third person singular to the second person singular in this mood. Contrary to standard Greek, where the subjunctive is more polite than the imperative for expressing directives, Christos extends the subjunctive to contexts of explicit directives where politeness is less important than the immediate accomplishment of an action. It must be noted however that the boy does not yet contrast both moods for expressing directives since lemmata used in the imperative do not occur in the subjunctive and vice versa (e.g. *ela* 'come!', *cita* 'look!', *fighe* 'go away!', *ase* 'leave/let (it)!').[32] Since, until 2;1, the 2nd person is limited to the few imperative forms quoted, it does not seem unlikely that one reason why Christos prefers the subjunctive to the imperative is that the former mood allows for the use of the default form for person, namely the third singular.

As is the case with the inventory of TAM categories used by Mairi at 1;9, her development of person and number is also more advanced than that of Christos. In contrast to the boy, she uses all person-number combinations except the 2nd plural. However, the 3rd person singular occurs most frequently and also shows traces of its former default use, since it is overextended to both the 1st and 2nd person, while the 1st and 2nd person singular are overextended (to the 2nd and 1st person, respectively) much less and never to the 3rd singular (table 9b). It should be noted that Mairi overextends the 3rd person singular to the 1st singular much more in the indicative (14 types/30 tokens) than in the subjunctive (4 types/12 tokens), in which the 1st person is better established.[33]

[31] This error only occurs in the perfective subjunctive.
[32] These imperatives also belong to the most common ones in Stephany's data (see Stephany 1985:231ff., 1986:382).
[33] There is no evidence in Greek for Bybee's finding that the 1st person singular is formed by using the 3rd person singular as a base (Bybee 1991:74f.), since both forms end in different vowels (1st Sg *–o*, 3rd Sg *–i* (or *–a*)).

Table 9b. Types/tokens of person/number categories used by Mairi at 1;9

PERS/NUM	**1S**	**2S**	**3S**	**1P**	**3P**
Correctly used	37/149 97.4%/99.3%	17/43 85.0%/91.5%	44/238 (+ 127 *íne* 'is/are') 65.7%/83.2%	21/57 100%	1/1 100%
Incorrectly used	**1S* = 2S**	**2S* = 1S**	**3S* = 1S**	-	-
	1/1	2/3	18/42		
		2S* = 2P	**3S* = 2S**		
		1/1 (Imperative)	4/5		
			3S* = 3P		
			1/1		
Total incorrectly used	2.6%/0.7%	15.0%/8.5%	34.3%/16.8%	-	-

4.2.3 Productivity of inflectional categories and development of verbal paradigms

In order to understand the development of verbal inflection it is not sufficient to examine the grammatical forms of verbs children spontaneously use but one must try to find out in how far systematic relations among verb forms and the grammatical categories they express have developed. We will therefore apply two criteria of morphological productivity used by Pizzuto & Caselli (1994) and others[34] to the data of the two children studied and relate them to the notion of mini-paradigms elaborated by Bittner, Dressler & Kilani-Schoch (2000).

According to Pizzuto & Caselli (1994:156, quoted in Gathercole et al. 1999:144) a given inflectional form is considered to be productive when either or both of the following conditions hold: "(a) the same verb root appear[s] in at least two distinct inflected forms, and (b) the same inflection [is] used with at least two different verbs." As pointed out by Gathercole et al. (1999:144), these criteria cannot underestimate a child's productivity of grammatical verb forms and therefore represent a minimal requirement for inflectional development. In order to be able to compare the inflectional achievements of the more advanced child Mairi at 1;9 to Christos' development, we will first consider both of these criteria separately.

The first of the two criteria is linked to the notion of "mini-paradigms", which is defined by Bittner, Dressler & Kilani-Schoch (2000:5) as "an incomplete paradigm corresponding to a non-isolated set of minimally 3 accurate and distinct inflectional forms of the same verbal lexeme produced spontaneously in contrasting contexts." While criterion (b) of Pizzuto & Caselli's stresses the productivity of a given grammatical form, criterion (a) and the notion of mini-paradigm take the establishment of paradigmatic relations characteristic of inflectional morphology into consideration. According to Bybee (1991:78), "the learning strategy involved in constructing a paradigm [...] is the principle that new input is analyzed and stored in terms of existing structures. The first form of a paradigm to be acquired will be the most frequent and the semantically most coherent. Once this form is represented other less frequent and more complex forms may be analyzed and stored by reference to the existing form." This agrees well with the "default" status of the 3rd person singular noted in the preceding section.

We hope that by using both types of the criteria mentioned, we will be able to describe the children's grammatical achievements more properly. For the following analysis, only spontaneously and correctly used forms with stems and endings recognizably corresponding to those of standard Greek will be taken into consideration.

[34] See Gathercole et al. (1999:144) for references.

Although, up to 1;10, Christos uses his verbal lemmata in one grammatical form only and therefore does not yet meet Pizzuto & Caselli's (1994) productivity criterion (a) (table 10a), his two (out of three) inflectional forms of the imperfective non-past and the imperative occur with more than one lemma (see table 6a above) so that criterion (b) is fulfilled. At 1;11, Christos first meets both of Pizzuto & Caselli's (1994) criteria of productivity since now five of the 20 verbal lemmata (25%) occur in two forms (criterion (a)) and two of these 5 lemmata also occur in the same form (criterion (b)), i.e. the imperfective non-past third singular. At the age of 2;0, Christos uses 6 of his 23 verbal lemmata (26,08%) in two different forms and three grammatical categories occur with more than one of these lemmata. Finally, at the age of 2;1, the first three-member paradigms appear with 5 lemmata along with one four-member paradigm.

Table 10a. Inflectional forms and verbal mini-paradigms in Christos' speech

Age	**Number of verbs**	**1 form per lemma**	**2-member paradigms**	**3-member paradigms**	**4- member paradigms**
1;8	7	100%			
1;9	10	100%			
1;10	8	100%			
1;11	20	15 (75%)	5 (25%)		
2;0	23	17 (73.91%)	6 (26.08%)		
2;1	46	34 (73.91%)	6 (13.04%)	5 (10.87%)	1 (2.17%)

In the course of the boy's inflectional development, not only the number of verbs used with two or more inflectional forms increase, but also the number of different inflectional categories used with more than one lemma. While, at 2;0, the imperfective non-past 3rd person singular and 3rd person plural as well as the perfective subjunctive 3rd person singular occur with more than one lemma, at 2;1, the 1st singular of the imperfective non-past and the perfective subjunctive as well as the 3rd singular of the perfective past and the imperfective subjunctive are added to these.[35] A major achievement at the age of 2;1 seems to be that Christos uses the 1st person singular contrastively with more than one lemma in both the indicative and the subjunctive and thus begins to abandon the default use of the 3rd person singular.[36]

[35] For details see the appendix.

[36] Although the forms of the imperfective and the perfective subjunctive mentioned in table (11a) seem to be adequately used, it cannot be attested from the context if they are really in contrast in Christos' system.

Table 11a. Inflectional categories occurring with at least 2 verbal lemmata every one of which also exhibits a mini-paradigm in Christos' speech (only correctly used forms) [37]

AGE	TAM	1S	3S	1P	3P
1;11	**5 verbs with ≥ 2 forms, Σ = 20 verbs**				
	IPF:NONPAST		2 verbs		
	PFV:PAST				
	PFV:SUBJ				
2;0	**6 verbs with ≥ 2 forms, Σ = 23 verbs**				
	IPF:NONPAST		3 verbs		2 verbs
	PFV:PAST				
	PFV:SUBJ		2 verbs		
2;1	**13 verbs with ≥ 2 forms, Σ = 47 verbs**				
	IPF:NONPAST	2 verbs	4 verbs		
	PFV:PAST		7 verbs		
	PFV:SUBJ	4 verbs	7 verbs	3 verbs	
	IPFV:SUBJ		2 verbs		

If Christos' morphological development is judged according to Bittner's et al. (2000) criterion of paradigmatic development, morphological productivity only sets in at 2;1, when the first three-member mini-paradigms occur (table 10a), i.e. five months later than by Pizzuto & Caselli's criterion (b) (reached at 1;8) or at least two months later than by criterion (a) (fulfilled at 1;11). When Pizzuto & Caselli's (1994) as well as Bittner's et al. criteria of productivity are applied to Mairi's speech at 1;9, it becomes evident that the girl's morphological development is at least two months ahead of that of the boy Christos. Although 45.31% of her 64 verbal lemmata spontaneously and correctly used (both formally and functionally) occur in one grammatical form only, nearly 55% of her verbs are used with 2 to 7 forms demonstrating inflectional productivity in agreement with Pizzuto & Caselli's criterion (a) (table 10b). According to the stricter criterion of mini-paradigms which requires at least three contrastively used different inflectional forms of a verb, Mairi shows morphological development characteristic of the phase of protomorphology with 36% of her verbs.

Table 10b. Inflectional forms and verbal mini-paradigms in Mairi's speech at 1;9

Number of verbs	1 form	2 forms	3-member paradigms	4- to 5-member paradigms	6- to 7-member pararadigms
64	29 (45.31%)	12 (18.75%)	11 (17.19%)	8 (12.5%)	4 (6%)

Of the 43 verbs belonging to the 1st conjugation and spontaneously used by Mairi at 1;9, 23 (36% of all verbs) are used productively on both of the criteria (a) and (b) and 8 more 2nd conjugation verbs (12.5% of all verbs) (table 11b). In all, 48.5% of Mairi's 64 verbal lemmata are inflectionally productive on both of the criteria (a) and (b) and 36% according to the criterion of mini-paradigms requiring at least 3 contrastively used verb forms per lemma.

Of the bundles of grammatical categories expressed by Greek verb forms those represented in table (11b) occur with at least 2 lemmata in Mairi's speech, satisfying Pizzuto & Caselli's productivity criterion (b). The imperfective non-past ('present') and the perfective subjunctive are much more productive in both the 1st and 2nd conjugation than the perfective past. Also, the first conjugation is more developed than the second as far as the diversity of verb forms concerning both TAM categories and person and number are concerned. Medio-passive verbs

[37] Since Christos uses only one lemma of the second conjugation and only in forms which do not differ from the first conjugation, we will not concern ourselves with the formal distinction between first and second conjugation.

are only beginning to be productively used according to criterion (b). In spite of a number of errors to be found in her use of verb forms (see section 4.2.2 above), Mairi has made a good headstart into the acquisition of verbal conjugation by 1;9.

Table 11b. Inflectional categories occurring with at least 2 verbal lemmata in Mairi's speech at 1;9 (only correctly used forms)

TNS-ASP-MOOD	**1S**	**2S**	**3S**	**1P**
1st conjugation **(23 verbs with ≥ 2 forms, Σ = 43 verbs)**				
IPF:NONPAST	8 verbs	7 verbs	19 verbs	2 verbs
PFV:PAST	2 verbs	-	3 verbs	3 verbs
PFV:SUBJ	14 verbs	5 verbs	5 verbs	12 verbs
IPF:SUBJ			2 verbs	2 verbs
IMPERATIVE		13 verbs		
2nd conjugation **(8 verbs with ≥ 2 forms, Σ = 13 verbs)**				
IPF:NONPAST	7 verbs	-	2 verbs	-
PFV:PAST	-	-	2 verbs	-
PFV:SUBJ	3 verbs	-	3 verbs	2 verbs
IMPERATIVE	-	3 verbs	-	
Medio-passive **(2 verbs, Σ = 6 verbs)**				
IPF:NONPAST	-	-	2 verbs	

It is interesting to compare the results of the assessment of productivity of verbal inflections of the two children studied in this paper to the child-directed speech of their mothers in order to find out in how far a limited number of forms may be a result of studying a limited amount of data or of the mothers' adaptation to the communicative needs of adult-child interaction. As shown in tables (12a) and (12b) 61% of the verbs used by Mairi's mother and 67% (at 1;8) and 65% (at 2;0) of Christos' mother's speech occur in one or two forms only. Given that both mothers are native speakers of Greek, this finding cannot be explained by a limited knowledge of the language, but by their adjustment to the communicative needs of mother-child interaction. In view of the fact that Mairi uses up to 7-member mini-paradigms at 1;9, it seems to follow that the nearly 64% of her verbs occurring in only one or two forms (see table 10b) may at least in part be due to sample size. The picture is quite different with Christos, all of whose verbs occur in one form only until 1;10 and who continues to use his entire verbal inventory in at most two forms until 2;0 (see table 10a). Since it seems quite unlikely that his mini-paradigms comprising three or more verb forms were somehow missed in the recordings, the boy's data demonstrate a rather immature inflectional verbal system with different inflectional forms spread cross-lexically (see table 6a above) – except for sporadic instances which do not yet constitute true three-member paradigms with forms used in contrastive contexts.[38] It should be mentioned, however, that at the age of 1;9 the girl Mairi is quite advanced in her inflectional development also in comparison to other Greek children (see Stephany 1985, Hyams in press).

Table 12a. Inflectional forms and verbal mini-paradigms in child-directed speech (subject Christos)

[38] According to the criteria set up by the editors of this volume, only forms constituting paradigms are indicated in the 3rd, 4th, and 6th columns of table (10a): These forms are neither imitative, nor formulaic, suppletive, or analytical and occur in contrastive contexts within the same month.

Age	Number of verbs	1 form	2 forms	3-member paradigms	4- to 5-memb. par.	6- to 7-memb. par.	8- to 11-memb. Par.
1;8	52	48.07%	19.23%	11.53%	17.30%	3.84%	-
2;0	95	47.36%	17.89%	13.68%	14.73%	3.15%	3.15%

Table 12b. Inflectional forms and verbal mini-paradigms in child-directed speech at 1;9 (subject Mairi)

Number of verbs	1 form	2 forms	3-member paradigms	4- to 5-memb. par.	6- to 7-memb. par.	8- to 13-memb. par.
110	36.36%	24.55%	10.91%	10.9%	7.28%	10.00%

Although, by contrast with Christos, Mairi's use of inflectional forms of verbs seems quite comparable to that of her mother, the girl's still immature inflectional system becomes apparent when the size and number of her mini-paradigms are compared to those of her mother's child-directed speech. While there are 110 verbs in the mother's child-directed speech and mini-paradigms comprise up to 13 forms, Mairi only uses 64 verbs with at most 6 or 7 different inflectional forms of a given lemma. Also, the number of verbs used with 4 to 7 different inflectional forms by Mairi's mother is larger than the child's (20 vs. 12 verbs). In addition, the mother uses 11 verbs in 8- to 13-member paradigms. As for the boy Christos at 2;1, he also uses about half of the number of verbal lemmata as compared to his mother in child-directed speech at 2;0 (47 vs. 95 verbs). However, both the size of his mini-paradigms and the number of verbs used with three or more forms are much lower than those in his mother's speech. While his mother uses 31 lemmata (32.6% of verbs) with 3 to 11 different inflectional forms, only one verb occurs in 4 forms and five more occur in three forms in Christos' data (12.75% of verbs) (see tables 10a and 12a). It seems clear that the input of both children is far richer than their own speech both type- and tokenwise so that a mere artefact of sampling underrating the children's linguistic competence can be excluded.

5. Conclusion: Early phases in the acquisition of Greek verbal inflection

On the basis of our analysis of the early development of the inflectional categories of the verb in Christos' language from 1;8 to 2;1 and in Mairi's at 1;9, we will discuss the problem of establishing phases of the early development of Greek verbal inflection and address the question in how far this early acquisition is piecemeal or systematic.

There are different theoretical positions on the development of inflection to be found in the literature. One major point of discussion is the onset of inflection in child language, i.e. the demarcation of the 'preinflectional' and the 'inflectional' stage (Stephany 1985), the 'prefunctional' and 'functional' stage (Radford 1990), and the 'premorphological' and 'protomorphological' stage (or phase) (Dressler & Karpf 1995, Bittner, Dressler & Kilani-Schoch 2000).

Stephany (1985:225) considers the process of language acquisition to be basically a process of morphologization and syntactization. The preinflectional stage is defined by the absence of contrasting inflectional forms of one and the same verb (Stephany 1985:200). Although the forms used by the child may correspond to certain adult inflectional categories and do carry certain functional values in given pragmatic contexts (e.g. modal vs. nonmodal), the functions they carry are not yet formally distinguished. Thus, a German infinitive may either serve modal directive or commissive functions or nonmodal descriptive ones. The transition from the preinflectional to the inflectional stage is seen by Stephany (1985:225) as an increase in

grammaticization. The major achievement of the inflectional stage is not only that different functions are expressed by different forms, but that those forms offer the possibility of expressing further functional categories, such as aspect, tense, person, and number, so that the inflected forms serve their functional roles in a more differentiated way (loc. cit.).

It should have become evident in the course of our analysis that when the girl Mairi was first observed at 1;9, she had already entered the inflectional stage and proceeded quite far past the initial stages of the inflectional development of the verb.[39] It is therefore more interesting to turn to the early development of the boy Christos. Although, by the above definition, Christos could be taken to remain in the preinflectional stage until the age of 1;10, it seems more adequate to attribute some knowledge of the function of inflectional categories and thus some kind of local morphological awareness to the boy already by 1;8 when he was first observed. Unlike nouns,[40] verbs do not occur in a single basic inflectional form fulfilling different TAM functions in the boy's early speech. By 1;8 Christos already uses two and by 1;9 three different verb forms carrying clear morphological markers (e.g. *pai* 'go:IPFV:NONPAST:3S' 'all-gone', *ela* 'come:IMPER:2S' 'come!' or *epese* 'fall:PFV:PAST:3S' '(it) has fallen'). What is important is that these forms, although still lexically bound and not productively created, do not occur randomly, but are used in a largely functionally adequate way as far as their TAM categories are concerned.[41]

According to the 'maturational position' held by certain proponents of theories of language acquisition situated within Universal Grammar (e.g. Radford 1990) there is a 'prefunctional' stage, in which functional categories (in the sense of generative grammar) are entirely lacking from child grammar. According to Hyams (in press) this position "violates the continuity assumption, that is, the restrictive hypothesis that child grammars do not fall outside the limits of Universal Grammar." What is more important in the framework of the present paper is the fact that Hyams (in press) also provides convincing empirical evidence from Greek child language for the finding of Early Morphosyntactic Convergence (Hoekstra & Hyams 1998), i.e. the fact that "children acquire the specifics of the target language at a strikingly early age," a position similar to that advocated by proponents of usage-based theories of language acquisition (see the references quoted in section 1).

This leads us to Dressler's and co-workers' theory of morphological acquisition, in which the 'premorphological' stage (or phase[42]) precedes the stages of protomorphology and (modularized) morphology proper. In spite of its name, the premorphological stage is not devoid of morphological phenomena. Rather, it is characterized by 'extragrammatical' morphological operations, "whose only unifying property is that some principle of morphological grammar is violated" (Dressler & Karpf 1995:101). Examples of such operations which, according to Dressler & Karpf, are characteristic of early child language, are blends, back-formations, surface analogies, truncations, and reduplications (loc. cit.). In addition, the stage of premorphology is characterized by "morphological operations" which are "precursors of later grammati-

[39] Number and case distinctions had also emerged in Mairi's language by 1;9 (Stephany 1997a).
[40] Until the age of 1;10, Christos uses nouns exclusively in their basic form ending in a vowel and corresponding to the accusative singular for masculines (*baba* ACC vs. *babas* NOM 'Daddy') and to the nominative/accusative singular for feminines (*mama* NOM/ACC vs. *mamas* GEN 'Mummy') (Kilani-Schoch et al. 1997).
[41] The fact that the 3rd person singular is used as a kind of basic verb form in all of Christos' early TAM categories (except, of course, the imperative), does not represent counter-evidence to our claim of inflectional awareness, since the formal differences of both stems and endings do have functional values in the child's language and person and number are more peripheral categories of the verb than tense, aspect, and mood.
[42] The terms 'stage' and 'phase' seem to be used interchangeably in their works. At least the pre- and protomorphological sections of morphological development seem to have characteristics of entire stages as well as mere phases of development (see Dressler & Karpf 1995).

cal rules" consisting of rote-learned forms (Bittner et al. 2000:5). In the protomorphological stage, the system of morphological grammar and its subsystems start to develop, without however reaching "the status of modules and submodules" (Dressler & Karpf 1995:104). Bittner et al. (2000:5) characterize protomorphology as "the phase where children start to construct creatively morphological patterns of analogies and first rules." In what follows we will only be concerned with the premorphological and protomorpholoigcal stages and have nothing to say about an eventual modular dissociation of morphology.

Based on the data of the Greek children studied in this paper we will try to find empirical evidence for the theoretical concepts of a premorphological and a protomorphological stage in the development of verbal inflection and for a possible demarcation of these stages. As far as the extragrammatical operations characteristic of the premorphological stage are concerned, there are the isolated blend *bume* (*bum* + *epese*) and a few other pseudoverbs in Christos' speech between 1;8 and 1;10 (see section 4.2.2) and, between 1;11 and 2;2, reduplications such as *kakani* for *na kani* 'MDL.PTL make:NONPAST:3S' '(he/she) should do' and *pepetsume* for *na peksume* 'MDL.PTL play:PFV:NONPAST:1P' 'let's play' are used rather extensively (Christofidou & Kappa 1998). Since they systematically mark the function of modality they are not to be counted among extragrammatical operations, but belong to the protomorphological phase. At least with the referential children studied by Stephany (1985), truncations of verbal endings are relatively rare in the best established TAM categories of the imperfective and imperfective non-past (2% to 7.4% of verb form tokens from 1;8 to 1;11) and somewhat higher in the perfective past for three of four children (5% to 29%). Therefore, in Greek child language studied so far, extramorphological operations seem to play a minor role in early inflectional development. Furthermore, this type of operations represents 'blind alleys' as far as the acquisition of morphological operations of the standard language is concerned, since reduplication, back-formation, or blending do not occur in the inflectional system of Modern Greek. It therefore seems more adequate to describe the above phenomena as morphophonemic so that they will not block further language-specific morphological development. Although it is certainly true that the verb forms occurring in this early period are lexically bound and that paradigmatic contrasts have not yet begun to develop within lemmata, it can be maintained that the occurring forms will easily pattern once the child will recognize that different verbs may form the same bundles of inflectional categories. It is in this sense that rote-learned forms used during the premorphological stage may be termed "precursors of later grammatical rules" (Bittner et al. 2000:5) or rather precursors of later inflectional patterns or regularities. The period of Christos' development between 1;7.10 and 1;10 could therefore be described as premorphological as far as the development of both verbal and nominal inflection is concerned (see also Kilani-Schoch et al. 1997, Christofidou 1998, and Christofidou & Stephany 1997).

As far as the development of Greek verbal inflection is concerned, we consider patterning of inflectional forms to be the most important achievement showing that the children have entered the protomorphological 'stage'.[43] Since this patterning and the evidence for mini-paradigms develops in a lemma-based way, i.e. locally and not across the board, we think of this development as proceeding in phases rather than stages (see section 1). It is at 1;11 that Christos' speech gives evidence of the beginnings of a new phase of development: He starts to use the 1st person singular of the modal verb *thelo* 'to want' (*thelo* 'want:IPFV:NONPAST:1S' vs. *theli* '3S') in the imperfective non-past and of two full verbs in the perfective subjunctive besides the old 3rd person singular. In spite of the fact that there is functional overlap – the 3rd singular continues to be also used for the 1st singular – the new 1st singular is not overexten-

[43] We have nothing to say here about the development of the subdivision into inflectional and derivational morphology in the acquisition of Greek. On word formation in child Greek see Stephany (1997a, b).

ded to the 3rd person. This shows that a grammatical contrast is beginning to emerge. Besides, the 3rd person plural is contrasted to the 3rd singular with the verb *troo* 'to eat' (*troi/trone* 'eat:IPFV:NONPAST:3S/3P'). Another two-member mini-paradigm developing at this age consists of the forms *kani* 'do:NONPAST:3S' and *kakani* (for *na kani* 'MDL.PTL do:NONPAST:3S') formally marking a modal contrast. At this age, Christos also meets both of Pizutto & Caselli's (1994) criteria of productivity for verbal inflection and case marking of nouns sets in (Kilani-Schoch et al. 1997:21). It therefore seems well-founded to assume that the age of 1;11 represents the onset of the protomorphological phase in Christos' development, since the first signs of systematic and contrastive use of some inflectional forms emerge at this time. It is only at 2;1 that Christos meets the more rigid criterion of true mini-paradigms, when five 3-member-paradigms are first observed (see section 4.2.3). If one is interested in tracing the very development of inflectional competence it seems more adequate to say that until the age of 2;1 Christos has made important progress in his inflectional development so that his competence may certainly be termed protomorphological. We would rather not place Christos at the beginning of the protomorphological stage of development since in order to demarcate stages of morphological development one would have to find evidence of 'turning points' in language acquisition. The picture presented by Christos' inflectional development is rather one of smoothly gliding developmental phases, however.

Is the inflectional development of the Greek verb piecemeal or systematic? A sibylline answer to this question would be "both", since morphological development is piecemeal on the one hand and systematic on the other. In view of Christos' and Mairi's early inflectional development of the verb, there is no doubt that it is piecemeal in the sense that not all morphological contrasts occurring in the input are at once acquired. Rather, only certain inflectional forms of certain verbal lemmata are at first taken in by the children, such as the 3rd person singular of the imperfective non-past, the perfective subjunctive, or the perfective past. The initial phase of inflectional development studied in this paper, the premorphological phase, is strongly lexically based. In this phase, acquisition may be called piecemeal because paradigmatic patterns have not yet started to develop within verbal lemmata and the inflectional forms used by the children are only correct as far as the central combinations of TAM categories are concerned but may be overgeneralized with respect to the peripheral categories of person and number. As soon as the kinds of TAM and person/number categories used by the children and the aspectual categories (*aktionsart*) of the verbs occurring with different TAM are taken into consideration, it becomes evident that some systematicity is inherent already in this early period of inflectional acquisition: Neither are the inflectional categories children use randomly selected nor is there much interindividual variation in this respect. The first combinations of TAM and person/number categories occurring in child Greek are the most unmarked and therefore also the most frequent ones in child-directed speech (Stephany 1985; see also Dressler & Karpf 1995:114, Gathercole et al. 1999:161). Once evidence for paradigmatic patterns appears in the protomorphological phase there is no doubt that development has become systematic in the stricter sense of the establishment of paradigmatic contrasts within lemmata and classes of these.

We consider the results of our study of the early inflectional development of the Greek verb as consistent with usage-based models of language acquisition such as those mentioned in the introduction and therefore see no reason for explaining language acquisition on the basis of early innate knowledge of grammatical categories. Also, rather than slicing the process of language acquisition into neat and clearly delimited developmental stages, we think that the following image taken from Gathercole et al. (1999:160f.) captures the characteristics of the process of language acquisition in a more adequate way:

> *A better image would be one of drops of water falling down, to eventually form a river. Each drop adds to the whole, until there is a substantial, critical mass to establish a whole, which both functions as a stable unit and at the same time continually changes as new drops fall and old ones dry up or roll away. At no point is it possible to say that before that point there was no river, while after it there is.*

As the authors mention, this idea is consistent with dynamic, self-organizing systems "capable of generating stable patterns of enormous complexity, without pre-existing programs or prescribed processes" (op. cit. p. 161).[44]

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[44] See Smith & Thelen (1993) and Thelen & Smith (1995).

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APPENDIX

Christos' two-member paradigms from 1;11 to 2;01

Age	Lemma	Gloss	Form	Category
1;11	kano	do	kani	NONPAST:3S
			kakani(=na kani)	SUBJ:3S
	pefto	fall	epetse(=epese)	PFV:PAST:3S
			petane(=pesane)	PFV:PAST:3P
	pezo	play	petun(=pezun)	IPF:NONPAST:3P
			a peciome (na peksume)	PFV:SUBJ:3P
	thelo	want	thelo	IPF:NONPAST:1S
			(th)eli	IPF:NONPAST:3S
	troo	eat	troi	IPF:NONPAST:3S
			trone	IPF:NONPAST:3P
2;0	kano	do	kani	NONPAST3S
			kakani(=na kani)	SUBJ:3S
	kathome	sit	katse	PFV:IMP:2S
			kacici(=na kathisi)	PFV:SUBJ:3S
	odhigho	drive	(o)dhighai	IPF:NONPAST:3S
			(o)dhighu(n)	IPF:NONPAST:3P
	pao	go	pi(gh)e	PFV:PAST:3S
			ela	PFV:IMP:2S
	pezo	play	petun (=pezun)	IPF:NONPAST:3P
			a patume (=na peksume)	PFV:SUBJ:3P
	thelo	want	thelo	IPF:NONPAST:1S
			theli	IPF:NONPAST:3S
2;1	ferno	bring	efere	PFV:PAST:1S
			ta feghi (=tha feri)	PFV:FUT:3S
	fevgho	leave	efighe	PFV:PAST:3S
			fighe	PFV:IMP:2S
	odhigho	drive	odhighai	IPF:NONPAST:3S
			dhogho (=odhigho)	IPF:NONPAST:1S
	pefto	fall	epese	PFV:PAST:3S
			t(h)a pesi	PFV:FUT:3S
	vazo	put	na valo	PFV:SUBJ:1S
			na vali	PFV:SUBJ:3S
	xalao	destroy/ spoil	xalai	IPF:NONPAST:3S
			xalace (=xalase)	PFV:PAST:3S

Christos' first three-member paradigms at 2;1

Age	Lemma	Gloss	Form	Category
2;1	pao	go	pai	IPF:NONPAST:3S
			(na) pame	PFV:SUBJ:1P
			tha pao	PFV:FUT:1S
	pezo	play	na peciume (=na pek-sume)	PFV:SUBJ:1P
			a pecio (=na pekso)	PFV:SUBJ:1S
			a peci (=na peksi)	PFV:SUBJ:3S
	perno	take	palo (=na paro)	PFV:SUBJ:1S
			na pali =(na pari)	PFV:SUBJ:3S
			pile (=pire)	PFV:PAST:3S
	pino	drink	na pii	PFV:SUBJ:3S
			na pini	IPF:SUBJ:3S
			ipse (=ipje)	PFV:PAST:3S
	troo	eat	na/t(ha) fai	PFV:SUBJ:3S
			(n)a/t(h)a fame	PFV:SUBJ:1P
			tatoi (=na troi)	IPF:SUBJ:3S

Christos' first four-member paradigm at 2;1

Age	Lemma	Gloss	Form	Category
2;1	kano	do	kano	NONPAST:1S
			kani	NONPAST:3S
			ekana	PAST:1S
			ekane	PAST:3S