

Mutual Knowledge and Prosody in Young Children

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Abstract

This work aims at modelising the use of the suprasegmental system and its relation with the enunciative structure in young children in a dialogue situation with a competent speaker. The role of the intonative and temporal parameters during the grammaticalisation period, which takes place between 2 and 3.5 years of age is investigated in this paper.

Results show that children who use intonation precociously for communicative purposes, also use it in a specific way related to their ability to detach themselves from the context. Three chronological periods emerge. As time goes by the complexification of the grammatical structures generates a functional redistribution of prosody.

1. Introduction

In the domain of developmental psycholinguistics, several authors show that language acquisition is indissociable of dialogue acquisition. In a pragmatic perspective, J.S. Bruner [3] detects notably that children integrate fundamental structures which support language (reference, co-reference, etc.) by the adjustment of *joint attention* inside *formats* (interactive routines).

More recently, E. Veneziano [12] accounts for the interdependency between first verbal exchanges and utterances development. She brings to the fore that the type of dyadic conversational sequence in which children participate determines the progressive acquisition of his mother tongue knowledge (for example the development of *successive single-word utterances*).

Meanwhile, even though communicative experience is necessary to the development of the linguistic competence, it becomes relevant only when interlocutors set up cooperation relationship, when they manage to share a *mutual background knowledge* [4]. Thus, communication involves from the partners the mutual recognition of communicative intentions. Those intentions are transmitted through the enunciative structure and the prosodic structure. That's the reason why it appears essential today to explore those two structures in order to better understand language functioning and its development.

We consider the topic as the element given by the locutor [7]. It distinguishes itself from the comment (rhem), which is the development of the topic. Both are components of enunciative structure and convey, through particular segments, various types of informative degrees according to the context. Those grammatical segments are also marked by intonative changes.

By prosody, we refer to the intonative system as a whole. This system has notably an enunciative function, insofar as it

carries meaning; prosody really transmits communicative intentions and takes part in founding of *mutual knowledge*. Thus, in order to give optimal intercomprehension, locutors must use prosody discerningly.

How do children learn to use correctly the prosodic means? How do they integrate them during grammar acquisition? It's the object of our study.

2. Problematic

If the development of thematisation and the development of prosody have been the object of multiple investigations [5], [6], [2], [8], [9], they have never been studied together in an interactionist aim. That's precisely the purpose of our study. Moreover, most authors have favoured the prelinguistic period (before 2 years old). It's precisely in the second and the third years of life that appears the « vocabulary explosion » [1] and consequently the modification of all oral expression. Therefore, we are interested in that chronological range with the following question to guide our study: how do prosodic features contribute to the evolution of thematisation operations?

Our study examines prosodic patterns not only in their enunciative functions, but also in their interactive functions, in dialogues between young children and an adult (an accomplice).

3. Methodology

The methodology, centred on the analysis of prosody functioning in spontaneous speech, is the result of an interdisciplinary collaboration which consists in a pragmatic and structural approach of speech from psycholinguistic, linguistic and phonetic points of view. Data come from the observation of interactions between children (from 25 to 41 months aged) and a competent locutor. We total more than twelve hours of tape recording.

All corpora (41 dialogues) are entirely transcribed and coded. To accomplish the transcription, a coding scale with several levels has been designed. Specifically, four analysis axis which allow to evaluate the weight of the informative structure on syntagmatic structures (each axis has several variables with n conditions) are considered:

- I. a pragmatic enunciative model arisen from studies about conversation analysis, integrates the modal nature of interventions, the nature of thematisation operations and is to a great extent based on the Functional Grammar;
- II. a prosodic model which includes the acoustic description of segments previously defined with the P. Martin's software (Winpitch, 1997) and constructed around the observation of prototypical¹ intonative

patterns;

- III. a semantic model based on an intuitive method of the description of various kinds of verbs;
- IV. a syntactic model based on the syntagmatic structure analysis of the produced utterances, in terms of actancial forms.

Concerning the prosodic level, our study is centred on fundamental frequency (F0) and duration. F0 is defined in terms of prototypical global contours determined from a set of acoustic features related to intonative levels.

Intonative levels were created with an empirical method. A common range (four intervals with an amplitude of 70 hertz each) served to analyse and place melodic variations of all locutors productions in functional intonative spaces. Thus we created our own intonative morphemes according to the various used patterns. Indeed in those spaces, we isolated patterns defined from a set of acoustic features related to the

3.1 Synthesis of the coding

form of the pattern - simple or dynamic – to its **direction** - rising, descending or flat for single contours, concave or convex for dynamic patterns – to its **amplitude** - ample or restricted – and to its **duration** – more or less long.

According to their configuration in comparison with the basic neutral structure, utterances defined from various types of thematic structures, are decomposed in one or two intonative contours. Thus, topic-comment andthetic utterances are only characterised by one contour (« / Il fait les gâteaux. / »), whereas utterances with an extraction or those with a double topicalisation are described from the succession of two prosodic patterns (« / Il a peur / lapin. / », « / Papa il est beau / papa. / »). We consider those configurations like global contours whose variants are arranged in prototypical general categories used for the final coding.

Concerning duration, we are exclusively interested in locution times and syllabic lengthening that appear at the end of the utterances [11].

Table 1: Classification of axes and their variables used in the coding of children utterances

ENUNCIATIVE	PROSODY	SEMANTICS	SYNTAX
1) Dialogal Modality	1) Duration	1) Deictic	1) Global syntax
2) Dialogal chain	2) General contour	2) Access to lexicon	2) Local syntax
3) Intentionality		3) Operator verb	3) Morphology
4) Discursive progression		4) ± Static verb	
5) Enunciative structure		5) Temporality	

Example : «Sur le chapeau.» _

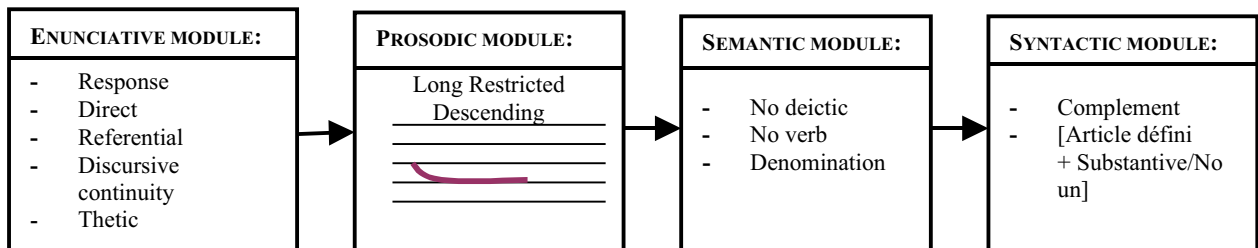


Figure 1: Example of a child utterance analysis

4. Results

Results have been obtained through statistic processing². We note that at the enunciative, prosodic, semantic and syntactic levels, three developmental periods appear. Those three periods seem to correspond to three types of the prosodic system functioning and various strategies of thematisation.

- **the first period** gathers subjects aged between 25 and 27-28 months. It's characterised by an abundance of single prosodic contours (see figures 2 and 3) on «reprises rhématiques» andthetic segments which are in the majority composed of «holophrases». Hence, at first, the *mutual knowledge* lives on a very limited number of elements.



Figure 2: Ample-Rising Pattern (26 months)

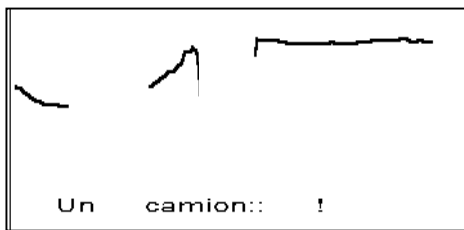


Figure 3: Long Ample-Rising Pattern (26 months)

- **the second period**, which includes subjects from 28 to 34-35 months old, identified by the massive arrival of conjugated verbs, the use of flat contours and lengthening on the final syllable of utterances, but also a lack of homogeneity between subjects of the same age. Nevertheless, that period can be divided into two sub-periods: from 28 to 32-33 months, then from 32-33 to 34-35 months. The latter distinguish themselves from each other on the one hand by the nature of topicalised elements («ça» in the first, a substantive in the second) and on the other hand by the position of these topicalisations (at the beginning of the utterance for the first, at the end for the second); children acquire new marked expressive structures (see figures 4 and 5).

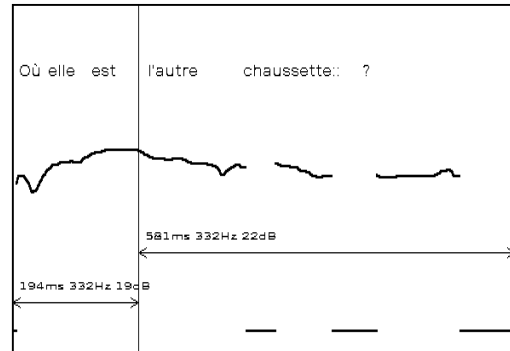
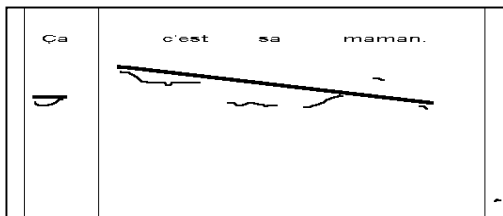


Figure 5: Rising-Flat Pattern (33 months)

- **the third period** includes children from 35-36 to 41 months old. It is identified by the initial position of the detached topic and the production of descending intonative contours on comment (see figure 6). Such a pattern allows children to separate the topic part from the comment part, better prepare speech turn of the adult partner, and stabilise their new grammatical knowledges. Consequently, at the prosodic level, they make more and more use of intonative morphemes which are analogous to those of adult speech.

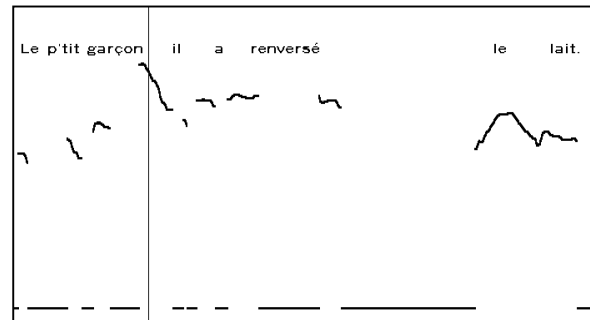


Figure 6: Rising-Descending Pattern (41 months)

5. Discussion

Globally, we note that at 2 years old, the development of children prosodic system seems far from being achieved. Indeed, during the first and second years of life, they make new hypotheses on their prosodic grammar. Moreover, the development of thematic units and their prosodic features seems to obey a non-linear evolution. Some «intonative possibilities» are more or less activated according to the syntactic constructions «available» to children. Variations of F0 allow them to construct and to arrange enunciative elements according to their importance in the *mutual knowledge*. However fundamental frequency modulations are not the only concerned parameter. We note also a special use of duration, especially in phenomena of final syllabic lengthening in 31 months old children.

The collected data contribute to outline a model of

prosody use in the setup of enunciative structures in infants between 2 and 3.6 years old. This model is based on the idea of a *circular reaction* [10], i.e. an often neglected process in language studies. Repetitions of a same enunciative or prosodic structure by children may cause conflicts among the constraint levels useful to reference and utter. In the piagetian view, the repetition is sometimes intended to find out the effects of actions on a same object. That *circular reaction* would explain how children discover gradually means to obtain more and more «power» on the dialogue partner. Controlling progressively cognitive and linguistic invariants according to perception of the interlocutor, they learn to manage the organisation of enunciative, prosodic, semantic and syntactic axis.

During the first period, prosody would essentially have a modal role. Then, during the second period, it would serve to highlight a comment in comparison with an extracted topic. Finally, in the third period, children would have access to an enunciative prosody. Prosody may allow children to be relevant by focusing an information which is new or known by the partner according to the form of the interaction and the dynamics they want to give to the discourse.

6. Conclusion

The results suggest that between 25 and 41 months old, the use of the prosodic factor by children during the language acquisition phase consists in three developmental periods following one another. At the beginning, prosody implies intentionality of the communicative structure through modes that meet children expressive needs. Then, grammatical structure becoming more complex, prosodic parameters vary and highlight at the same time topic and comment. From then on, we note that prosody «reacts» according to communication needs and the complexity of syntagmas, phrases produced by children.

From a general point of view, this evolution of prosody seems to go on a par with the evolution of symbolic thinking. Linguistic elements are integrated as a function of the cognitive constraints related to the age of individuals. Therefore prosody participates for a long time and actively to the acquisition of the mother tongue and not only during the prelinguistic stage. Consequently, all prosodic means are not right away mobilised to take charge the *mutual knowledge*.

In addition, at a methodological level, results provide a reflection on how to improve general modelisation in psycholinguistics. Today it's necessary to take prosodic parameters into account in studies on language development and studies on oral communication.

¹ Gestalts or stylized units coming from a general intonative patterns typology.

² *Analyses Factorielles des Correspondances Multiples*.

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