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The changing status of 'filler syllables' on the way to grammatical morphemes*

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ABSTRACT

The appearance of 'filler syllables' (called here PAEs, for Prefixed Additional Elements) in the late single-word period is analysed in relation to the emergence of grammatical morphemes, by confronting data from the longitudinal study of one child acquiring French, video-recorded between 1;3.2 and 2;2.6, with four hypotheses making different claims about the kind of language knowledge underlying their production: the DEVICES TO LENGTHEN SINGLE-WORD UTTERANCES, the SYNTACTIC SLOTS, the SELECTIVITY OF OCCURRENCE, and the ORGANIZATION OF SURFACE REGULARITIES hypotheses. The pattern of results concerning the first two to three months' production of PAEs points to the existence of

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The present revision of an earlier version of this paper has been delayed by the passing away of Hermine Sinclair. The revision was finally carried out by the first author who greatly missed her precious collaboration and takes on herself full responsibility for the changes undertaken. Hermine Sinclair was a remarkable scholar who could look over the field of developmental psycholinguistics from the vantage point of her double training, in linguistics and in psychology, and from that of her profound knowledge of Piagetian constructivism. This paper greatly benefited from her wide expertise and interdisciplinary interests. Her ability to spot the relevance in children's behaviours, to establish links among non-obviously related facts and theoretical notions, and her enthusiasm and generosity in sharing her discoveries with others all contributed to render Mimi Sinclair a uniquely vivid and deeply inspiring teacher, researcher and collaborator.

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a premorphological period in which PAEs result from the organization of phonoprosodic regularities of the language rather than being constrained by structural rules relative to syntactic slots or to the class of the word they precede. This premorphological period is followed by a protomorphological one in which incipient properties of grammatical morphemes and of word classes start to appear at the same time.

INTRODUCTION

Almost since the first extensive and phonetically careful observations of children's early utterances, it was noted that children start adding monosyllabic, often vocalic or nasalized elements to their wordlike productions, usually in the early period of acquisition. The possible sources, functions and destiny of these short elements has long been a subject of interest to many researchers. Referring to French-speaking children, Guillaume (1927a; 1927b) and especially Grégoire (1937; 1947) provided a number of examples and cautious interpretations of the status of these elements. Both warn repeatedly against crediting the child prematurely with grammatical knowledge on the basis of them. Grégoire says that at first they are 'personal markers that lead us to suppose that the child's mind is occupied with something other than the attachment of labels to objects or actions' (1937: 160; our translation). Somewhat more recently, Braine (1963, reprinted 1973) notes for Steven, an English-speaking child, 'the periodic occurrence, at the beginning or in the middle of utterances, of either a front-central vowel or, somewhat less often, of /d/ or /t/ followed by a front or central vowel' and concludes that 'while it is quite likely that these elements are an interesting distillate of the unstressed and phonetically often obscure English articles, prepositions, and auxiliary verbs, there is no basis for giving them morphemic status at this stage of Steven's development' (1973: 415).

Since then, these elements have been reported to occur in many languages (see Peters, 1997, for an overview), and the question of their status in the child's early language acquisition has been addressed more specifically. Some authors have linked the appearance of these monosyllabic, vowel-like elements to the acquisition of combinatorial speech (e.g. Bloom, 1970, 1973; Dore, Franklin, Miller & Ramer, 1976; Greenfield, Reilly, Leaper & Baker, 1985). Bloom, in her interesting discussion of the possible function of the form schwa + X, notes that it 'was probably not syntactic in the early Gia and Eric grammars; rather, it represented the child's attempt to extend phonologically the limits of one-word utterances' (1970: 81–82). *Dore et al.* (1976) include these productions among the 'presyntactic devices' by which the child extends his/her one-word utterances without as yet combining meanings.

Other authors (e.g. Dolitsky, 1983; Peters, 1990; Veneziano, Sinclair & Berthoud, 1990; Peters & Menn, 1993; Bottari, Cipriani & Chilosi,

1993/1994; Scarpa, 1993; Simonsen, 1993; Veneziano & Sinclair, 1993, 1997; López-Ornat, 1997; Kilani-Schoch, 1998; Kilani-Schoch & Dressler, 2000) have linked these phenomena more specifically to the child's development of grammatical morphemes considering them as a sort of intermediate form on the way to grammatical morphemes. They might at first reflect phonological and/or prosodic regularities of the language (Peters & Menn, 1993; Scarpa, 1993; Simonsen, 1993; Veneziano & Sinclair, 1993, 1997; Kilani-Schoch, 1998; Kilani-Schoch & Dressler, 2000) and assume later incipient grammatical properties occurring as 'filler syllables', in grammatically determined 'slots' (Peters & Menn, 1993). In a similar vein, Dolitsky (1983: 359) refers to them as 'amorphous placeholders' and Bottari *et al.* (1993/1994) as 'monosyllabic placeholders' showing the child's early recognition of 'structural positions'. In some cases they have also been taken to realize some 'grammatical subregularities' of the language like the distinction between feminine and masculine values in Spanish (López-Ornat, 1997: 12).

Thus, if authors agree that the phenomenon cannot be considered as evidence that the child already has knowledge of grammatical morphemes, they also agree that it must be the result of some kind of knowledge, however unconscious, that the child has constructed about language, knowledge other than merely lexical. Yet the nature of this knowledge, its possibly changing status during the time the child produces dummy syllables, and the relation between developments in the phenomenon and the later appearance of grammatical morphemes, remain to be determined more clearly and more precisely.

In this paper we will consider four hypotheses that make different claims about the kind of language knowledge underlying the child's production of fillers (hitherto referred to as prefixed additional elements – in short, PAEs) and test them against the longitudinal data of a child in the process of acquiring French, followed between 1;3.2 and 2;2.6.

The first hypothesis – called here DEVICES TO LENGTHEN SINGLE-WORD UTTERANCES (DLS) hypothesis – stems from the suggestion, mentioned above, that children might use dummy syllables to lengthen their one-word utterances in the transitional period between the production of one and two-word utterances (e.g. Bloom, 1970, 1973; Dore *et al.*, 1976; Greenfield *et al.*, 1985). This hypothesis is NON-MORPHOLOGICAL since children are not supposed even to attend to grammatical morphemes. One implication of this hypothesis is that children would have a greater need to introduce these elements when their verbalizations consist of single words, than when they consist of two meaningful words.

The next two hypotheses consider PAEs as protomorphological by exploring the possibility that they present some of the properties that grammatical morphemes have in the language. Hypothesis 2 is the SYNTACTIC

SLOTS hypothesis, suggested in particular by the work of Peters (1990) and Peters & Menn (1993), who discuss it for later occurrences of the phenomenon, and of Bottari *et al.* (1993/1994), who argue in its favour for earlier occurrences as well. According to this hypothesis, PAEs occur as 'unspecified grammatical words' (Simonsen, 1993: 4) in places where free grammatical morphemes are required or allowed according to the syntactic rules of the language. PAEs would have in this case a PROTOMORPHOLOGICAL status since they would present an important property of adult grammatical morphemes, while not reproducing specific required morphemes from a phonological point of view. Bottari *et al.* (1993/1994), in their analysis of data from Italian-acquiring children, take as evidence in support of this hypothesis the fact that most 'monosyllabic placeholders' occur in slots where a grammatical morpheme is required, and conclude that their production 'attests to an acquired consciousness of certain structural properties of linguistic strings'. Indeed, this hypothesis highlights that the occurrence of PAEs constitutes an important source of evidence on the extent to which children have implicit structural knowledge about the language. However, the results of Bottari *et al.* cannot be considered sufficient evidence for attributing early knowledge of phrase constituents to children. What one needs to know further is whether the production of PAEs in slots where a grammatical morpheme is required or allowed occurs with a probability that is higher than that expected by the simple strategy of prefixing elements to content word. Indeed, if these slots greatly outnumber those that do not require nor allow a grammatical morpheme, as is the case in languages such as Italian and French, the probability of producing a PAE in a required or allowed slot by the simpler strategy is very high and thus even a few errors may turn out to be too many. Consider for example a case where 90% of pre-content-word slots require (or allow) a grammatical morpheme. A PAE produced without any structural knowledge of the language has a 90% chance of occurring in a syntactic slot: to show structural knowledge, children need to be 'on target' significantly more than 90% of the times they produce PAEs.

The third hypothesis – put forth specifically in this paper and referred to as the SELECTIVITY OF OCCURRENCE hypothesis – claims that PAEs are protomorphological if, like grammatical morphemes, they are produced differentially in prenominal and in preverbal positions. In particular, they may differ in sheer presence (selectivity by presence/absence) and/or in the kinds of elements produced in the two positions (selectivity by identity). Whereas in the SYNTACTIC SLOTS hypothesis ideally each PAE should occur in a slot where French requires or allows a grammatical morpheme, the selectivity of occurrence hypothesis requires only the presence of OVERALL differences between the prenominal and the preverbal positions. Moreover, it is not necessary to judge whether a specific occurrence of a PAE can stand for a grammatical morpheme that could appear there, judgments that are often

difficult to make for early one and two-word utterances. The presence of differential production – corresponding or not to that actually present in the language – is considered sufficient evidence for attributing some weak protomorphological status to PAEs. Moreover, since 'what makes formal classes formal is definition by appearance in a set of grammatical uses' (Maratsos, 1982), evidence of differential production will also allow us to attribute some knowledge of noun and verb word classes on which the differential production would be based.

As none of these hypotheses will turn out to be supported by the analyses, we will reconsider PAEs from a broader, non-grammatically motivated perspective. The systematic changes observed by comparing the child's lexical production before the sizeable appearance of PAEs to that occurring at the time of their appearance and afterwards will lead us to the fourth hypothesis, referred to as the ORGANIZATION OF SURFACE REGULARITIES (OSR) hypothesis. According to this hypothesis the child, at first, organizes surface, phonoprosodic, regularities of the language rather than deep-seated structural properties, an organization that later becomes more specifically centred on grammatical morphemes. Evidence for this interpretation will be provided by analyses of the occurrence of PAEs in relation, on the one hand, to the phonological segments of the grammatical morphemes present in the prenominal and preverbal positions of the mother's speech and, on the other, to a related phenomenon – the existence of vowel-initial productions where the initial vowel, instead of being additional, is part of the word itself.

We will argue that the model that seems to fit best with the overall pattern of results is one in which PAEs do not constitute one single transitional phenomenon on the way to grammatical morphemes. Their status changes in the course of development: PAEs are prosodically and phonologically motivated – and thus premorphological – before starting to present some general characteristics of French grammatical morphemes, becoming thus protomorphological.

In the analyses and results section, before presenting the methodological details and the results of the analyses performed to test the hypotheses outlined above, an overview of the child's production of PAEs in the period between 1;3 and 2;2 will be provided. We will also look into the possibility that their appearance might involve imitative mechanisms and will consider to which extent PAEs could be taken as phonological approximations of grammatical morphemes required or allowed in the positions in which they are uttered, providing a rough evaluation of the progress still to be made at each time period considered. Proposed mechanisms for the changes in the status of PAEs will be discussed in the final section.

Free grammatical morphemes in French

In French, the prenominal position is almost always filled by a determiner. The most usual grammatical elements that take this place are definite (*le*, *la l'*, *les* 'the') and indefinite (*un*, *une*, *des* 'a') articles, contractions of a preposition and a definite article (e.g. *au* 'to the', *du* 'of the, some'), demonstratives (*ce*, *cet*, *cette* 'this', *ces* 'these') and possessives (e.g. *mon*, *ma*, *mes* 'my'). All these determiners agree in gender with the noun in the singular (*mon gâteau* 'my cake', *ma poupée* 'my doll') while in the plural they are invariant (*mes gâteaux* 'my cakes', *mes poupées* 'my dolls'). Other elements that can appear in the prenominal position are quantifiers, the preposition *de* (e.g. *un kilo de carottes* 'one kilo of carrots'), and some adjectives may be interposed between the determiner and the noun (*une petite fille* 'a little girl'). Nouns or noun phrases without one of these elements are rare.

The preverbal position may be filled by a proper name, by a noun phrase or by one of several grammatical morphemes. In particular, by one of the subject pronouns (*je*, *tu*, *il*, *elle*, *nous*, *vous*, *ils*, *on*), by one of the object pronouns (*le*, *la*, *les*, *me*, *te*, *vous*, as in the example *tu* ***le*** *tournes comme ça* 'you turn it like that') by one of the relative or interrogative pronouns (*qui*, *qui?* 'who, who?'), by an auxiliary or copula (*avoir* 'to have', *être* 'to be') or by a modal verb (*vouloir* 'to want', *pouvoir* 'can', *devoir* 'must/should'). Infinitives can be preceded by prepositions (*à* 'to', *pour* 'for', *de* 'of', *sans* 'without'). None of the noun-determiners can precede verb forms though the definite articles *le*, *la*, *les* have homophones that can appear before verbs as preposed object pronouns (cf. example above), and sometimes verbs are substantivized. In contrast with nouns, verbs in the imperative form, which are frequently used, occur without a preceding grammatical morpheme. Moreover, verbs present themselves under different bound morphological forms that indicate features like person, plurality, time and mode, while nouns are mostly phonetically invariant since the plural marking rarely surfaces in the oral language. Homophony is common among verb forms: past participles often have the same phonetic form as infinitives, and present indicatives and infinitives may have the same oral form as imperatives.

METHOD

The subject

The data reported are based on the longitudinal study of one girl (referred to as C) acquiring French, observed regularly every two weeks at her home between 1;3.2 and 1;10.12, and then again at 2;2.6. She is a second-born child with a male sibling about three years older. The family, of middle-class status, lived in Geneva and the parents were native French speakers.

Data collection and transcription

Audio and video recordings of an hour were made by the same two observers (one of them was the first author) throughout the study, their visits lasting about one-and-a-half hours. C was observed during naturally-occurring interaction with a familiar adult (most usually her mother, on a few occasions her father, and sometimes one of the observers), in a variety of situations arising during free play, including naturally occurring symbolic play, bookreading and snack-time.

Transcriptions of the speech of the child and of the persons interacting with her were made primarily from the videotapes, complemented by the audio recordings. Transcriptions of the child's speech remained close to actual pronunciation (transcribed essentially in IPA); adult speech was transcribed in conventional French orthography. Transcripts include detailed information about nonverbal activities contributing to understand what was said. All transcriptions were first made by one of the observers (the first author), were checked at least once by a second transcriber, and again by the first transcriber. Cases of disagreement still remaining at this point were reviewed by the two transcribers and were most often solved during this phase of joint repeated listening/viewing of the tapes. The few disagreements still remaining, and those productions whose identity was uncertain for both transcribers, were not taken into account in the analyses. A further control, focused specifically on the prefixed dummy syllables, object of the present study, was performed later on.

Definition and identification of prefixed additional elements (*PAEs*)

Identification of the child's lexical production was based on phonological form and use as well as on conversational functioning, including the mother's interpretation (Veneziano, 1981; Vihman & McCune, 1994). For example, when the child said /tun/, handing a spin top to her mother, her production was interpreted to be an approximation of the French word /turn/ *tourne*(*s*) 'turn around', and when she said /ʃõ/, pointing to a toy bottlecap stuck on her mother's leg, her production was interpreted to be an approximation of the French word /buʃõ/ *bouchon* 'bottlecap'.

A prefixed additional element was defined as a syllabic sound, usually a vocalic one (rarely nasalized), to which no lexical value could be assigned and i. occurred in the initial position of a child's word; ii. was absent from the target word, or was clearly different from the sound(s) appearing in the nonreproduced parts of the corresponding adult target word. For example, the /e/ in /e'ʃɛ̃/ for /ʃjɛ̃/ 'dog', in /e'pik/ for /pik/ 'sting(s)', in /e'ʃõ/ for /buʃõ/ 'bottlecap', and in /e'zɛn/ for /karuzɛl/ 'merry-go-round' were counted as PAEs since, in all these examples, the sound /e/ is not contained

in the target word nor it could be taken to be drawn from the target word (as, for example, the /a/ in /a'ty/ for /vwatyr/ *voiture* 'car' and the /o/ in /o'ti/ for *sorti* 'gone out'). The use of the term 'additional' is also justified by the fact that some of the lexical items appearing with a PAE were produced without one at earlier sessions or at the same session. For the examples provided above, earlier records show that the child approximated the same target words by /ʃɛ̃/, /pik/, /ʃõ/ and /zɛn/, respectively.

ANALYSES AND RESULTS

Occurrence of PAEs in the child's development

The longitudinal study of this child shows a sudden and very sizeable increase in the production of PAEs at 1;7.18, both in sheer number and in the proportion of lexical items preceded by them: at this time these elements are found in front of 38·7% of identified lexical items, whereas, up to then, they did not exceed 2% (see Table 1). The production of PAEs remains at about the same level until 1;9·3, decreases to 20·9% of the lexical items at 1;10.12 and further diminishes at 2;2.6, when PAEs are produced in front of only 12·6% of the lexical items. Phonologically well-formed grammatical morphemes are very rarely produced until 1;10.12, three months after the sizeable increase in PAEs (at most 6 were counted, preceding 2·6% of the lexical items). At 1;10.12 they count 38 and appear before 7·7% of lexical items; four months later, at 2;2.6, this proportion reaches 60·5% and their number 115.

The occurrence of this phenomenon presents intricate relations with the child's ability to combine words. As can be seen in Table 1, the sudden increase in the production of PAEs shortly precedes the increase in word combination (defined as at least two meaningfully related words uttered without any detectable pause between them). However, if transitional phenomena such as within-turn successive single-word utterances[1] are taken into account, then the increase in PAEs at 1;7.18 appears three months after such SSWUs are observed for the first time, and coincides with their increase. It is when two-word and longer utterances become the dominant way of expression (when they constitute 72·2% of C's production) that the proportion of lexical items preceded by PAEs decreases, and that preceded by well-formed grammatical morphemes starts to increase (see Veneziano, 1999, for more details on these developmental relations).

As other authors have also pointed out (cf. in particular Bottari *et al.*, 1993/1994), PAEs do not seem to be produced as a result of immediate

[1] Within-turn successive single-word utterances are defined as at least two meaningfully related words produced by the child without the intervention of another speaker but separated by a pause of between 0·5 and 2 sec.

TABLE 1. *Prefixed additional elements (PAEs), phonologically well-formed grammatical morphemes, and combinatorial speech, per child's age*

age in months	1;3.2	1;3.16	1;4.26	1;5.23	1;6.22	1;7.18	1;8.15	1;9.3	1;10.12	2;2.6
No. of communicative intentions/events expressed verbally	12	70	120	113	153	72	119	99	194	191
% expressed by within-turn SSWUs[1]	0·0 %	0·0 %	2·5 %	2·7 %	3·9 %	9·7 %	16·0 %	13·1 %	2·1 %	0·0 %
% expressed by multiword utterances	0·0 %	0·0 %	0·0 %	0·0 %	0·0 %	1·4 %	18·5 %	36·4 %	72·2 %	81·7 %
Total identifiable lexical productions[2]	8	60	118	154	213	111	190	232	493	190
PAEs: % of lexical items preceded by them and number (in parentheses)	0 % (0)	1·7 % (1)	1·7 % (2)	1·9 % (3)	1·4 % (3)	38·7 % (43)	37·9 % (72)	42·2 % (98)	20·9 % (103)	12·6 (24)
Phonologically well-formed grammatical morphemes: % of lexical items preceded by them and number (in parentheses)	0 % (0)	0 % (0)	0 % (0)	0 % (0)	0 % (0)	0·9 % (1)	1·6 % (3)	2·6 % (6)	7·7 % (38)	60·5 % (115)

[1] Successive single-word utterances.
[2] Excluding 'maman', 'papa'.

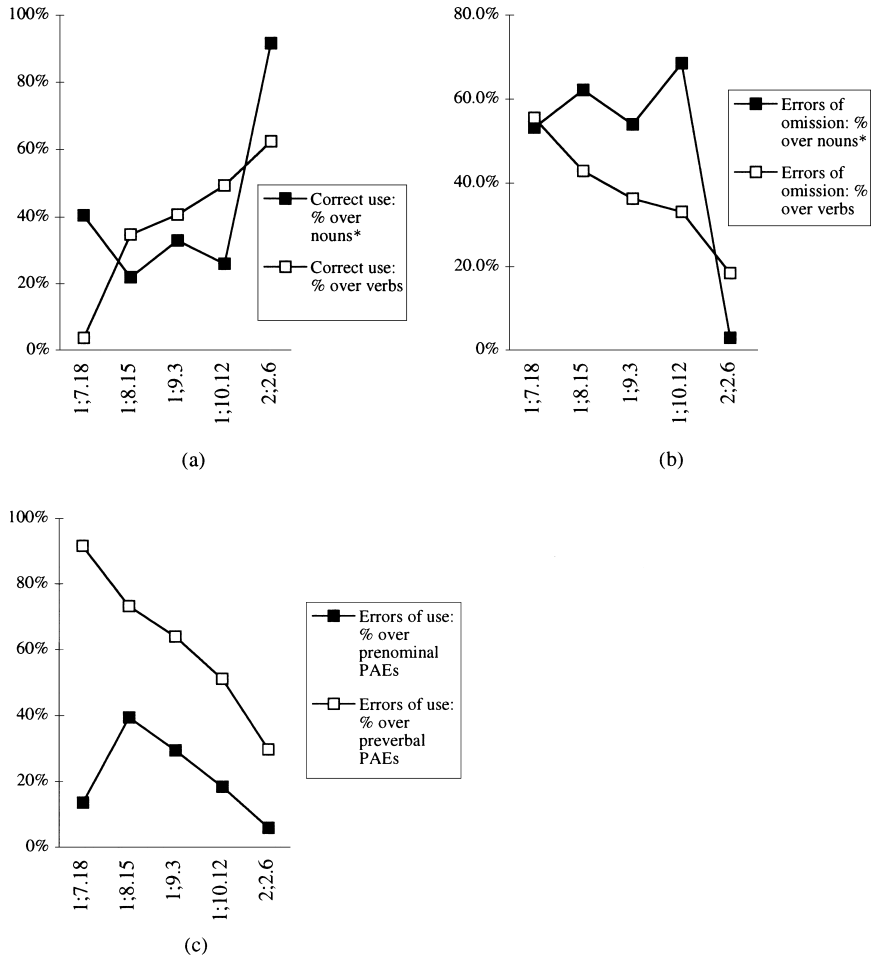
imitation. At the time of their first sizeable appearance only 40% of them occur in utterances taking up part of the adult's preceding utterance; moreover, in 70% of these cases the additional element is NOT drawn from the grammatical morpheme appearing in the prelexical position of the word the child imitates. Thus, after the mother's utterance *c'est le grelot du chat* 'it is the (small) bell of the cat', the child says /ə'ʃa/ 'əcat', where the PAE /ə/ is not drawn imitatively from the grammatical morpheme /dy/ found just before the imitated word *chat*. Similarly, after the mother's utterance *tu peux le mettre sur la chaise* 'you can put it on the chair', the child says /e'ʃɛ/ 'echair', where the PAE /e/ is not an imitative uptake of the grammatical morpheme /la/ *la* 'the' found just before the imitated word *chaise*.

Additions as approximations of adult-language grammatical morphemes

All authors who have dealt with this phenomenon have pointed out that PAEs cannot simply be taken as approximations of grammatical morphemes. Our data corroborate this position.

Looking at the prenominal and preverbal positions, we considered whether PAEs occurred where grammatical morphemes should have obligatorily appeared and, if present, if they could phonologically stand for one of the grammatical morphemes that could have appeared in that position (e.g. Cazden, 1968; Brown, 1973; deVilliers & deVilliers, 1973; Pizzuto & Caselli, 1992). However, at the level of development we are dealing with, though it is often possible to provide a general semantic interpretation of the child's utterances, it is difficult to provide a single linguistically precise realization and thus to decide for the necessity of a given morpheme over another (see Brown, 1973: 298; Howe, 1981, on this point). For example, in uttering /əpɛ̃ əsiŋ/ 'əbread əswan' – produced while looking at a picture of swans swimming in a pond, the child clearly intends to relate swans and bread, but such a relation can be expressed in many different ways as, for example, *le pain est pour les cygnes* 'the bread is for the swans', *les cygnes ont mangé du pain* 'the swans have eaten some bread', or *on a donné du pain aux cygnes* 'we gave some bread to the swans' and nothing in the situational or in the conversational context imposes one particular interpretation over another. A PAE has thus been considered acceptable if it could be taken to approximate one of the grammatical morphemes that could have occurred in any one of the different plausible linguistic realizations of the child's utterance.[2]

[2] This methodological choice is unlike that made by Bottari, Cipriani & Chilosi (1991) who, for example, treat /a/ in *abimbo* 'achild' as an error, as if the child uttered the article *la* (fem. sing.) instead of *il* (masc. sing.). By our method such a conclusion could be reached only if there was no interpretation where *al bimbo* 'to the child' could be considered a possible realization of the child's intended meaning. The uncertainty concerning the specific linguistic realizations of children's utterances cast doubts on accounts of early development of determiners based on analyses of this kind.



*excluding 'maman', 'papa'

Fig. 1. Prenominal and preverbal positions: (a) Proportion of prenominal and preverbal positions adequately filled/unfilled. (b) Errors of omission. (c) Errors of use: % of PAEs and phonologically well-formed grammatical morphemes.

Figure 1a shows the proportion of nouns and verbs whose prelexical positions are filled by PAEs that phonologically approximate one of the grammatical morphemes that could have appeared there, or remain unfilled in a structurally acceptable way.[3] During the first three months of PAEs'

[3] The terms 'nouns' and 'verbs' are shortcuts for 'words that are nouns and verbs in the language'.

production, for nouns, this proportion presents a U-shaped curve and it ranges from 40·4 % to 20 % (the higher figure being registered at the session where PAEs appear) while at 2;2 it attains 91·5 %; for verbs, this proportion presents a linearly increasing curve: it starts out very low (3·7 %) and then increases, first sharply and then gradually, and attains 62·4 % at 2;2.

Errors may be errors of omission, that is, cases in which, though a grammatical morpheme could not be absent in any plausible interpretation of the utterance, no PAE is found (Figure 1 b); or errors of use, that is, cases in which the produced PAEs cannot be considered phonological approximations to any acceptable grammatical morpheme for the position considered (Figure 1 c) (Cazden, 1968; for a recent application of these measures: e.g. Pizzuto & Caselli, 1992). Comparing Figures 1 a and 1 b, we can see that in prenominal position most of the overall errors are errors of omission. These errors constitute respectively 89·3 %, 79·7 %, 80·4 % and 92·5 % of the overall errors at the first four sessions, and concern more than 50 % of the nouns until, and including, 1;10·12, when their proportion reaches 68·5 % (see Figure 1 b). By 2;2, they only account for 2·8 % of the nouns (33·3 % of the remaining overall errors). Errors of use present a bell-shaped developmental pattern and range between 13 % and 39 % of the elements produced in prenominal position until 1;10, while they constitute only 6 % at 2;2 (see Figure 1 c). In preverbal position, errors of omission start out as high as for nouns (55·6 % of the verbs), but decrease steadily over the period under study (see Figure 1 b). Although here they also represent the majority of the overall errors at the first four sessions (respectively, 57·7 %, 65·6 %, 61 % and 65·2 %), their proportion is lower than that noted above for the prenominal position. At 2;2 they still concern about 18 % of the verbs (48·8 % of the remaining overall errors), a percentage very close to that found for the same position by Peters & Menn (1993) for one of their two subjects at 2;3. Errors of use start out very high (91·7 % of the PAEs produced there at 1;7.18) and represent still more than 50 % at 1;10 (see Figure 1 c); at 2;2 this proportion is lower but remains much higher than for the prenominal position (about 30 %).

These results are consonant with those of previous studies showing that before specific grammatical morphemes reach acquisition criteria there 'is always a considerable period ... in which production-where-required is probabilistic' (Brown, 1973: 298), that is, its occurrence appears random rather than following an acquired rule. Actually, the child's knowledge of the grammatical morphemes required by the language might even be poorer than the above results might suggest since PAEs could look like acceptable grammatical morphemes for reasons other than knowledge of the rules governing them (reducing also some of the reported differences between the prenominal and preverbal positions). Indeed, the relatively low rate of omissions in the preverbal position, instead of being due to a good grasp of the structural constraints of the preverbal slot (better than those of the

prenominal one) may simply be due to the way verbs function in French. As will be shown later, the proportion of preverbal positions presenting a PAE is not very different from the corresponding proportion of prenominal positions. However, whereas verb forms are often acceptable without a prelexical grammatical morpheme (in particular because they lend themselves to an imperative interpretation), in only very few cases this is true of nouns. In the same vein, the relatively small number of errors of use found in the prenominal position at the first session (13·6%) may well be a sort of pseudo-success due to the fact that, at the beginning – as we will see – the child produces most /ə/ or /e/ as PAEs, forms that have a high probability of fitting the prenominal position of the nouns used by the child at that session. In fact, more than 70% of the noun types she uses are either masculine – and thus the definite masc. sing. article *le* is an acceptable grammatical morpheme – or are used in a context where the plural form *les* is acceptable.

We turn now to consider the hypotheses spelled out in the introduction.

Hypothesis 1 : prefixed additional elements as devices to lengthen single-word utterances (*the DLS hypothesis*)

According to this hypothesis children's production of PAEs might be a way to lengthen one-word utterances in the transitional period between one and two-word speech. An implication of this hypothesis is that the child would produce additional elements more in single-word utterances than when she produces two meaningful words.

Figure 2 shows that with the exception of the session at which they first appear, PAEs are found more in multiword (including within-turn SSWUs and two-word utterances) than in single-word utterances, a difference that becomes increasingly large in the course of development ($\chi^2(2 \times 2) = 3{\cdot}85$, $p = 0{\cdot}05$, at 1;8.15; 6·76, $p < 0{\cdot}02$, at 1;9.3; and 19·21, $p < 0{\cdot}001$, at 1;10.12; at the first session the difference is not statistically significant: $\chi^2(2 \times 2) = 0{\cdot}573$, n.s., all p values for df = 1).

Although it may not be ruled out that one of the reasons bringing the child to start producing PAEs is to make her single-word utterances sound longer, this does not seem to underlie their production soon afterwards.

Two protomorphological hypotheses

The next two hypotheses consider PAEs to be protomorphological. One basic requirement for such a claim is that PAEs, in spite of errors of omission and of use relative to the adult system, present some property that grammatical morphemes have in the target language.

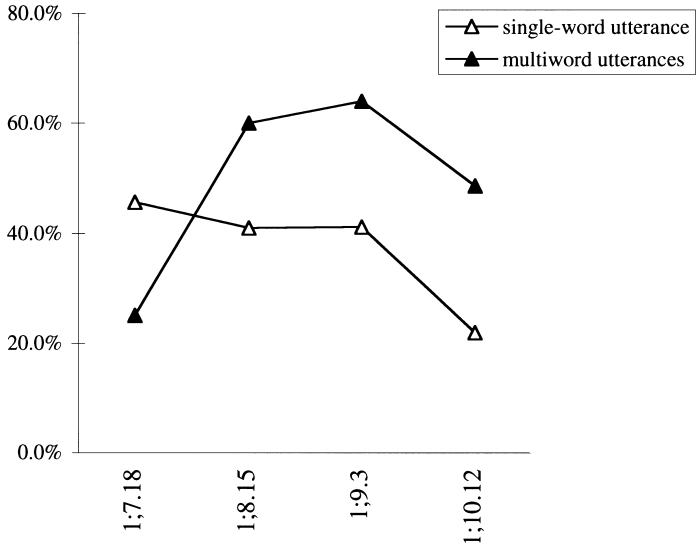


Fig. 2. Proportion of single-word and of multiword utterances containing at least one PAE.

TABLE 2. *Proportion of prenominal and preverbal PAEs produced where grammatical morphemes are expected and proportion of prenominal and preverbal positions requiring a grammatical morpheme ((a) single and multi-word utterances (b) multi-word utterances only)*

	(a) single + multiword utterances				(b) multiword utterances only		
age of the child	1;7.18	1;8.15	1;9.3	1;10.12	1;8.15	1;9.3	1;10.12
% of PAEs produced in positions where a grammatical morpheme is required/allowed	92 %	96 %	95 %	76 %	100 %	87 %	73 %
% of prenominal and preverbal positions where a grammatical morpheme is required/allowed	92 %	92 %	89 %	77 %	89 %	81 %	74 %

Hypothesis 2 : the syntactic slots hypothesis

The existence of a high number of errors of omission during the first three months of PAE production indicates already that whatever knowledge the child may have of syntactic slots is limited or fluctuating. However, it could still be possible that when PAEs are produced, they occur preferentially in places where grammatical morphemes are required or allowed by structural rules, rather than where they are neither required nor allowed. In line with

other research (e.g. Bottari *et al.*, 1993/94) we also find here that most PAEs do occur in those prenominal and preverbal positions where grammatical morphemes are required or allowed (see the first row of Table 2). Does this entitle us, however, to infer that the child has phrase structural knowledge of the language as Bottari *et al.* strongly claim on the basis of similar observations? The mere fact of finding a high proportion of PAEs in 'legitimate' positions is insufficient *per se*: such a proportion needs to be evaluated against that of prenominal and preverbal positions requiring or allowing a grammatical morpheme in the child's OVERALL production of nouns and verbs. Given that a grammatical morpheme was considered to be required or allowed if there was no interpretation of the child's utterance allowing no grammatical morpheme to be present, we found that the proportion of the overall prenominal and preverbal positions requiring or allowing a grammatical morpheme ranged between 77 and 92 %, depending on the session (see the second row of Table 2). These proportions correspond to the probabilities that PAEs will fall in 'syntactic slots' even if the child is simply prefixing elements to content words rather than following structural rules of the language.[4] In order to infer structural knowledge, the proportion of PAEs 'on target' needs to be significantly higher than these probabilities. As can be seen by comparing the two rows of Table 2 under a), at each session the respective figures are very close to each other (note in particular the close match of the lower proportions found in both at 1;10) and at none of the sessions is the former significantly higher than the latter (the difference between the two proportions was calculated by using the z-score approximation to the binomial test which are, for the four sessions, respectively, 0·224, 0·69, 1·246 and 0·103, none of them significant).

It might be argued that the child's underlying structural knowledge is better mobilized when she produces multiword utterances. As can be seen in Table 2 under b), the results obtained above are found again when only utterances containing two or more words are taken into account: none of the scores of the z-approximations to the binomial tests are significant (these are 0·733, 0·468 and 0·008, at 1;8, 1;9 and 1;10 respectively). Moreover, analyses of these utterances show that only rarely do nouns figure in preverbal subject positions, and that their presence does not prevent the production of an additional element between the noun and the verb (for example, /ezwazo əvol/ 'ebirds əfly') which, though allowed in colloquial French, syntactically is not required.

To summarize, though a large proportion of PAEs are produced in slots where a grammatical morpheme is required or allowed, this high proportion

[4] To illustrate this point further, consider the theoretical case where all prenominal and preverbal positions present in the child's production required/allowed a grammatical morpheme. All PAEs produced in precontent word position would automatically fall in 'legitimate' places.

corresponds to the one expected were the child simply producing PAEs in pre-content word position. Thus, on the basis of this finding,[5] it cannot be concluded that during this period the child knows something about the structural constraints linked to these positions, nor that PAEs are protomorphological in this sense.

Hypothesis 3 : the selectivity of occurrence hypothesis

According to this hypothesis PAEs would be protomorphological if they were produced differently according to the lexical category of the word they precede, providing at the same time evidence that the child has some knowledge of noun and verb word categories on which such differential production would be based. Differential production may concern the differential presence of PAEs in the two positions (selectivity by presence/absence) and/or the kinds of elements produced in the two positions (selectivity by identity).

Before testing this hypothesis we will present data of the mother's speech addressed to the child concerning differences in the rate at which grammatical morphemes precede nouns and verbs and in the types of vocalic elements that immediately precede these word categories. Indeed, though it is known that in French functionally different grammatical morphemes appear in front of nouns and verbs (see also the section on free grammatical morphemes in French), the homophony of certain grammatical morphemes which have completely different functions (for example, object pronouns before verbs and definite articles before nouns) might reduce the difference between the prelexical environments of the two word-classes, as might the homophonies created by considering only the vocalic component of grammatical morphemes (for example, the 1st person pronoun *je* and the definite article *le*). The analysis will also look for other cues that might help the child distinguish these two categories of words.

Data on the adult language addressed to the child

Utterances addressed by the adult to the child at 1;7.18 (the session at which PAEs first appear) and at 1;8.15 constituted our sample. Prenominal and preverbal positions were coded as either 'empty' or 'filled' depending on whether they were sentence-initials or not. If filled, the first vocalic element adjacently preceding nouns and verbs was selected for analysis. As no significant differences were found between the two sessions, the data are presented for the two sessions combined.

[5] Paradoxically, languages that require or allow grammatical morphemes at a high rate in prenominal and preverbal positions are not good candidates for testing the structural knowledge hypothesis. The best would be languages that require or allow them much more selectively.

The prenominal position remains unfilled only 1·4 % of the time (5/354), whereas the corresponding figure for the preverbal position is 12·7 % (53·417). This difference is statistically significant ($\chi^2 = 33{\cdot}52$, $p \ll 0{\cdot}001$, for df = 1). Nouns and verbs differ also in terms of the sets of vocalic elements that occupy their adjacently preceding positions, a difference that is again statistically significant ($\chi^2 = 142{\cdot}11$, $p \ll 0{\cdot}001$, for df = 9). The distribution of vocalic elements in prenominal position peaks markedly for the occurrence of /ə,e/, constituting 44·4 % of all prenominal vocalic elements, and presents a second major peak for the occurrence of /a/ (19 %). Instead, the distribution of elements in preverbal position is more spread out as it presents five elements whose proportional occurrence is comprised between 10 and 28 %: /ə,e/ (25 %), /a/ (23 %), /i/ (16 %), /y/ (16 %) and /ɛ/ (10 %). Other differences concern the higher proportions of /œ̃/ and /yn/ in prenominal position and of /ɛ/, /i/ and /y/ in preverbal position (see Figures 3 and 4, presented later on, for the distribution of vocalic sounds adjacently preceding the adult's nouns and verbs, respectively). Table 3 presents the grammatical

TABLE 3. *Grammatical morphemes corresponding to the vocalic elements found in the adjacent prenominal/preverbal positions in the adult's utterances*

vocalic elements	prenominal position	preverbal position
		je 'I'
		le 'it, him',
/ə,e/	*le*, *les* 'the'	*les* 'them',
	de, *des* 'some'	*veu*(*x*,*t*) 'want(s)', *peu*(*x*,*t*) 'can', *me*
	ce, *ces* 'this, these'	'me', *te* 'you', *se* 'him'
/a/	*la* 'the'	*ça* 'it'
	à 'to'	*a*/*as* 'has, have'
	ta 'your'	*la* 'it, her',
	sa 'his, her'	*à* 'to'
/ɛ/		*elle* 'she'
		est 'is'
	c'est 'its'	*ai* 'have'
/i/, /wi/		*il* 'he'
		qui 'who'
		lui 'to him, to her'
/y/	*du* 'some'	*tu* 'you'
/œ̃/ and /yn/	*un*, *une* 'a'	
/õ/	*ton* 'your'	*on* 'we'
	son 'his, her'	*sont* 'are'

morphemes corresponding most often to these vocalic elements in the two positions.

Other surface properties distinguish nouns from verbs in the language addressed to the child. Nouns are always invariant (no example of a vocalic

TABLE 4. *Number of child's renditions of noun and verb targets and percentage presenting a PAE by age*

	Age of the child									
	1;7.18		1;8.15		1;9.3		1;10.12		2;2.6	
	No.	% with PAE	No.	% with PAE	No.	% with PAE	No.	% with PAE	No.	% with PAE
Noun targets[1]	46	47·8 %	82	40·2 %	76	44·7 %	163	30·7 %	71	95·8 %
Verb targets	27	44·4 %	49	30·6 %	69	36·2 %	130	34·6 %	109	65·1 %
Total	73		131		145		293		180	

[1] Excluding 'maman', 'papa'.

change for pluralization occurred in our sample), whereas 48 % of the verb types present two or three different forms (still far below the number the language allows). Furthermore, for a given lexical item, the vocalic elements appearing in the prenominal position are more stable than those appearing in the preverbal one: 47·5 % of the noun types are always preceded by the same vowel, and only 13 % are preceded by three or more different vocalic sounds; for verbal forms, the respective proportions are 27 % and 34 %.

To summarize, adult speech addressed to the child shows differences between the prenominal and the preverbal positions in terms of the presence/absence of a grammatical morpheme, and of the distribution of the most adjacent vocalic elements produced there, and this without taking into account functional distinctions among grammatical morphemes. Nouns and verbs also present other surface differences. Nouns have an invariant phonological shape, present relative stability in their prelexical adjacent vocalic context, and are preceded frequently by /ə,e/; in contrast, verbs occur in different forms, present relative variability in their prelexical adjacent vocalic context, and show a wider range in the kind of vocalic elements that can be found there.

Testing hypothesis 3: selectivity of occurrence

Selectivity by presence/absence of PAEs. Table 4 shows the number of the child's productions whose targets are nouns and verbs and, for each category, the proportion presenting a PAE, at different ages.

In contrast with the adult's language sample, the child's production of PAEs in prenominal and in preverbal positions does not show any significant difference up to and including the session at 1;10.12 ($\chi^2 = 0{\cdot}002$, at 1;7.18; $\chi^2 = 0{\cdot}845$, at 1;8.15; $\chi^2 = 0{\cdot}76$, at 1;9.3; $\chi^2 = 0{\cdot}446$, at 1;10.12, all values are n.s. for df = 1); at 2;2.6, the difference is significant and goes in the same direction as that found in the adult's sample ($\chi^2 = 21{\cdot}23$, $p < 0{\cdot}001$, for

df = 1), for PAEs and phonologically well-formed grammatical morphemes taken together.

The analysis by types confirms the results obtained for tokens. For this analysis, a word-type was considered to be preceded by a PAE if it occurred more often with than without one, and was considered to be produced without a PAE in the opposite case; cases in which occurrences were evenly distributed were considered 'undecidables'. No significant differences between nouns and verbs are found up to and including the session at 1;10.12 ($\chi^2(3 \times 2)$) values, performed on three categories – with/without PAE and undecidables – and two word classes, are: 0·538, at 1;7.18; 1·35, at 1;8.15; 0·038, at 1;9.3; 0·622, at 1;10.12, all values are n.s. for df = 2).

Selectivity by identity of PAEs. The distribution of PAEs found in prenominal and in preverbal positions at the four sessions is presented in Table 5. In the few cases in which PAEs consisted of full realizations of identifiable grammatical morphemes, the vocalic sound adjacent to the content word was retained for computation (as it was done in the analysis of the adult language). The few cases of consonantal additions (e.g. /tuve/ for /uvr, uvrir/*ouvre*, *ouvrir* 'open, to open') and of double additions (e.g., /'aepj'e/ for /pje/ *pied* 'foot') were classified separately as 'others'.

Results indicate that the nature of the elements uttered in prenominal position and, to a lesser extent, in preverbal position, changes over time (chi-square applied on contingency tables for 3 types of PAEs – /a/, /e, ə/ and 'others'[6] – and four age levels: for the prenominal position – $\chi^2 = 15{\cdot}71$, $p < 0{\cdot}02$, df = 6; for the preverbal position – $\chi^2 = 11{\cdot}95$, $p = 0{\cdot}063$, df = 6). At each individual session, however, no significant difference between the distribution of PAEs uttered in prenominal and in preverbal positions is found until 1;10.12[7] (at 1;7.18: $\chi^2(2 \times 2) = 0{\cdot}412$, n.s., df = 1; at 1;8.15 and 1;9.3: $\chi^2(3 \times 2) = 4{\cdot}17$ and 3·73, respectively, all n.s., df = 2; at 1;10.12: $\chi^2(4 \times 2) = 11{\cdot}04$, $p < 0{\cdot}02$, df = 3).

Thus, for the first two to three months there is no evidence that PAEs are protomorphological, because they neither occur in syntactically defined positions nor does their occurrence depend on the lexical category of the word they precede. The analysis of the phenomenon in a broader perspective than that provided by the comparison with grammatical morphemes, will allow us to take some positive steps towards understanding the nature of PAEs and the way they might arise in the child's production.

[6] Due to frequency restrictions in the computation of the chi-square test, the remaining types of PAEs were placed in the category 'others'.

[7] Chi-square tests have been applied to 2 × 2, 3 × 2 and 4 × 2 contingency tables, depending on the number of types of PAEs retained to conform to the test's frequency restrictions.

TABLE 5. *Distribution of PAEs in prenominal and in preverbal positions, by child's age*

	Age of child															
	1;7.18				1;8.15				1;9.3				1;10.12			
Targets	Nouns		Verbs		Nouns		Verbs		Nouns		Verbs		Nouns		Verbs	
PAEs	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
a	0	0·0 %	1	8·3 %	8	24·2 %	1	6·7 %	7	20·6 %	6	24·0 %	14	28·0 %	8	17·8 %
e,ə	21	95·5 %	10	83·3 %	17	51·5 %	6	40·0 %	21	61·8 %	10	40·0 %	25	50·0 %	15	33·3 %
ɛ	0	0·0 %	1	8·3 %	4	12·1 %	4	26·7 %	1	2·9 %	0	0·0 %	0	0·0 %	2	4·4 %
o	1	4·5 %	0	0·0 %	1	3·0 %	3	20·0 %	4	11·8 %	2	8·0 %	5	10·0 %	14	31·1 %
u	0	0·0 %	0	0·0 %	1	3·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %
i	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	3	12·0 %	0	0·0 %	3	6·7 %
y	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %
yn+n	0	0·0 %	0	0·0 %	1	3·0 %	1	6·7 %	0	0·0 %	0	0·0 %	0	0·0 %	0	0·0 %
other	0	0·0 %	0	0·0 %	1	3·0 %	0	0·0 %	1	3·0 %	4	16·0 %	6	12·0 %	3	6·7 %
Total	22		12		33		15		34		25		50		45	

Analyses of PAEs within a broader perspective

The child's lexical production before and at the time of the occurrence of PAEs. As can be seen in Table 6, in the period from 1;3.2 to 1;6.22, between 72·2 and 93·1 % of the child's renditions of adult words are either monosyllabic (with a CV(C) pattern) or consist of the reduplication of one syllable, with a mean of 76·1 % of monosyllabic renditions over the period.

These types of renditions range between 86·3 and 100 % for monosyllabic targets (with a mean 88·2 % of monosyllabic renditions over the period), and between 63·9 and 83·8 % for multisyllabic ones (with a mean 66·2 % of monosyllabic renditions over the period, a proportion similar to that found by Wijnen, Krikhaar & Den Os, 1994, for iambic-patterned targets, in two Dutch-learning children between 18/19 and 22 months). With the appearance of PAEs, monosyllabic renditions greatly diminish, particularly for monosyllabic targets, while there is a change towards the production of an iambic metrical structure consisting of an unstressed syllable followed by a stressed one.[8] This is a typical pattern of many French disyllables (as in /ga'to/ *gâteau* 'cake') and of monosyllables embedded in prosodic units like 'DET + N' (e.g. *la grue* 'the crane') or 'PRON + V' (e.g. *il part* 'he leaves') (Delattre, 1965, 1966; Allen & Hawkins, 1980; Wenk & Wioland, 1982; Vihman, DePaolis & Davis, 1998). At the time of the appearance of PAEs (at 1;7·18) this pattern is realized most often under the form V'CV(C) (more than 70 % of the iambic patterns for both mono and multisyllabic targets). Compared to the previous sessions, the increase in both the iambic and V'CV(C) patterns is highly significant (for the total targets: $\chi^2 = 69{\cdot}02$ and 199·48, respectively for the iambic and for the V'CV pattern, both with $p \ll 0{\cdot}001$, df = 1; similar highly significant results are obtained for monosyllabic and multisyllabic targets, considered separately). The preference for the V'CV pattern and for V-initial productions in general strengthens or remains at this high level for the following two months. These findings are consistent with those presented by Vihman *et al.* (1998), who show the predominance of an iambic foot in disyllables produced by French-acquiring single-word speakers, and with those of Kilani-Schoch & Dressler (2000), who report a similar preference for an iambic VCV structure for Sophie, another French-acquiring child.

At 1;10.12, the iambic structure diminishes slightly (compared to the earlier three sessions combined: $\chi^2 = 6{\cdot}543$, $p = 0{\cdot}011$, df = 1) while the V'CV pattern and the V-initial productions in general diminish greatly (compared to the earlier three sessions combined: $\chi^2 = 74{\cdot}24$ and 61·84, respectively, both with $p \ll 0{\cdot}001$, df = 1).

[8] We wish to thank an anonymous reviewer for emphasizing this point and for stimulating further analyses relating to it.

TABLE 6. *Child's renditions of noun and verb targets: total, monosyllabic and multisyllabic, by child's age*

	Age of the child										
	1;3.2	1;3.16	1;4.26	1;5.23	1;6.22	1;3 to 1;6.22	1;7.18*	1;8.15	1;9.3	1;10.12	1;7 to 1;10.12
Total TARGETS	5	36	116	104	136	397	73	131	145	293	642
Child's renditions											
% Monosyllables	**80·0%**	**52·8%**	**83·6%**	**72·1%**	**78·7%**	76·1%	**26·0%**	**20·6%**	**14·5%**	**21·8%**	**20·4%**
% CV-reduplicated	0·0%	19·4%	9·5%	6·7%	8·1%	9·1%	6·8%	2·3%	6·9%	15·0%	9·7%
% Monosyllabic or reduplication of one syllable	**80·0%**	**72·2%**	**93·1%**	**78·8%**	**86·8%**	**85·2%**	**32·8%**	**22·9%**	**21·4%**	**36·9%**	**30·1%**
% Iambic disyllables	**20·0%**	**47·2%**	**16·4%**	**27·9%**	**21·3%**	**23·9%**	**74·0%**	**77·1%**	**84·1%**	**70·3%**	**75·2%**
% VCV(C)	0·0%	5·9%	5·3%	13·8%	3·4%	7·4%	77·8%	90·1%	80·3%	45·1%	67·1%
% Trisyllables (+)	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**2·3%**	**1·4%**	**7·8%**	**4·4%**
% V-initials	—	—	—	—	—	—	—	100·0%	100·0%	65·2%	71·4%
V-initial in tot multisyllabic	0·0%	2·8%	0·9%	3·8%	0·7%	1·8%	57·5%	71·8%	69·0%	36·9%	53·6%
MONOSYLLABIC TARGETS	2	9	73	43	51	178	22	53	68	108	251
Child's renditions											
% Monosyllables	**100·0%**	**88·9%**	**86·3%**	**90·7%**	**88·2%**	**88·2%**	**45·5%**	**35·8%**	**20·6%**	**38·9%**	**33·9%**
% CV-reduplicated	0·0%	0·0%	12·3%	9·3%	11·8%	10·7%	4·5%	0·0%	0·0%	0·0%	0·4%
% Monosyllabic or reduplication of one syllable	**100·0%**	**88·9%**	**98·6%**	**100·0%**	**100·0%**	**98·9%**	**50·0%**	**35·8%**	**20·6%**	**38·9%**	**34·3%**
% Iambic disyllables	**0·0%**	**11·1%**	**13·7%**	**9·3%**	**11·8%**	**11·8%**	**54·5%**	**64·2%**	**79·4%**	**61·1%**	**66·1%**
% VCV(C)	—	100·0%	10·0%	0·0%	0·0%	9·5%	75·0%	85·3%	98·1%	100·0%	94·6%
% Trisyllables (+)	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**
% V-initials	—	—	—	—	—	—	—	—	—	—	—
V-initial in tot multisyllabic	0·0%	11·1%	1·4%	0·%	0·0%	1·1%	40·9%	54·7%	77·9%	61·1%	62·5%

MULTISYLLABIC TARGETS	3	27	43	61	85	219	51	78	77	185	391
Child's renditions											
% Monosyllables	**66·7%**	**40·7%**	**79·1%**	**59·0%**	**72·9%**	**66·2%**	**17·6%**	**10·3%**	**9·1%**	**11·9%**	**11·8%**
% CV-reduplicated	0·0%	25·9%	4·7%	4·9%	5·9%	7·8%	7·8%	3·8%	13·0%	23·8%	15·6%
% Monosyllabic or reduplication of one syllable	**66·7%**	**66·6%**	**83·8%**	**63·9%**	**78·8%**	**74·0%**	**25·4%**	**14·1%**	**22·1%**	**35·7%**	**27·4%**
% Iambic disyllables	**33·3%**	**59·3%**	**20·9%**	**41·0%**	**27·1%**	**33·8%**	**82·4%**	**85·9%**	**88·3%**	**75·7%**	**81·1%**
% VCV(C)	0·0%	0·0%	0·0%	16·0%	4·3%	6·8%	78·6%	92·5%	66·2%	19·3%	52·7%
% Trisyllables (+)	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**0·0%**	**3·8%**	**2·6%**	**12·4%**	**7·2%**
% V-initials	—	—	—	—	—	—	—	100·0%	100·0%	65·2%	71·4%
V-initial in tot multisyllabic	0·0%	0·0%	0·0%	6·6%	1·2%	2·3%	64·7%	83·3%	61·0%	22·7%	47·8%

* Session at which additional elements appear.

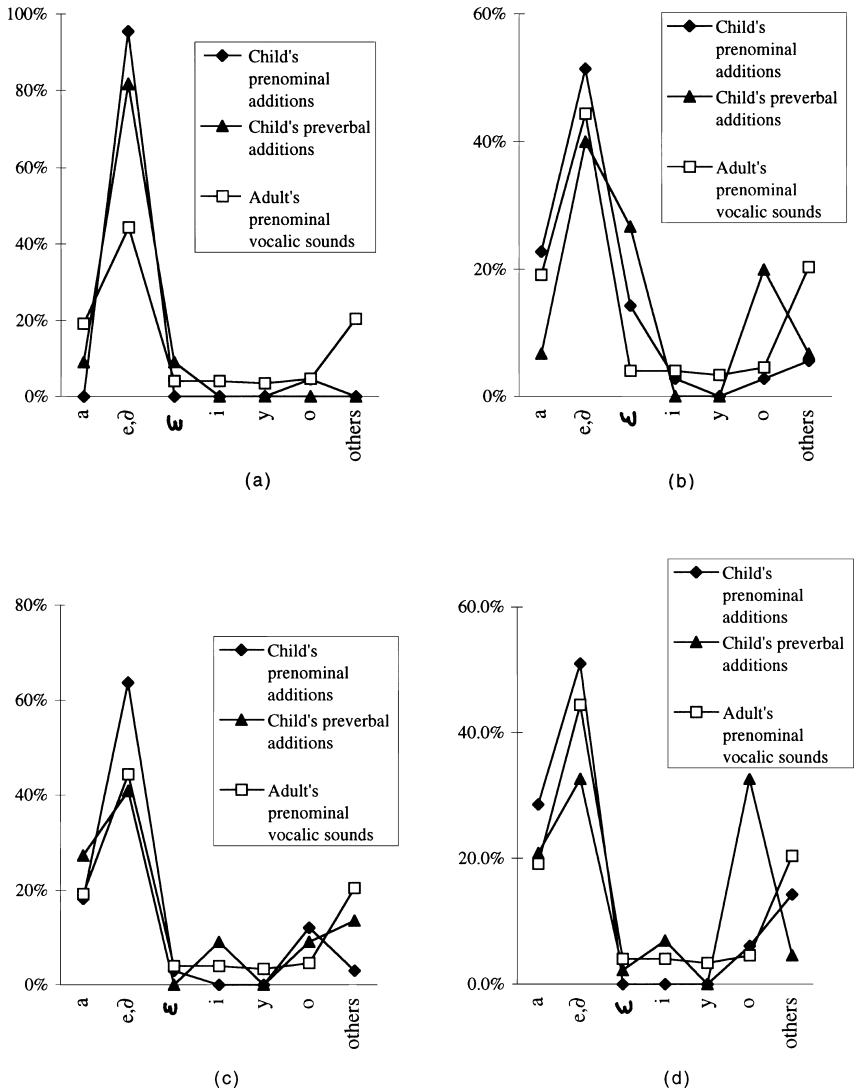


Fig. 3. Child-produced PAEs in prenominal and preverbal positions and adult-produced vocalic sounds in the adjacent prenominal position at: (a) 1;7.18, (b) 1;8.15, (c) 1;9.3, (d) 1;10.12.

PAEs and the vocalic segments of grammatical morphemes in the adult speech. A comparison between the phonological substance of PAEs produced by the child in prenominal and in preverbal positions and that of the vocalic segments occurring in the position adjacent to adult-produced nouns shows systematic relations. The dominance of /ə,e/ among the PAEs produced in

both prenominal and preverbal positions found at 1;7.18 (95% of PAEs), corresponds to the dominance of these vocalic sounds in the adjacent prenominal and preverbal positions of the adult's utterances (see Figure 3a). At the next sessions, PAEs become more varied in nature and their distribution presents closer resemblance to that of the vocalic sounds in the adjacent prenominal position of the adult's utterances, with the proportion of /ə,e/ and /a/ being particularly well reproduced (see Figures 3b–d) and that of the /o/ segment apparently rendering the variety of the adult's vocalic sounds.

Except for the session at 1;7.18 when additional /ə,e/ are largely over-represented, at the following three sessions the chi-square values obtained by comparing the occurrence of /ə,e/, /a/ and 'others' (a third category containing the other types) in the child's prenominal and preverbal positions with that in the adult's prenominal position, do not point to significant differences (child's prenominal vs. adult's prenominal positions at 1;8.15, 1;9.3 and 1;10.12 are respectively: $\chi^2(3 \times 2) = 1{\cdot}98, 5{\cdot}19, 4{\cdot}59$, all n.s., df = 2; child's preverbal vs. adult's prenominal positions at 1;8.15, 1;9.3 and 1;10.12 are respectively: $\chi^2(3 \times 2) = 2{\cdot}38, 0{\cdot}37, 2{\cdot}82$, all n.s., df = 2). Moreover, at these same three sessions, the full distribution of PAEs in prenominal position correlates significantly with that of vocalic sounds in the adjacent prenominal position of the adult's utterances (Spearman rank correlation values – r_s – are respectively 0·75, 0·81, $p < 0{\cdot}05$, and 0·93, $p < 0{\cdot}01$, for N = 7, where N is the number of types of PAEs ranked by proportional frequency); at the last two sessions, significant correlations are found also between the distribution of PAEs in preverbal position and that of the prenominal vocalic sounds in the adult's utterances ($r_s = 0{\cdot}88$ and 0·79, respectively, both with $p < 0{\cdot}05$, for N = 7).

Instead, no such good distributional fit exists between the distribution of PAEs in the child's prenominal and preverbal positions and that of vocalic sounds in the adjacent preverbal position of the adult's utterances (see Figures 4a–d in comparison with Figures 3a–d, respectively). The distribution in the child's preverbal position never correlates significantly with the distribution in the adult's preverbal position (r_s values obtained at 1;8·15, 1;9.3 and 1;10.12 are respectively, 0·05, 0·59 and 0·27, all n.s. for N = 7, N being the number of types of PAEs ranked by proportional frequency), nor does the distribution of the child's prenominal PAEs (r_s values obtained at 1;8.15, 1;9.3 and 1;10.12 are respectively, 0·45, 0·33, 0·41, all n.s. for N = 7).

Hypothesis 4: the organization of surface regularities hypothesis

The above results led us to formulate the organization of surface regularities (OSR) hypothesis according to which, during the first two to three months of production, PAEs result from the organization of surface

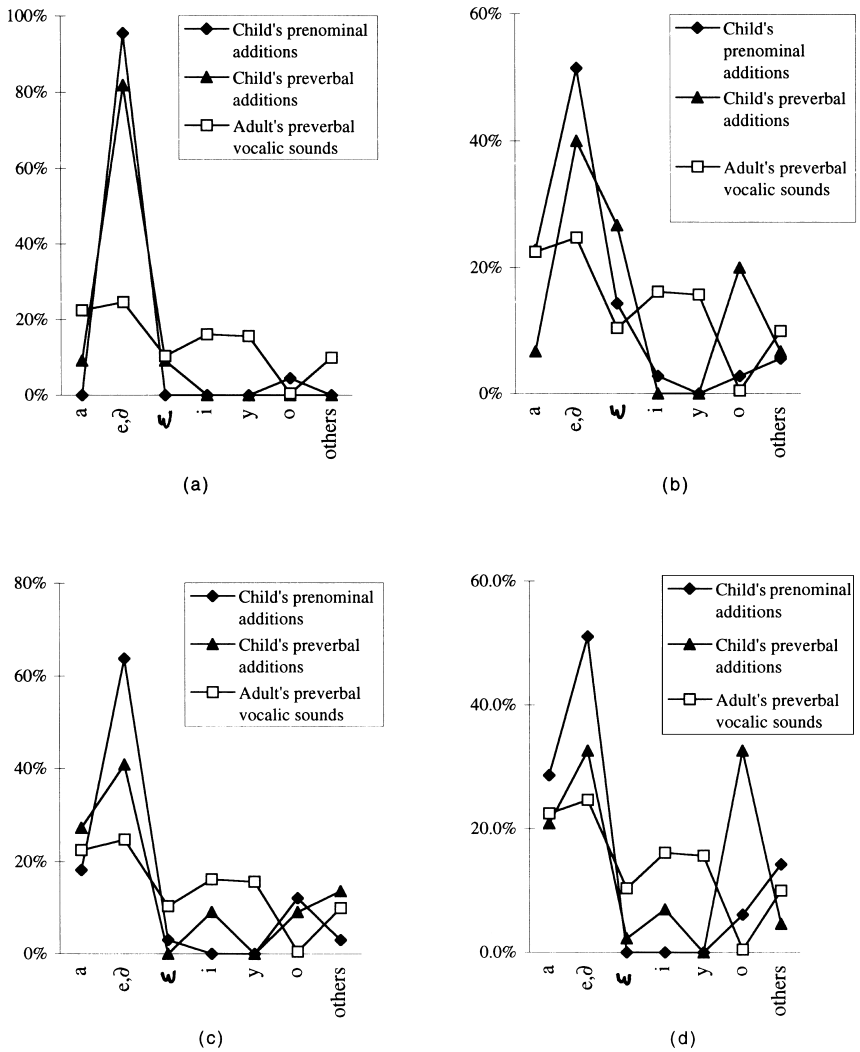


Fig. 4. Child-produced PAEs in prenominal and preverbal positions and adult-produced vocalic sounds in the adjacent preverbal position at: (a) 1;7.18, (b) 1;8.15, (c) 1;9.3, (d) 1;10.12.

(prosodic and phonological) regularities of the language. This corresponds to a first nongrammatical period in which PAEs are premorphological (see also, Peters & Menn, 1993; Simonsen, 1993; Kilani-Schoch, 1998; Kilani-Schoch & Dressler, 2000) and grammatical morphemes are treated as phono-prosodic phenomena.

The child first constructs an iambic metrical structure – an important

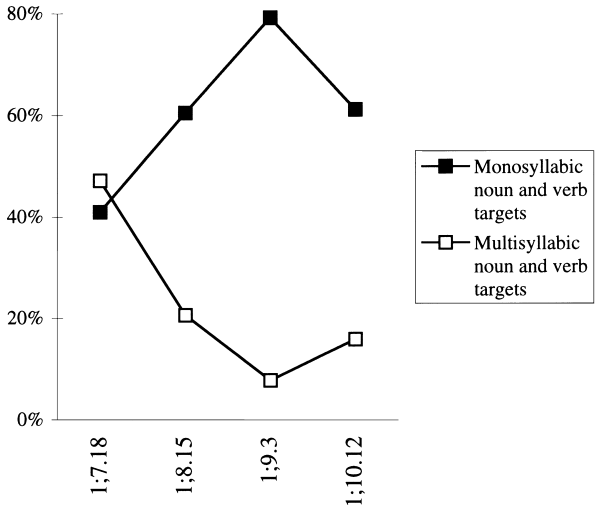


Fig. 5. Production of PAEs according to length of the target word: monosyllabic vs multisyllabic target nouns and verbs, per child's age.

prosodic pattern of French lexical units – that she realizes preferentially as a VCV(C) pattern. The construction of a preferred iambic VCV template provides one of the thrusts underlying the appearance of PAEs.

Another component, contributing to this particular realization of the iambic structure, consists in paying attention to, and integrating to her production, the sonoric environment that precedes focused salient syllables of adult words, where vocalic elements constitute the acoustically more prominent part.[9] In French, these elements have different functions, depending on whether the adult word the child is attending to is monosyllabic or multisyllabic. In the position adjacent to adult monosyllabic nouns and verbs the vocalic element is likely to belong to a grammatical morpheme (for example, the /a/ of /la/ in /labuʃ/ *la bouche* 'the mouth', the /i/ of /il/ in /ilsot/ *il saute* 'he jump(s)'), whereas in the position adjacent to the focused segment of adult multisyllabic words – for this child it is often the final syllable – it is likely to belong to the target word itself (for example, the /a/ of /ʃapo/ *chapeau* 'hat' occurring before /po/, a syllable the child used earlier to render this target).

The OSR hypothesis predicts that during the premorphological period the child tends to produce (a) PAEs (target-external from the observer's point of view) in front of child's renditions of monosyllabic targets, and (b) vocalic

[9] The focused syllables may correspond to previously constructed, largely monosyllabic, child units (the 'articulatory filter' suggested by Vihman, 1993; and, similarly, Elbers & Wijnen, 1992) and/or to highly perceptually salient ones, by stress and/or lengthening.

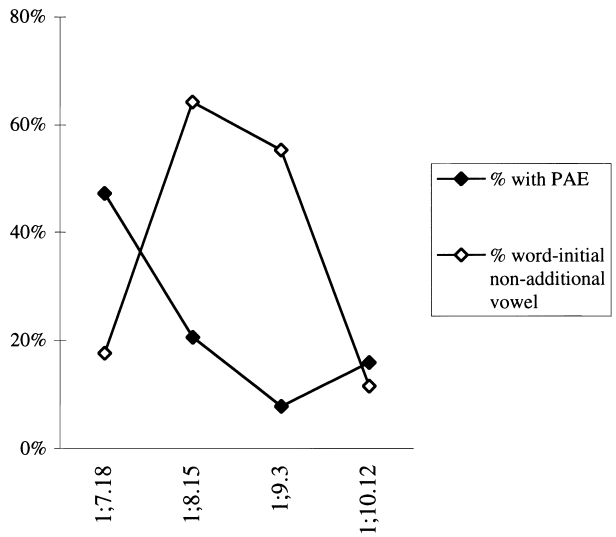


Fig. 6. PAEs and non-additional word-initial vowels in child's renditions of multi-syllabic nouns and verbs targets, per child's age.

elements belonging to the word itself (target-internal and thus non-additional from our point of view), in front of approximations of multisyllabic targets. For example, at the time the child produces /abuʃ/ for /buʃ/ *bouche* 'mouth', where the initial /a/ segment is additional relative to the lexical item /buʃ/, she should produce also /apo/ for /ʃapo/ *chapeau* 'hat', where the initial /a/ segment is not additional since it belongs to the word itself.

The data from this child conform to this prediction. As can be seen in Figure 5, presenting the child's renditions of noun and verb targets, after the sizeable appearance of PAEs, 60·4 % of the child's renditions of monosyllabic targets are preceded by an additional element, whereas only 20·5 % of her renditions of multisyllabic targets are so preceded; at 1;9.3 these percentages are even further apart – 79·1 % and 7·7 % – and at 1;10.12 they are 61·1 % and 15·7 % respectively. Chi-square tests show that such differences are highly significant (χ^2 values at 1;8.15, 1;9.3 and 1;10.12 are respectively 19·91, 73·23 and 62·19 with $p \ll 0{\cdot}001$, df = 1). These results are obtained also when the whole lexical production of the child (not only adult nouns and verbs) is considered.[10]

As expected, at 1;8.15 and 1;9.3, the child's renditions of multisyllabic noun and verb targets tend to present in initial position a non-additional element, respectively 64·1 % and 55·1 % of the cases (see Figure 6), and this

[10] χ^2 values at 1;8.15, 1;9.3 and 1;10.12 are respectively 19·95, 76·04 and 36·43, all with $p \ll {\cdot}001$, df = 1; like for noun and verb targets, also for the lexical production as a whole the difference is not significant at 1;7.18.

much more frequently than a PAE (the z-score approximations to the binomial tests are, respectively, 4·0 and 5·7, with $p \ll 0{\cdot}001$; at 1;7.18, they present more often a PAE: $z = 2{\cdot}43$, $p < 0{\cdot}02$, two-tailed), whereas at 1;10.12 there is no significant difference between the two ($z = {\cdot}989$, $p = 0{\cdot}32$, two-tailed). Again, very similar results are obtained for the lexical production as a whole.

So, while for monosyllabic targets the VCV pattern continues to be realized by a PAE followed by a CV(C), for multisyllabic targets it is most often realized by the production of an initial vowel which, instead of being a prefixed target-external addition, belongs to the target word itself. This is not a peculiarity of this child's production as examples of the same kind can be found in other data collections of this period (e.g. for French, Grégoire, 1937; Kilani-Schoch & Dressler, 2000, who call them 'lexical fillers'; Vihman *et al.*, 1998; for Italian, Bottari *et al.*, 1993/94, who exclude them however from their analyses). It should be noted that the production of word-initial non-additional vocalic elements cannot merely be attributed to the child's growing ability to approximate target words. In fact, at the same time that we observe the change towards the extension of previous renditions (from CV(C) to VCV(C)), we note also a change towards their reduction. Some adult multisyllables that were earlier uttered in a better matching CVCV pattern, are later produced without the first consonant, conforming thus to the VCV production pattern but becoming in this way less adequate approximations than before, as can be seen in the following examples:

adult target word	*at 1;5.23 and 1;6.22*	*Later*
/bebe/*bébé* 'baby'	/be'be/	/e'be/
/ʃapo/*chapeau* 'hat'	/pa'po/	/a'po/
/dodo/*dodo* 'night-night'	/do'do/	/o'do/
/gato/*gateau* 'cake'	/ka'ko/	/a'ko/
garsõ/*garçon* 'boy'	/ka'sõ/	/a'sõ/

These results point to the fact that, during the first two to three months, PAEs (target-external) and non-additional (target-internal) vowels in initial position are functionally related phenomena: both are ways of realizing iambic VCV(C) patterns and both derive their phonetic substance from the child's work on surface characteristics of the language. After the over-generalization of the most frequent vocalic sounds adjacently preceding adult's content words, particularly nouns – here /ə,e/ –, PAEs adjust to the distributional properties of the vocalic sounds of grammatical morphemes found in the prelexical position most adjacent to nouns, that are practically invariant and present less variety and greater recurrence in their prelexical environment than verbs. Word-initial non-additional vowels correspond to the vocalic sounds found in the position most adjacent to salient segments of multisyllabic targets.

Results related to those above further strengthen the OSR hypothesis and the relatedness between the production of PAEs and of non-additional vowels in initial position of VCV-patterned productions. First, like PAEs, non-additional vowels in initial position increase suddenly (see Figure 7):

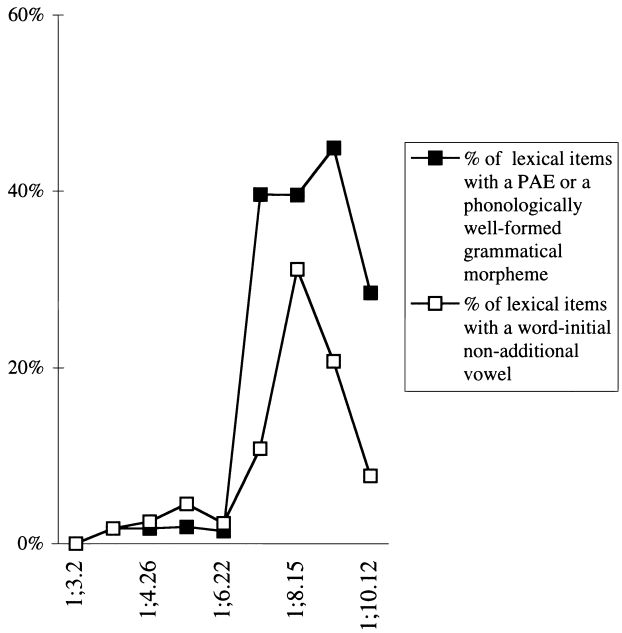


Fig. 7. Proportion of lexical items presenting PAEs or non-additional word-initial vowels, per child's age.

PAEs show a sudden increase at 1;7.18, non-additional vocalic sounds, at 1;8.15.

Second, just as certain adult monosyllables are produced by the child without an additional element before she produces them with a PAE (for example, the child says /pik/ *pique*(*s*) 'sting(s)' before /əpik/; /mɛ̃/ *main* 'hand' before /amɛ̃/), so adult multisyllables, rendered earlier in a C-initial form, are later produced in a V-initial form, where the initial vowel is non-additional (for example, /ve/ *enlever*/*enlevé* 'to remove/removed' before /əve/; /po/ *chapeau* 'hat' before /apo/). Finally, if productions with PAEs and those with word-initial non-additional vowels are combined and considered both as realizing V-initial productions, the difference found earlier between the child's renditions of mono- and multisyllabic targets diminishes considerably, though a significant difference remains in favour of multisyllabic targets at 1;8.15, and in favour of monosyllabic ones at the next two sessions (see under V-initial productions in Table 6).

The relatedness in the treatment of grammatical morphemes and of multisyllabic words found here is consistent with recent work strongly suggesting that the early omission of function morphemes and of weak syllables from multisyllabic targets, on the one hand, and the subsequent early production of both, on the other, reflect phonoprosodic constraints and developments at the perceptual and production levels (e.g. Pye, 1983; Gerken, Landau & Remez, 1990; Gerken, 1994; Wijnen *et al.*, 1994; Vihman, 1996).

This sonorically-motivated organization is the result of a nontrivial cognitive construction on the child's part, far removed from a mere copying of the input; however it does not correspond to the organization of the French language. Morphologically speaking, the child is not on the right tract; in this way she has, however, been able to focus on parts of the language where grammatical morphemes occur.

From premorphological PAEs to protomorphological fillers : signs of a new organization

At 1;10·12, though there are still many errors, especially errors of omission, signs of a grammatically-based reorganization start to be observable.

Non additional elements and the child's rendition of multisyllabic targets. At this session, the proportion of multisyllabic noun and verb targets rendered by the child with a nonadditional vowel in initial position decreases considerably: from 64·1 % and 55·1 % at the two previous sessions, is reduced to 11·4 %. Although these renditions still present most often the iambic structure (75·7 %), only 19·3 % have now a V'CV(C) pattern (compared to the 93 % and 66·2 % at the two previous sessions, see Table 6). At this session multisyllabic noun and verb targets are rendered most frequently in CVCV(C) form and additions may be prefixed to them as, for example, /eko'ne/ *cornet* '(paper) bag'. CVCV(C) productions amount now to 61 % of the multisyllabic targets' renditions and an addition 12·4 % consists of CVCV-patterned productions prefixed by an additional element, whereas at the two previous sessions they averaged respectively 17·5 % and 3·2 %.

The pattern of changes in the child's renditions of multisyllabic targets and the differences between renditions of monosyllabic and multisyllabic targets (all of the iambic structures of the former continue to be VCV(C)-patterned and present a PAE in initial position) indicate that the PAEs of this period start to acquire specific functions.

Differential production of PAEs according to word class categories. As noted earlier, at 1;10.12 there appear the first signs of differential production of PAEs according to the category of the word they precede: the set of PAEs produced in prenominal position presents significant differences relative to

the set in preverbal position. This is the first characteristic that PAEs share with grammatical morphemes of the language, conferring to them a proto-morphological status. It constitutes also a sign of differentiation among words pointing to the beginnings of word classes.

The beginning of linked morphology. At the same time, another type of differentiation among words starts to appear. Up to 1;9.3 the child produces only one main form (with phonological variants) per target word, no matter whether it corresponds to an adult noun or to an adult verb. For verb targets, most of the child's forms approximate the past participle form (which is often homophonous with the infinitive form) as, for example, /o'ʃe/ *couché*/*coucher* 'to lie down/laid down', /o'be/ *tombé*/*tomber* 'fallen/to fall', /ə've/ *enlevé*/*enlever* 'removed/to remove'. For other verb types, forms of the present indicative (often homophonous with the imperative) may be found as, for example, /e'pik/ *pique* 'sting(s)' and /py'ɛ/ *pleure* 'cry/cries' (for other studies reporting single-form verb morphology, see also Gathercole, Sebastián & Soto, 1999; Grégoire, 1947; Pizzuto & Caselli, 1994; Tomasello, 1992). At 1;9·3 two different forms (with phonological variants) for each of four verb types are found. At this session, however, at least one of the two forms is an immediate repetition of the adult's. It is at 1;10.12 that the child produces different forms – the indicative/imperative and the past participle/infinitive form – for each of ten verb types (37% of the verb types at the session), and this without being stimulated by an immediately preceding adult model: e.g. /sot, i'sot, e'sot/ for /sot/ *saute*(*s*) 'jump(s)' and /o'te/ for /so'te/ *sauté*/*sauter* 'jumped/to jump', /tun/ for /turn/ *tourne*(*s*) 'turn(s)' and /tu'ne/ for /tur'ne/ *tourné*/*tourner* 'turned/to turn' (see Veneziano, 1999, for more details on this point). In contrast, for noun targets, only one word type presents a certain variation: the target-word /ʃeval/ *cheval* 'horse', pl. /ʃevo/ *chevaux*, is produced as /to'val, pu'val/, /tu'fo, tu'vo/. Furthermore, at 1;10.12 we find that only forms whose targets are verbs are immediately followed by the deictic *ça* 'this', as in /me'sa/ *met ça* 'put this' and /va'sa/ *enlève ça* 'remove this', and by the negative particle /pa/ *pas*, as in /pi'pa/ *pleure pas* 'don't cry'. These productions are not 'amalgams', or undifferentiated units, as /me/, /va/ and /sa/ are all also produced separately.

Thus it seems that while the child reconstructs lexical units and starts to find the boundaries between adult content words and grammatical morphemes, she also begins to realize that some content words behave differently from others, a finding that is in line with Slobin's proposal that operating principles responsible for the acquisition of word classes and of grammatical morphemes 'operate in tandem' (1985: 1195).

It should be stressed, however, that at this period verb morphology is still very limited in scope, in terms of both the number of forms produced and the

number of child verbs to which different forms are applied (see also Gathercole *et al.*, 1999; Pizzuto & Caselli, 1992, 1994; Tomasello, 1992). The initial differentiation between content words found here does not necessarily imply that the child has already elaborated the adult word categories of nouns and verbs. These differences might result from the child's knowledge of particular content words or from generalizations limited to a certain number of words without yet implying the capacity to identify grammatically distinctive common properties.

Form and use of additional elements. At 1;10.12, a greater proportion of PAEs become phonologically adequate reproductions of the grammatical morphemes that could have appeared where PAEs occur (from 4% and 5·8% at the two previous sessions respectively, to 27%). For example, the articles *le* in /lə'bɛ̃/ *le bain* 'the bath' and *la* in /la'paʒ/ *la page* 'the page', and the negative particle *pas* in /'paka'se/ *pas cassé/casser* 'not broken/to break'. Although errors of omission are still high (in prenominal position, even higher than at the earlier sessions), as noted earlier, the proportion of errors in the use of PAEs decreases relative to the previous two sessions, particularly in prenominal position, where it constitutes 18·4%. By contrast with the session at 1;7.18, when few errors of use were also observed (13·6%), at 1;10.12 such a good result cannot be interpreted as a pseudo-success: the child now correctly uses not only /ə,e/ (84% of these PAEs), but also /a/ (100%) and /o/ (33%). Additions in preverbal position show lower adequacy than in the prenominal one. In particular, none of the 14 occurrences of /ə,e/ can be taken to stand for a contextually plausible grammatical morpheme, suggesting that these two elements, which are the first to be extracted and generalized, may now serve as all-purpose 'fillers'.

Articulated speech. The appearance of two-word utterances co-occurs with that of PAEs but it is only at 1;10.12 that multiword speech becomes the dominant way of expression (see Table 1).

PAEs, although quantitatively less prominent than at the earlier sessions, have undergone a change in function: they start to have the proto-morphological status of filler syllables proposed by Peters (1990) and Peters & Menn (1993), a change that occurs concomitantly with a change in the child's first grasp of grammatically-relevant features of the language.[11] However, although the child is now on the morphological track, she still has a lot to learn. Indeed, the prenominal position, for which errors of choice are low, remains unfilled 69% of the time a grammatical morpheme is expected. The low level at which additions are supplied in places where morphemes are

[11] A change along similar lines has been proposed by Kilani-Schoch (1998) and Kilani-Schoch & Dressler (2000) for Sophie, another French-acquiring child, at 1;11.

obligatory shows that the child has not yet mastered the structural constraints of the language she is acquiring, nor probably the grammatical functions that the additional elements she has been producing can fulfill.

Four months later, at 2;2.6, development in all of these domains seems to have made a leap forward: 82·7 % of PAEs are phonologically well-formed grammatical morphemes; the prenominal position is adequately filled 91·5 % of the time and the preverbal one 62·4 %, suggesting that the constraints of the noun phrase might have been acquired and those of the verbal phrase are well under way although, even at this stage of development, further analyses are necessary to establish whether the child has acquired the corresponding abstract categories, as for example that of determiner (Pine & Martindale, 1996).

DISCUSSION

The results presented point to the existence of a premorphological, non-grammatical, period in which the production of PAEs is not constrained by structural rules of the language, neither in terms of syntactic slots nor of the class of the word they precede. During the first two to three months the production of PAEs results from the organization of phonoprosodic regularities of the language and seems to stem from the same developments that lead the child to produce nonadditional vowels in the initial position of her renditions of multisyllabic targets.

This position finds support in two main sets of results. The first concerns the change towards a dominant iambic VCV production pattern. This is realized first by producing a PAE in V-initial position (at 1;7.18, for all monosyllabic targets and for 72·7 % of the multisyllabic ones), and then by producing either a PAE or a non-additional vowel depending on the syllabic length of the target word (for monosyllabic targets the pattern continues to be realized by a PAE in V-initial position while, for multisyllabic targets in 76 % to 88 % it is realized by a non-additional vowel in initial position). This first set of results points to the child's early sensitivity to the phonoprosodic properties of the target language (Demuth, 1994; Wijnen *et al.*, 1994; Vihman *et al.*, 1998) and shows that the early production of PAEs and child's renditions of multisyllabic words are linked by similar phonoprosodic concerns (see also Pye, 1983; Gerken, 1994; Wijnen *et al.*, 1994; Vihman, 1996). The second set of results concerns the systematic and developmentally changing relationship between the distributional occurrence of PAEs and that of the vocalic sounds in the adjacent prenominal position of the adult's utterances. It shows the child's treatment of the segmental level and the increasing adjustment to the probability of occurrence of the most frequently recurring segments.

The more specific account considers that the child first constructs an iambic metrical structure – an important prosodic pattern of French lexical

and/or constituent units – that she overgeneralizes and realizes preferentially as a VCV(C) pattern. This marks the beginning of a reorganization in the child's production and is one of the components in the appearance of PAEs. Another component consists in paying attention to the sonoric environment that precedes perceptually and cognitively salient parts of adult words, where the vocalic element constitutes the acoustically more prominent part, contributing to the establishment of the preferential V'CV(C) template. At first she extracts the most frequent vocalic sounds adjacently preceding adult's content words (/ə,e/) and uses them in the initial position of most of her VCV-patterned productions. Soon after, while the V'CV(C) pattern remains strong, its initial vowel becomes more systematically linked to the vocalic elements that precede the focused salient parts of adult words. For monosyllabic targets, the initial vowels are PAEs whose specific identities reflect the salient distributional properties of the vocalic sounds of grammatical morphemes found, in adult's utterances, in the prelexical position most adjacent to nouns, which are practically invariant and present less variety and greater recurrence in their prelexical environment than verbs. For multisyllabic targets, initial vowels correspond most often to the vocalic sounds found systematically in the word itself. This results in a coherent but wrong organization where the boundaries between content words and grammatical morphemes are not yet clearly differentiated.

This premorphological period is followed by a protomorphological one where PAEs start to present some of the structural characteristics of French free grammatical morphemes. While PAEs start to be syntactically-motivated fillers, other signs of a more grammatically-based organization appear: words start to show formal differences, some verbs present incipient bound verbal morphology, and combinatorial speech becomes well-established. However, the PAEs of this period can only be considered protomorphological fillers as they lack in particular the structural constraints of obligatory production, a revealing correlate of the grammatical function of PAEs.

The model that best fits the overall pattern of results is thus one in which PAEs take on different statuses with development: from a premorphological status where they reflect phonoprosodic properties (and should be called PAEs), to a protomorphological status where they start to share with grammatical morphemes some general structural properties (and can then be called FILLERS).

Between the PAEs of the premorphological period and the FILLERS of the protomorphological one, there is a functional discontinuity: the beginnings of a grammatical organization spring up from the preceding nongrammatical one. Such a discontinuity in specific contents does not imply a lack of continuity in development. Even if later acquisitions are qualitatively different from the preceding ones and are not in a 'homologous' continuity with them (Bretherton & Bates, 1979), they can nevertheless result from a

progressive construction in which earlier acquisitions constitute essential intermediary and releasing steps. This is a constructivist principle contained in Piaget's epistemological theory of developmental change (see, for example, Piaget & Garcia, 1983): the acquisition of new forms and structures results from a progressive construction whose directionality is constrained by the solutions to problems encountered at earlier states of knowledge (see also Gréco, 1985). Recently this notion, allying discontinuity in contents and continuity in processes of acquisition, has been applied, for example, by McCune (1992) to the acquisition of first words, and by Veneziano (1999) to the transition from single to multiword utterances.

Let's see how this notion can apply here by discussing the processes supposed to underlie the successive changes leading the child from the production of additionless renditions of adult targets to that of pre-morphological PAEs first, and of protomorphological fillers later.

We have shown that the first change – the appearance of PAEs – is linked to the child's construction and overgeneralization of an iambic, mostly VCV-patterned, phonoprosodic structure, on the one hand, and to the extraction of recurrences occurring in the sonoric environment that precedes focused salient parts of adult words, on the other. We argue that what brings the child to attend to and treat such regularities at this particular time is her increasing mastery in lexical abilities. Indeed, at 1;7.18 the child has a considerable vocabulary at her disposal (44 word types and a cumulative vocabulary of 89), a vocabulary that at 1;5.23 has undergone an acceleration greater than the constantly accelerating rate observed throughout the developmental period (Veneziano, 1999), and that she uses to express a large array of meanings and communicative intentions (Veneziano & Sinclair, 1995). We suppose that this increasing lexical knowledge allows the construction of stable lexical units providing the child with a secure and familiar basis from which she can better treat the neighbouring language material. It is in bringing her attention on what lies on the outskirts of established lexical shapes that the child is likely to discover and extract recurrences and regularities, and to encounter and treat grammatical morphemes (see also Peters, 1985 for the discussion of a similar shift of attention from content words to grammatical morphemes). This surface organization is then pursued with growing systematization, giving rise to the strong link between adult monosyllables and prelexical additional elements on the one hand, and between adult multisyllables and word-initial non-additional vocalic sounds, on the other.

One of the components of the reorganization leading premorphological PAEs into protomorphological fillers is provided by the growing coherence of the premorphological organization, whose deviance from the system to be learned is bound to get magnified. In particular, the child is likely to discover asymmetries in the treatment of monosyllabic and multisyllabic targets. Indeed, in performing her surface analyses more systematically, she may

notice, for example, that in the immediately preceding environment of the vocalic sounds attended to in multisyllabic targets there is a great variety of consonants (i.e. practically any consonant can be found before a vocalic sound in the initial or mid-position syllable of multisyllabic words), whereas there is greater consonantal uniformity before the vocalic sounds that in reality belong to grammatical morphemes (indeed, in the prenominal position, the one that the child seems to attend to most during this developmental period, most of the grammatical morphemes are the definite articles *la*, *le*, *les* all presenting the same initial consonant). Moreover, by looking further 'behind' focused parts of multisyllabic words, the same pattern of regularities may be spotted there as well. The boundaries between content words and grammatical morphemes may thus start to be differentiated.

Another major thrust to the qualitative change in PAEs is provided by the simultaneous construction of other fragments of structural knowledge – particularly, words start to show formal differences, some verbs present incipient bound verbal morphology, combinatorial speech becomes well-established – leading the child to abandon her surface hypotheses in favour of a more grammatically-motivated organization.

Thus, the two major reorganizations put into evidence here seem to follow disequilibria brought about by increasing competence at the developmentally lower level of functioning. The first reorganization has its source in the child's increasing lexical knowledge which leads her to treat previously ignored, little or variably attended to, parts of the language. The second reorganization is partly due to the increasing mastery with which the child implements the previous system. Although the latter is wrong and leads the child in a direction other than that needed for acquiring the system of grammatical morphemes, it has the advantage of focusing her attention on material relevant for this acquisition, and of generating conflicting data that raise problems for her to solve.[12] The 'new' data are ever present in the language input; and so is the varied French verbal linked morphology. What changes is the relation between the object and the child's way of apprehending it. It is when the child has constructed sufficiently stable lexical units and an iambic metrical structure that their preceding unstressed syllables become relevant; and it is when other fragments of structural knowledge emerge that verbal linked morphology starts to make sense to the child.

These findings complement, for an earlier developmental period, those of several recent studies showing that the acquisition of lexical and syntactic

[12] In this approach the data become bothersome on grounds internal to the system developed by the child up to that moment. The more mature analysis should be viewed as providing some solution to the problems encountered earlier and, at the same time, as leading to new discoveries and possibly to other problems. We thank Michael Maratsos for raising questions concerning this issue (personal communication).

categories are a gradual process based on the reorganization of previously-acquired limited and lexically-bound bits of knowledge (e.g. Pizzuto & Caselli, 1992, 1994; Olguin & Tomasello, 1993; Pine & Martindale, 1996; Gathercole *et al.*, 1999). In our study, although the child would have, through the production of PAEs, the appropriate means to show some structural knowledge of the language, in terms of constituent structures and/or in terms of word categories, she doesn't manifest it, casting serious doubts on the hypothesis of their innate, or even early, availability. Instead, fragments of structural knowledge appear to emerge simultaneously and only after considerable work has been performed on what are the phonoprosodic, lexical and morphosyntactic levels of the language.

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