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SELECTING A THEORETICAL FRAMEWORK FITTING ACQUISITION DATA IS NO EASY MATTER

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Abstract

The question addressed in this paper is how to select an appropriate theoretical framework for describing acquisition data so that the description may contribute to an explanation of the acquisition process. The major current theoretical approaches to language acquisition to be taken into account are the functionalist, usage-based approach founded in cognitive linguistics and the nativist, generative Universal Grammar approach whose basic assumptions concerning human language are diametrically opposed to each other so that their consequences for theories of language acquisition differ in fundamental ways. In comparing the two approaches to language acquisition it will be argued that a constructivist, usage-based approach seems to be more appropriate than a nativist, generativist theoretical framework for explaining the empirical results gained so far in the domain of inflectional development in Greek child language acquisition.

1. Introduction: What is science?

As pointed out by Ströker (1987: 86-87) and other philosophers of science, there is no 'pure' experience, since experience and its scientific interpretation require a theoretical framework in which such an interpretation can be achieved. A precondition for interpreting empirical data is therefore to ask questions. These must be based on the state of the art in a given scientific domain and will lead to conjectures or hypotheses to be checked empirically. Hypotheses stay valid as long as they have not been empirically refuted. If refuted, new hypotheses must be advanced. The course of science may therefore be considered as a series of conjectures and refutations (Popper 1962). Hypotheses or entire theories cannot be verified, but only falsified. Therefore, it is doubt, rather than truth, which is at the center of scientific endeavor. Most importantly, the method of falsification serves to find and test more efficient scientific theories (Popper 1934/1971) and therefore has a constructive rather than a destructive function.

The two major currently competing theoretical approaches to child language acquisition are the nativist, generativist approach based on Chomsky's ideas on Universal Grammar and the non-nativist, constructivist, usage-based approach. In section 2 of the paper, these approaches will be briefly compared and in section 3, the comparison will be narrowed down to the single- vs. double-route processing model of inflectional acquisition. In section 4, evidence for the single-route model in the acquisition of Greek nominal and verbal inflection will be provided. We hope to be able to demonstrate that the Usage-Based theoretical framework is not only apt to describe the acquisition data, but that it significantly contributes to our understanding of the acquisitional process.

2. Generativist vs. constructivist approaches to child language acquisition

As far as falsifiability is concerned, it is currently not clear whether the generativist or the constructivist theoretical approach to language acquisition meets this criterion since it has not been discussed in either of the two theories (Tomasello 2004; Ambridge & Lieven 2011: 376).

A precondition for being refutable is that a hypothesis or theory be precisely formulated. This is not the case for the Universal Grammar hypothesis, since more than seven different proposals of UG are found in the literature (Tomasello 2004: 642-643; see also Tomasello 2010: 313). Generativists are not

usually concerned with the falsifiability of the UG hypothesis and simply assume that UG exists or they try "to provide confirmatory evidence for it" (Tomasello 2004: 643). A more fundamental problem with the UG hypothesis is that it is not clear what kind of evidence could refute it (Ambridge & Lieven 2011).

The UG hypothesis has grown more and more abstract in the history of Chomsky's formal approach to language (Tomasello 2010: 312). According to Chomsky's more recent publications (Hauser, Chomsky & Fitch 2002: 1569 and Chomsky 2007), the two specifically linguistic computational principles which seem to have survived are recursion and merge. While considering recursion as "the only uniquely human component of the faculty of language," Hauser, Chomsky & Fitch (2002: 1569) admit "that FLN [faculty of language in the narrow sense, U.S.] may have evolved for reasons other than language, [and that] hence comparative studies might look for evidence of such communication (for example, number, navigation, and social relations)."

Tomasello (2010) considers recursivity as a fundamental principle in the evolution of specifically human cooperative communication, which he shows to be more complex than the intentional communication also found in great apes, the difference being that, in human cooperative communication, there is not only individual intentionality, but in addition shared intentionality. According to Tomasello (2010: 321), "the basic cognitive skill of shared intentionality is recursive mindreading" which "generates joint goals and joint attention." Recursive mindreading may be paraphrased as "I know that you know that I know that you know" etc. For successful intentional communication, "the communicator needs some kind of cognitive model of how the recipient perceives the signal and acts as a result" (Tomasello 2010: 45).

As far as the evolutionary and cultural-historical processes underlying the development of human cooperative communication and the differentiation of about 6,000 different conventional languages are concerned, Tomasello's (2010: 11) proposal "basically turns the Chomskian proposal on its head, as the most fundamental aspects of human communication are seen as biological adaptations for cooperation and social interaction in general, whereas the more purely linguistic, including grammatical, dimensions of language are culturally constructed and passed along by individual linguistic communities."

This view is, of course, also diametrically opposed to Chomsky's present position. In a lecture given as an Albertus-Magnus-Professor at the University of Cologne in June 2011, Chomsky claimed that "the question whether language exists is basically whether UG exists." Such a claim seems immune to refutation.

If it seems impossible at present to refute the UG hypothesis, the question arises whether supporting empirical evidence can be found. This is what generativists have been and are being concerned with. Thus, in example (1), the question is about whether the eagle can swim and not whether it can fly. This type of example goes back to the 1980ies when generativists claimed that "structure dependence is the 'parade case' of an innate constraint" (Ambridge & Lieven 2011: 300; see also Chomsky 1980).

(1)   Can the eagle that can fly swim? (from Chomsky 2011)

Most importantly, the argument of structure dependence rests on the hypothesis that "questions are generated by movement" (Ambridge & Lieven 2011: 302). Example (1) is thus taken to be derived from example (2a) by taking its hierarchical rather than its linear structure into consideration. Moving the first occurrence of the modal auxiliary *can* to the front would, of course, result in the ungrammatical structure (2c).

(2)   (a) [The eagle that can fly] can swim.
        (b) Can [the eagle that can fly] swim?
        (c) *Can the eagle that fly can swim?

As early as in 1980, Chomsky claimed that in spite of the fact that children almost never hear relevant evidence such as example (2b), they do not produce structure-dependence errors (example 2c). He concluded from this that structure dependence must be innate.

As demonstrated by Ambridge & Lieven (2011: 300-302), an innate constraint is unnecessary to explain children's acquisition of *yes/no* questions containing relative clauses. According to the constructivist account, children can construct *yes/no* questions with an embedded relative clause on the basis of constructional templates or schemas such as (3) in which either a simple NP without a relative clause (e.g. *the eagle*) or a complex NP containing a relative clause (e.g. *the eagle that can fly*) may be inserted into the NP slot.

(3)   [MOD.AUX] [NP] [V]

The main difference between the generativist and the constructivist approach to the acquisition of *yes/no* questions is that the first rests on the hypothesis that "questions are generated by movement" while the second does not (Ambridge & Lieven 2011: 302). According to the constructivist account, "utterances that are not complete complex *yes/no* questions can still provide evidence with regard to the form of this structure" (Ambridge & Lieven 2011: 302). Thus, the simple NP *the boy* and the complex NP *the boy who is smoking* share the same distribution since the complex NP can be substituted for the simple one in the slot in (4).[1]

(4)   _____ is crazy. (from Ambridge & Lieven 2011: 300)

If examples such as this one can be multiplied and no empirical evidence can be found for the UG hypothesis, the latter hypothesis must be abandoned on the account of the scientific principles that the data should "constrain the theory" (Karmiloff & Karmiloff-Smith 2001: 142) or that "a theory should make as few assumptions as are necessary to understand the data" (Ambridge & Lieven 2011: 376).

Tomasello (2010: 313) justifies his proposal of abandoning the UG hypothesis by arguing for the learnability of language from the input and accordingly refutes the generativist poverty-of-the-stimulus argument. The poverty-of-the-stimulus argument claims that there is an infinite number of possible hypotheses which are consistent with the child's linguistic experience, but are linguistically incorrect, so that categories, rules and principles must be innate (Ambridge & Lieven 2011: 371).

What is the theoretical status of principles, rules, and categories? As mentioned above, in Chomsky's most recent versions of the UG hypothesis, principles have been reduced to the computational operations of recursion and merge. As pointed out by Tomasello (2010), recursion is not specifically linguistic, but a basic cognitive skill of shared intentionality, namely recursive mindreading. The operation "merge" could eventually be compared to Bybee's "chunking", one of a few domain-general, i.e. not specifically linguistic, cognitive processes relevant for studying language. According to Bybee (2010: 7), "chunking is the process by which sequences of units that are used together cohere to form more complex units."

In the generativist framework, linguistic rules are very general "contentless, algebraic" operations for combining linguistic units (Tomasello 2010: 275). Such symbolic rules describe highly productive morphology on the one hand and syntactic generalizations on the other (Bybee 2010: 64, 73). In the constructivist approach, grammatical knowledge, rather than being innate, is taken to emerge "from the categorization of experienced utterances" (Bybee 2010: 78) resulting in a structured list of constructions, i.e. more or less general patterns of usage.

While the generativist account of language structure stresses generality, the constructivist account points to its gradient character. This difference becomes especially clear in the approach to morphology in both accounts. The generativist approach is forced to assume two distinct processing types, namely analogical processes for 'irregular' lexical patterns, but symbolic processing in the rules component of the lexicon for 'regular' patterns (see Bybee 2010: 73), whereas the constructivist approach argues "for a gradation between unproductive, specific patterns and the most productive, general patterns" (Bybee 2010: 73).

Constructions reach from most abstract or schematic to most concrete or specific ones and represent the most important category of the constructivist approach (Ambridge & Lieven 2011: 127). Tomasello (2010: 296) defines constructions as "essentially prefabricated, meaning-bearing structures for use in certain recurrent communicative situations." Bybee (2010: 76) stresses that they are "direct pairings of form with meaning […], often having schematic positions that range over a number of lexical items." Constructions are therefore directly or indirectly item-based. They may be quite concrete and consist of particular words or phrases (examples 5a) or they may involve abstract patterns of word types (schema 5b). Schemas such as the one for constructing certain English *yes/no* questions represent generalizations constructed on the basis of a number of exemplars. Finally, constructions may consist of a mixture of constant and variable patterns implemented by a number of concrete exemplars (example 5c).[2]

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[1] According to Dąbrowska & Lieven (2005), hierarchical structure is created by "superimposition", i.e. by elaborating a schematic slot in a construction (see Bybee 2010: 65).
[2] See also Ambridge & Lieven (2011: 126).

(5)   (a)   *ti kanis?* 'how are you?' *xronia pola!* '(may you live) many years!'

          (b)   [MOD.AUX] [NP] [V]

                    Exemplars: *can eagles swim? will the boy win? must Mary leave? should the child who left home return?* etc.

          (c)   *θelo na* V

                    Exemplars: *θelo na fiɣo* 'I want to leave', *θelo na kimiθo* 'I want to sleep', *θelo na fao* 'I want to eat', *θelo na δiavaso* 'I want to read' etc.

While admitting that patterns for the English auxiliary or the English regular Past Tense formation might suggest abstractions in the form of symbolic rules, Bybee (2010: 103) points out that "the availability of a pattern as a model for the analogical formation of novel exemplars of the pattern can provide a much more concrete explanation for generality without resorting to abstractness."

The fact that, in the constructivist view, even abstract syntactic patterns are taken to be based on classes of similar exemplars of meaning-bearing constructions rather than on contentless algebraic rules, has immediate consequences for the learnability of syntactic structures. While concrete constructions such as those in (5a) can be learned by imitation, abstract constructions must be reconstructed by the child. According to Tomasello (2010: 298), this means that children must recognize patterns of use "across individual learning experiences with different exemplars of the construction", i.e. they must be able to categorize linguistic experiences. It has been demonstrated that not only 7- to 8-month-old prelinguistic human infants "are able to find patterns in sequentially presented auditory stimuli" (Tomasello 2003: 28), but that this capacity even extends to nonhuman primates when these are presented with tone sequences or visual sequences (Tomasello 2003: 30). In language acquisition, pattern-finding skills must be used not only on the formal but also on the functional side of linguistic utterances (Tomasello 2003: 30-31).

As pointed out by Bybee (2010: 7), "memory for linguistic forms is represented in exemplars, which are built up from tokens of language experience that are deemed to be identical." Thus, language learners "map similar tokens onto one another to establish exemplars and these exemplars group together to form categories that represent both the fixed and schematic slots in constructions" (Bybee 2010: 26). Consequently, constructions are "surface based and can emerge from the categorization of experienced utterances" (Bybee 2010: 78).

The emergence of constructions is illustrated in (6). Tokens such as (6a) are classified as exemplars such as (6b) resulting in the concrete constructions (6c) so that, finally, the rather abstract construction (6d) emerges. It is important to note that, in contrast to a generative rule, the schema (6d) is indirectly item-based.

(6)   (a)   tokens:

                    θelo na fiɣo, θelo na fiɣo, θelo na fiɣo, etc.
                    'I want to leave'
                    prepi na fiɣo, prepi na kimiθo, prepi na fao, prepi na δiavaso, etc.
                    'I must leave/sleep/eat/read'
                    θelo na kimiθo, θelo na fao, θelo na δiavaso, etc.
                    'I want to sleep/eat/read'

      (b)   exemplars:

                    θelo na fiɣo, θelo na kimiθo, θelo na fao, θelo na δiavaso
                    prepi na fiɣo, prepi na kimiθo, prepi na fao, prepi na δiavaso

      (c)   concrete constructions:

                    θelo/prepi na fiɣo/kimiθo/fao/δiavaso

      (d)   more abstract construction:
                    MOD.V *na* V

It has been found that, in the acquisition of constructions, children do indeed start out from very specific points storing experienced exemplars and gradually expanding on these to arrive at more general patterns.[3] As pointed out by Bybee (2010: 78), the acquisition process thus consists in the children's "process of formulating partially schematic constructions on the basis of the specific utterances they have mastered and can use" (Bybee 2010: 78).

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[3] Tomasello (1992; 2003), Lieven et al. (1997), Dąbrowska & Lieven (2005).

In the usage-based or constructivist model of language, relations between linguistic forms can be formed on various levels, such as the word, phrase or sentence level (Bybee 2010: 22). As far as morphological relations on the word-level are concerned, these "are emergent from relations formed among words due to their semantic and phonetic similarity" (Bybee 2010: 22). Examples (7) and (8) illustrate such morphological relations from Greek verbal and nominal inflection.

(7) aγora<u>sa</u>   PAST:PFV:1S   'I bought/heard/read/wrote/painted'
      aku<u>sa</u>   PAST:PFV:1S
        δiava<u>sa</u>   PAST:PFV:1S
          eγrap<u>sa</u>   PAST:PFV:1S
            zoγrafi<u>sa</u>   PAST:PFV:1S

(8) anθrop<u>os</u>   NOM:SG   'human being/president/Spiros/teacher/list'
      proeδr<u>os</u>   NOM:SG
        Spir<u>os</u>   NOM:SG
          δaskal<u>os</u>   NOM:SG
            kataloγ<u>os</u>   NOM:SG

In both sets of examples, the underlined parts of the forms as well as their grammatical functions are identical so that these word forms become related in a common morphological pattern or schema.

In contrast to the structuralist (and generativist) analytical approach, which considers complex morphological forms to be constructed from a base with units added to the base by a symbolic rule such as (9), the usage-based approach is goal-directed and considers complex forms as wholes or *gestalts* whose internal structure is discovered by relating them to similar morphological forms with similar grammatical function in the language. Packages of such similar form-function pairs constitute schemas and guarantee productivity.

(9) Engl. V+*ed* → V$_{past}$

As pointed out by Bybee (2010: 23) "one advantage of this approach to morphological analysis is that it does not require that a word be exhaustively analyzed into morphemes." This especially applies to the description of fusional languages such as Greek where the segmentation of forms may lead to problems. As noted by Matthews (1991), the question whether a form such as *anθropos* should be segmented as in (10a) or (10b) depends on the forms with which it is compared.

(10) (a) *anθrop-os* vs. *anθrop-u/anθrop-i/anθrop-e*
       (b) *anθropo-s* vs. *anθropo-Ø/anθropo-n*

In a morphologically rich language like Modern Greek, a given inflectional form can enter into several networks of associations as exemplified by examples (11a) and (11b). As will be shown in section 4, the simultaneous membership of forms in the network of nouns ending in –*os* and in that of nouns ending in -V*s* may lead to a wrong classification of nouns in Greek child language acquisition.

(11) (a)   anθrop<u>os</u>   NOM:SG   (b)   anθrop<u>os</u>   NOM:SG
             proeδros   NOM:SG   adras   NOM:SG
               Spiros   NOM:SG   papus   NOM:SG
                 δaskalos   NOM:SG   kaθijitis   NOM:SG
                   kataloγos   NOM:SG   kafes   NOM:SG

In order to be able to refute the hypotheses of the generativist or the constructivist approach considerable further work is needed. Ambridge & Lieven (2011: 374) note that if the constructivist account is to be falsifiable, "the processes by which a child moves from more lexically specific to fully abstract constructions" must be addressed in more detail (but see Tomasello 2003). Another issue which must be dealt with is "how children learn to integrate knowledge from different constructions" (Ambridge & Lieven 2011: 374).

Before discussing empirical evidence for the acquisition of Greek nominal and verbal inflection, the two major current theoretical models of the acquisition of inflectional morphology must be considered.

3. The single-route vs. double-route processing model of the acquisition of inflection

While constructivists propose a single-route processing model of the acquisition of inflection, the dual-route model is defended by generativists. As mentioned above, the generativist approach assumes two distinct morphological processing types, analogical processes for 'irregular' patterns and symbolic rules for 'regular' ones (Bybee 2010: 73). In contrast to this, in the constructivist approach it is accepted that analogical processing also constitutes the basis for creating novel utterances. Productivity is therefore accounted for by analogy rather than by the application of rules (Bybee 2010: 75). Accordingly, constructivists assume that analogy, which operates across stored exemplars of inflected forms (Ambridge & Lieven 2011: 169), is sufficient to account for the acquisition and processing of regular as well as irregular inflection.

The most important difference between the inflectional schemas of the constructivist approach and the general inflectional rules of the generativist theory is that schemas are organizational patterns of categorized items, while symbolic rules act on variables such as Noun or Verb and "are postulated to exist independently of the forms to which they apply" (Ambridge & Lieven 2011: 169; see also Tomasello 2003: 237). Thus, the ideal inflectional rule is a general, 'default' rule applying to any member of a given part of speech, with the exception of irregular forms (Ambridge & Lieven 2011: 169). In contrast, inflectional schemas "have no existence independent of the lexical units from which they emerge" (Bybee 2010: 74).

Positing a strict division between regular and irregular inflectional processes poses a major empirical problem for linguistic typology since there are languages like Modern Greek which possess several inflectional patterns in nominal as well as verbal morphology, all reaching from more productive to less productive or even exceptional. Such languages are more adequately described by a continuum of gradient productivity than by a sharp division between productive, 'regular' and unproductive, 'irregular' forms.

The two theoretical conceptions of inflectional morphology also lead to important differences in their account of acquisition. According to the generative dual-route model, irregular forms, such as the English past tense forms *went*, *saw*, *threw*, are stored in memory in pairs with their stem forms (examples 12a), whereas regular past tense forms, such as *played*, *walked*, *hinted*, are generated by the regular past tense formation rule in (12b).

(12)   (a)   *go/went*, *see/saw*, *throw/threw*, etc.
         (b)   *play*, *walk*, *hint*, etc.

         $V + ed \rightarrow V_{PAST}$

         played, *walked*, *hinted*, etc.

Regular and irregular inflectional forms are thus taken to be produced by different mechanisms or via different routes (Ambridge & Lieven 2011: 170), namely retrieval from memory and generation by rule, respectively. Generativists assume the distinction between the lexicon, in which words are stored, and the grammar, in which rules operate, to be innate (Ambridge & Lieven 2011: 170). Accordingly, the regular-route mechanism is also taken to be innate. As pointed out by Ambridge & Lieven (2011: 170), this leads to the most problematic assumption that this mechanism "lies dormant for morphological systems and languages that do not have a regular system," a hypothesis which is theory-driven and cannot in principle be tested empirically.

By contrast, the constructivist single-route model does not assume innate grammatical categories or a lexicon vs. grammar division. Regular as well as irregular forms are taken to be stored in memory and the main force organizing the associate network of grammatical forms is formal and semantic analogy. There is thus no default rule and also "no need for an extra set of blocking mechanisms to keep these abstract rules from applying too widely" (Tomasello 2003: 239). Rather, English past tense formation depends on memory storage and, in case of rare verbs, on input frequency and the corresponding availability of schemas (Ambridge & Lieven 2011: 171).

Although the constructivist schema in (13) may at first glance look similar to the generative rule in (12b), there are two important differences: 1. The rule in (12b) is postulated to exist independently of the forms to which it applies, while the schema (13) remains tied to concrete inflectional forms such as those given in (14) from which it has emerged in language acquisition. 2. The rule in (12b) is source-directed and generates regular English Past forms by adding the suffix *–ed* to the verb stem, while the

schema (13) is goal-directed and describes the form and function of regular Past Tense forms of English verbs.

(13)   [[VERB] d] Past Tense (from Bybee 2001: 22)

(14)   English regular past forms (from Bybee 2010: 23)

pleɪd   PAST
  spɪld   PAST
    spɔɪld   PAST
        bæ̃nd   PAST
          ræ̃md   PAST

While, in the constructivist approach, type and token frequency of inflectional forms play a dominant role in acquisition, in the generativist approach, they do not (Tomasello 2003: 238). Type and token frequency are important for productivity and entrenchment, respectively. The productivity of a schema is a function of "its type frequency in terms of the number of different lexemes with which it has been used" (Tomasello 2003: 238). The more often a given form is experienced or used the more firmly it will be established or "entrenched" in memory. In the generative approach, only the acquisition of irregulars is sensitive to input frequency and phonological and semantic similarity (Tomasello 2003: 238).

Since the single-processing model "can handle the same range of data that is handled in the dual-processing model by two mechanisms" Bybee (2010: 74) puts "the burden of proof" on "those who propose two processing mechanisms rather than one." Adopting her point of view, I will therefore content myself with presenting evidence for the single-route model in the acquisition of Greek nominal and verbal inflection.

4. Evidence for the single-route model in the acquisition of Greek nominal and verbal inflection

The empirical evidence used for exemplifying the acquisition of Greek morphology comes from the naturally occurring speech of six monolingual Greek children observed between the last part of their second and the last part of their third year or beyond. The data are found in the computerized part of the Corpus Stephany (3 girls, 1 boy) entered in the CHILDES Data Base (CHILDES Project, Carnegie Mellon University, Pittsburgh, NJ, USA, directed by Brian MacWhinney) and in the corpora gathered by Anastasia Christofidou (boy Christos) and by Demetra Katis (girl Anna).

As mentioned above, a two-fold distinction between fully productive 'regular' and unproductive 'irregular' inflectional structure is inappropriate for the description of Modern Greek inflectional morphology, where several inflectional patterns exhibiting gradient productivity compete in each of the major parts of speech. Furthermore, it is unlikely that children faced with the acquisition of such a rich and complex inflectional system could possibly be able to 'link' hypothesized innate lexical default rules to any set of inflected forms. Rather, they will try to come to grips with experienced inflectional items by storing both their form and meaning in memory and gradually systematizing them by grouping formally and semantically similar ones. In this way, morphological development will start from specific lexical items proceeding to item-bound patterns and finally to more abstract schemas comprising larger sets of items.

Detailed analyses of observational data of Greek language acquisition have shown that the categories of Greek inflection and derivation develop piecemeal rather than across-the-board (Stephany 1985, 1997; Stephany & Christofidou 2009; Christofidou & Stephany 2003; Thomadaki & Stephany 2007). No evidence for general rules concerning plural or case formation in the noun or the inflectional categories of mood, aspect, tense, voice, person and number in the verb has been found.

The most important result in the morphologically less rich domain of Greek noun inflection is that number and case distinctions do not develop in unison and across-the-board for all nouns. Thus, in Mairi's speech from 1;9 to 2;9, number and case develop separately within certain gender classes (Fig. 1). While number distinctions first emerge and develop in neuter nouns, the first case distinction is limited to masculine nouns. A similar pattern is found with Christos (Stephany & Christofidou 2009). There is thus neither a general number nor a general case contrast to be found in the early speech of the two children studied by Stephany & Christofidou (2009). The authors conclude that as long as children only oppose singular and plural forms of neuter nouns, but not of masculine ones, "we do not have

evidence to affirm that they have generalized the number contrast to all nouns" (Stephany & Christofidou 2009: 256). A similar conclusion holds for case distinctions.
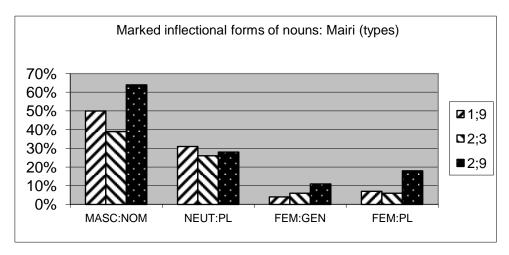
Marked inflectional forms of nouns: Mairi (types)

Figure 1 Inflectional development of the Greek noun
(from Stephany & Christofidou 2009: 230)

The inflectional development of diminutives carrying the three most frequently used suffixes –*aki*, -*ula* or –*itsa* in the extensive corpus of Anna's speech between 1;8 and 3;0 supports the above findings. Tracing the inflectional development of these diminutives Thomadaki & Stephany (2007: 110-112) found that number distinctions emerge before case distinctions and are at first limited to neuter diminutives ending in –*aki*. Within this class of diminutives, the development of number distinctions is item-based. While the noun *peδaki* 'child:DIM' is used in both the singular and plural at 1;8 when it first appears, seven other diminutives ending in –*aki* first emerge in either their singular or plural form and are found in the other number only one to five months later. Since, in Standard Greek, the genitive is not used with diminutives ending in –*aki* (Thomadaki 2008), no case distinction develops in this class of diminutives.

The development of number and case distinctions proceeds differently in the two classes of feminine diminutives ending in –*ula* and –*itsa*. While the unmarked nominative-accusative singular form of diminutives ending in –*ula* is contrasted with both the marked genitive singular and the nominative-accusative plural already by 1;11, the first genitive singular forms of diminutives ending in –*itsa* only occur at 2;9 (Thomadaki & Stephany 2007: 111, table 9).

Further evidence for the development of nominal inflection as "a gradual process of spreading systematicity" (Stephany 1997: 324) comes from the analysis of the early fine-grained observational data of the boy Christos (Stephany & Christofidou 2009). Marked nominative singular forms of masculine nouns ending in –*s* are restricted to certain animate masculine nouns when they first appear shortly before the turn to the second year. Use of these marked forms is subsequently extended to nouns referring to male beings more generally and finally, two months after their first appearance, to inanimate masculine nouns. The overextension **Plutos*, which is found less than two weeks after the first occurrence of a marked masculine, cannot be taken as evidence for the development of a general nominative marking rule for masculine nouns since more general marking of this noun class still has to wait for at least another six weeks. Rather, the non-standard form **Plutos* must be explained as an analogy to form pairs such as *Christos/Christo* 'Christos' or *papus/papu* 'grandfather'.

Our data also give evidence of the role of personal linguistic experience in inflectional development. Different linguistic experience can explain the variation in the development of nominative-singular marking of masculine nouns of the boys Christos and Spiros compared with the girl Mairi. While the boys rely more strongly on synthetic marking, Mairi in many cases combines the nominative form of the definite article with the unmarked form of the noun. This difference can be attributed to the fact that both Christos and Spiros, but not Mairi, must have experienced many examples of the nominative-accusative contrast of their respective first names belonging to the class of masculine nouns (*o Christos/Spiros* vs. *ton Christo/Spiro* but *i Mairi* vs. *ti Mairi*) (Stephany & Christofidou 2009: 240).

There is evidence for early pattern formation in Christos' data not only in the overgeneralization of the –*s* marker, but also in the way the boy handles the *dhiptota* and *triptota* subclasses of masculine nouns distinguishing two versus three singular case forms. In contrast to the other children studied by Stephany (1997) and Stephany and Christofidou (2009: 246), Christos at first generalizes the *dhiptota*

pattern to all masculine nouns by constructing a single inflectional pattern for all of them. It contains a simple contrast between the marked nominative singular and an unmarked oblique case form covering the accusative as well as the genitive singular of Standard Greek. In his early speech, Christos thus seems to have based pattern formation on examples such as the marked nominative singular forms given in (15a) contrasted with the unmarked oblique forms in (15b). It is only by 2;3.18 that Christos starts to distinguish between two declensional subclasses of masculine nouns by marking animate nouns ending in *–os* by *–u* in the genitive singular (Stephany & Christofidou 2009: 246).

(15)   (a)   Christos̲   NOM:SG   (b)   Christo   *OBL:SG
              adra̲s̲   NOM:SG   adra   OBL:SG
              papu̲s̲   NOM:SG   papu   OBL:SG
              kaθijiti̲s̲   NOM:SG   kaθijiti   OBL:SG
              kafe̲s̲   NOM:SG   kafe   OBL:SG

The fact that inflectional development is gradual rather than a matter of all or nothing is also substantiated by the observation that it may proceed at a different pace in distinct inflectional categories. This may concern onset and speed of verb inflection as compared to noun inflection. Thus, in the data of one girl at 1;11, only 1% of noun tokens occur in an inflectionally marked form such as the plural (Stephany & Christofidou 2009: 254) while, at the same age, she already distinguishes between three moods, two aspects, two tenses and both the first and third person singular and plural of the verb (Stephany & Christofidou 2009: 255; see also Stephany 1985 and 1997).

Due to the rich inflectional morphology of the Greek verb, it is to be expected that massive evidence for the piecemeal character of the emergence of inflectional categories will be found in the development of this grammatical category. A detailed study of verb forms used by Christos at 1;11 and 2;0 shows the lexeme-bound development of the categories of tense, aspect, and mood as well as person and number (Table 1).

Verbs	*Inflectional categories*							
	IPFV: NONPAST: 3S	**IPFV: NONPAST: 3P**	**IPFV: NONPAST: 1S**	**PFV: PAST: 3S**	**PFV: PAST: 3P**	**PFV: SUBJ: 3S**	**PFV: SUBJ: 1P**	**IMP: 2S**
kano 'do'	✓					✓		
θelo 'want'	✓		✓					
troo 'eat'	✓	✓						
pezo 'play'		✓					✓	
kaθome 'sit'						✓		✓
pefto 'fall'				✓	✓			

Table 1 Christos' verb forms at 1;11 and 2;0 (adapted from Christofidou & Stephany 2003:119)

In each of these two months, five verbs are used in two forms each. In spite of the fact that three specific combinations of grammatical categories occur with two or even three different verbs, the specific contrasts of forms documented in the boy's speech differ from verb to verb. Although it might be argued that this picture is partially due to lack of data, it would seem presumptuous to claim that the child has generally mastered all of the grammatical categories documented by a single verb or at most three of them. On the other hand, Table (1) clearly shows that verbal inflection has begun to develop since, at 1;11, the boy uses six of his 20 verbs in at least two different forms serving different functions. The same holds for the 23 verbs occurring a month later.

A comparison of Christos' and Mairi's development of verbal inflection towards the end of their second year shows that there may be quite important individual variation in inflectional development. At 1;9, Mairi uses 64 verbs, nearly three times as many as Christos. More than half of these occur in two to seven functionally distinguished forms (Christofidou & Stephany 2003: 110). In spite of this, the productivity of given bundles of inflectional categories varies considerably. Thus, in the imperfective non-past ('present'), the third person singular is used with 19 different verbs while the first person occurs with merely 8 verbs. In the perfective subjunctive, on the other hand, the relation between third and first person singular is reversed: the first person is used with 14 verbs, but the third person with only 5. The first person plural points in the same direction: While it is used with 12 different verbs in the perfective subjunctive, it only occurs with 2 verbs in the imperfective non-past. At this point in development, Mairi accordingly overextends the third person singular to refer to the speaker much more frequently in the indicative than in the subjunctive, in which the first person is more firmly established (Christofidou & Stephany 2003: 107). Person-number categories thus develop differently in

different tense-aspect-mood categories. This is more evidence for their piecemeal (although not necessarily unsystematic) inflectional acquisition.

The same kind of evidence is found in the development of aspect and tense in Greek child language acquisition. Rather than being documented with all or at least most verbs occurring in the children's speech, specific combinations of aspect and tense depend on input frequency as well as the aspectual character or *aktionsart* of verbs (see Stephany 1985, 1997; Christofidou & Stephany 2003: 118). Thus, durative, atelic verbs such as *pezo* 'to play' or *δiavazo* 'to read' are most likely to be used in the imperfective non-past, while punctual, telic verbs like *pefto* 'to fall' or *xalao* 'to break' most frequently occur in the perfective subjunctive or the perfective past (Stephany 1985: 116-117).

The kind of evidence which is usually considered to be most convincing for children's systematic or rule-like linguistic behavior are systematic errors such as the overgeneralization of inflectional patterns. This has even led some psycholinguistics to postulating a stage of overgeneralization or regularization in the acquisition of English (Ervin 1964). As far as the inflectional characteristics of early child Greek until the age of 3;0 or even 4;6 are concerned, there is no evidence for U-shaped learning, let alone a stage of overgeneralization or regularization (Stephany 1989; 1997: 323-324). The relatively few overgeneralizations which do occur are based on several inflectional models rather than a single one (Stephany 1997: 324) and are therefore better explained by analogy than general rules.

A few examples of form shift from rarer to more common inflectional patterns are found with both nouns and verbs. Rare neuter nouns ending in *–os* such as *to δasos* 'the wood' in (16a) may be reinterpreted as belonging to the common neuter class ending in *–o* so that their plural is formed according to the *–o/-a* pattern resulting in non-standard *ta *δasa* instead of *ta δasi* in a child's spontaneous speech at 4;6 (Stephany 1997: 222). At 2;5, another girl interprets the form *maimu* 'monkey' in (16b) as the oblique singular of a masculine noun in analogy to nouns such as *papus/papu* 'grandfather' and forms the non-standard nominative **maimus* on this basis (Stephany 1997: 223).

(16)　　(a)　　4;6 *to δasos* 'the wood'　　→　　*ta *δasa* instead of *ta δasi* 'the woods'
　　　　(b)　　2;5 *maimu* 'monkey:OBL:SG'　→　　**o maimus* NOM:SG for *i maimu*

Overgeneralization errors in verbal inflection are sometimes based on the more frequent verb stem. Due to "children's extensive use of the subjunctive mood to express deontic meanings, perfective stems of dynamic verbs (especially telic ones) are more frequent and accordingly better known than imperfective ones" (Stephany 1997: 246). This may lead to an analogical derivation of imperfective stems from perfective ones or even to a shift of verbs from the less common second conjugation to the more common first conjugation. An example is the non-standard imperfective non-past form **xaláδis* 'you break' for standard *xalás* found in the spontaneous data of a child at 2;3 (example 17). The child's form **xaláδis* is based on the frequently occurring perfective subjunctive *xalásis* in *θa xalásis* (FUT.PTL break:PFV:NONPAST:2S) 'you will break' or *na min xalásis* (MOD.PTL MOD.NEG break:PFV:NONPAST:2S) 'you must not break' so that the pair **xaláδis/xalásis* represents an analogy to first conjugation form pairs such as *δiavazis/δiavasis* 'you read:IPFV/PFV:NONPAST:2S' or *zoγrafizis/zoγrafisis* 'you paint:IPFV/PFV:NONPAST:2S' and many others.

(17)　　2;3　　**xaláδis* for *xalás* (break:IPFV:NONPAST:2S) 'you break'

With the exception of the overuse of certain person-number forms such as the third person singular in reference to the speaker and sometimes even the hearer, overgeneralization errors of verb endings are very rarely found in Stephany's (1985) data of five children until the end of their third year and Katis' (1984) extensive data of children until the end of their fourth year (see also Stephany 1997). All of these can be explained by analogy to more frequent patterns. One of the errors found is the regularization of the irregular form *lene* 'they say' to **lenun* at 2;11 (example 18) in analogy to regular first conjugation verb forms such as *peftun* 'they fall' or *δiavazun* 'they read' (Stephany 1997: 251).

(18)　　2;11　　**lenun* instead of *lene* 'they say'

In her summary of the inflectional development of Greek child language acquisition until the end of their third or fourth year, Stephany (1997: 323) states that what is most characteristic of Greek children's speech is underdifferentiation of forms and a corresponding overgeneralization of functions rather than incorrect inflectional forms. Examples are overuse of the unmarked singular forms of nouns in contexts where marked case forms occur in Standard Greek or the referential overuse of the third person of the verb mentioned above. Furthermore, due to missing or at least unreliable particle use, the subjunctive mood and the strongly modalized future tense are often merged in early child Greek.

Aspect and tense are also merged, since imperfective indicative forms are typically non-past and perfective ones past (Stephany 1985). After the emergence of marked grammatical forms of nouns "the old forms of nouns ending in the thematic vowel, which are underdifferentiated for case in the child's system (Stephany 1997[…]: 323), will specialize to fulfill the functions of a specific case form (accusative or oblique) thereby developing into grammatical forms of the adult language (see also Katis 1984; Stephany 1985, 1992)" (Stephany & Christofidou 2009: 256).

It follows from these observations that grammatical development is emergent in Greek language acquisition (Stephany 1992) and, as mentioned above, consists in "a gradual process of spreading systematicity" (Stephany 1997: 324) so that "expression of inflectional categories develops locally" rather than across-the-board (Stephany 1997: 324). Thus, a certain category is at first distinguished with certain stems and stem types and not yet with others. "Since children are more exposed to certain forms of certain types and will also use them more often than others, their experience with inflectional forms will not grow at an equal pace with all forms and stem types" (Stephany 1997: 324). "Over the course of time, grammatical distinctions are generalized and spread out within specific subclasses of lexemes following the same inflectional pattern and beyond. In this view, children are considered to gradually construct the inflectional system of their language, based on the way they hear their caretakers use it" (Stephany & Christofidou 2009: 256-257).

In summary, what has been found in the early development of Greek verbal and nominal inflection is massive evidence for stored exemplars of specific forms expressing bundles of grammatical categories rather than evidence for general symbolic rules. Accordingly, there is no evidence for the dual process model of inflectional acquisition. In addition, large evidence for analogy, let alone general default rules, would predict a great amount of inflectional errors, something which is not found in spontaneous early Greek child data. Interpreted in the framework of the constructivist, usage-based approach to language acquisition, early inflectional development of Greek children shows that their linguistic skills are much less abstract than generativists are likely to assume.

5. Conclusion

In trying to answer the question of how to select a theoretical framework for one's own empirical linguistic research, it must be pointed out that, to a considerable extent, such a selection depends on what one has been taught during academic education as well as on the advances in the particular academic field. This may lead to a change in one's theoretical convictions in the course of time.

Thus, my linguistic education in the United States of America including a summer during which I studied phonology and syntax with Chomsky, led me to choose his *Aspects of the Theory of Syntax* model (Chomsky 1965) as a theoretical framework for my doctoral dissertation on the French attributive adjective (Stephany 1970). Because of my ensuing dissatisfaction with the formal and abstract generativist approach to language and its rapidly changing grammatical models, I adopted a cognitively based theoretical framework for my postdoctoral thesis on the development of verbal grammar in Greek first language acquisition (Stephany 1985). Although, several years ago, this study was dismissed as "traditional" by a fervent young generativist, in the meantime, the cognitivist, usage-based approach to language acquisition has proved to perfectly fit its empirical results and also those of further work on Greek language acquisition (e.g. Stephany 1997). In my opinion, there are two reasons for preferring the usage-based approach to the generativist one: (1) it seems more apt to explain what is going on in the process of language acquisition and (2) its adult endpoint, namely the linguistic knowledge of mature speakers, is more realistic. If "the adult endpoint of language acquisition comprises nothing other than a structured inventory of linguistic constructions", the target of language acquisition is much more child-friendly than believed by generativists (Tomasello 2003: 7) and can be attained without assuming an inborn Universal Grammar.

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