

Early grammatical and prosodic marking of utterance modality in French: a longitudinal case study*

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ABSTRACT

The study investigates how basic communicative functions expressed by utterance modalities (declarative, exclamative, injunctive, interrogative) emerged in the early language of a French child, and examines whether and how morphosyntactic and prosodic devices were used to mark these contrasts. A longitudinal corpus of naturalistic productions was collected between the ages of 1;2 and 1;9, and 960 utterances were subjected to functional, prosodic and grammatical analyses. Declarative, exclamative and injunctive utterances were found from 1;2, and first interrogatives appeared at 1;6. Intonation contours varied as a function of utterance modality and were largely in accordance with the patterns in French: declaratives and exclamatives were falling, interrogatives rising and injunctives split between falling and rising contours depending on their specific functions. A quarter of the productions involved an elementary grammatical marking of utterance modality such as interjections, imperative or indicative verbal forms, or interrogative morphemes. These findings indicate an early and complementary use of prosodic and grammatical devices in the child's construction of the linguistic system.

INTRODUCTION

As a function of communicative intent, speakers may produce utterances of the declarative type (*Peter is coming back*), the exclamatory type (*Peter is coming back!*), the interrogative type (*Is Peter coming back?*) or the injunctive

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type (*Peter, come back!*). These variations correspond to the linguistic category known as sentence (or utterance) modality. The choice of utterance modality, which expresses the speaker's attitude towards what he or she is saying, is one of the basic operations in the production process. In natural languages, it is signalled by two main types of formal cue – prosodic markers and morphosyntactic markers. The present study takes a functionalist approach to investigate the emergence of the four utterance modalities in early child language, during the first-word and first-word combination stages. Based on longitudinal analyses of the productions of a French child between the ages of 1;2 and 1;9, the study is aimed at examining to what extent and by which means a child, in the earliest steps of language development, can use the two types of formal device – prosodic and morphosyntactic – to signal the functions expressed by sentence modality.

Function and marking of utterance modality in French

The underlying assumption of the study is that utterance modalities reflect distinctions between basic goals of communication, or, in other words, between the main communicative functions of language which they convey. Speakers fundamentally use the declarative modality to make assertions and describe facts or ideas, and the exclamatory modality to express emotions or strong feelings. The injunctive modality (which we prefer to the more usual term of 'imperative' modality) covers utterances which convey a request, command or a wish to the interlocutor, whereas the interrogative modality basically serves requests for information.

This functional conception of utterance modality is based on work in semantics in two fields of linguistics – language functions and speech act theory – which acted as the framework for definitions here. The most classic description of the functions of language is Jakobson's (1963) analysis, an extension of Bulher's (1934) three-dimensional schema. Jakobson defined six well-known communicative functions of language (referential, expressive, conative, metalinguistic, phatic and poetic). The first three functions – representation of the world, expression of speaker's attitude and action on the listener – are the basis for the distinction between the declarative, exclamative and injunctive/interrogative modalities.

The contribution of the philosophers of language of the Oxford school (Austin, 1962; Searle, 1969; Searle & Vanderveken, 1985) was to show that utterances accomplished speech acts which can be characterized by their illocutionary force. Lyons's (1977) description of sentence modality, which draws explicitly on this perspective, emphasizes the need to construct a hierarchy of illocutionary acts. He postulates three universal fundamental acts: statements, questions and command (the latter covering commands in the strict sense, plus requests, advice, entreaties, etc.), which correspond

respectively to the declarative, interrogative and imperative modalities. The argument for a distinction between questions and commands, which was not part of Jakobson's analysis of functions, is based on the fact that, although the two acts are addressed to an interlocutor, the former calls for verbal and the latter nonverbal responses. The exclamatory modality, found in the expressive function described by Bulher and Jakobson, often supplements the three defined by Lyons (cf. Arrivé, Gadet & Galmiche, 1986). There are a number of reasons to assign exclamatory modality a separate status even though it shares a number of features with the other three modalities. Ducrot (in press) makes claims for the specificity of exclamatory as compared to declarative utterances, arguing that although both types of utterances can provide virtually the same type of information, the exclamatory utterance differs in that it conveys the effect of an experience and is the manifestation of a personal feeling.

In natural languages, morphosyntactic marking and prosody are the two basic classes of formal linguistic devices which signal changes in communicative modality and render the main function of an utterance explicit.

In French, morphosyntactic marking (see Arrivé *et al.* 1986) is primarily accomplished by verb mood, word order and/or the use of specific morphemes. The declarative modality – the least marked – is signalled by default by the indicative mood and the SVO order, although these features can also be found in other types of utterances. In contrast to the indicative mood of declaratives, the imperative (or the subjunctive where the imperative mood is defective) is the typical and specific marker of the injunctive modality. The interrogative modality uses a highly complex morphosyntactic system. Total interrogation (dealing with the entire sentence) is marked traditionally by an inversion of verb and pronoun subject, which then is found in the post position (*Viens-tu?*). However, the use of inversion has declined considerably and interrogation now tends to be marked by intonation alone (*Tu viens?*), or by the use of the idiosyncratic morpheme *est-ce que* as the sentence head, which has the advantage of not changing the word order of the declarative sentence (*Est-ce que tu viens?*). Partial interrogation (dealing with a particular part of the sentence) is always characterized by an interrogative morpheme (*pourquoi* 'why', *quand* 'when', *où* 'where', etc.). The exclamatory modality is typically marked by the use of interjections or exclamatory morphemes (*que* 'what', *comme* 'how'), which are often formally identical to interrogative markers, but at times there may not be any morphosyntactic markers to signal the specificity of the utterance type.

In addition to these direct constructions, each of the four modality types has indirect constructions, calling in particular for the use of modal verbs (*vouloir* 'want', *pouvoir* 'can') and explicit performatives such as *je dis que* 'I am saying that', *je demande si* 'I am asking if'. Indirect constructions can give rise to utterances whose surface structure does not apparently match their

actual function. Interrogatives can be indirect, and, as has often been pointed out, an utterance with an injunctive function can have an apparently declarative (*I want you to pass me the salt*) or interrogative form (*Can you pass me the salt?*). These examples show that as is the case in other subdomains of language, there may not be one-to-one matching between communicative function and linguistic markers, and the borderline between utterance modalities may not be clearcut.

The second way of marking the modality of an utterance is through changes in prosodic parameters. Sentences in French have a specific prosodic intonation contour, produced by changes in pitch that vary as a function of modality. In the absence of morphosyntactic markers, intonation can be the sole indicator of sentence modality. Descriptions of modern French (Arrivé *et al.* 1986; Béchade, 1992; Di Cristo, 1994) indicate that the prototypical declarative sentence is characterized by a rise-fall sentence intonation contour. Injunctive sentences in the imperative are marked by falling intonation over the entire utterance. The same curve is found in other types of commands which are not marked by the imperative (including interrogatives which act as commands), which has prompted certain grammarians to argue that the falling intonation is the mark of the imperious register (Arrivé *et al.* 1986). The interrogative sentence (with no grammatical markers) typically contrasts with the declarative or the imperative by its rising contour on the final segment. However, the presence of an interrogative morpheme partially cancels out these contrasts, in that the rising tone affects the interrogative morpheme itself; interrogations introduced by *est-ce que* and partial interrogations often have intonation contours that are analogous to the ones found in declaratives or imperatives. The exclamatory sentence is characterized by a rising tone which however is lower than in the interrogative, or by a rising-falling contour associated with word stress.

Thus, intonation schemas characterizing utterance modalities are complex. In addition, they can be modified as a function of a range of other factors such as embedding of syntactic groups, focal stress and thematic organization (Rossi, 1980; Di Cristo, 1981; Di Cristo, 1994). Furthermore, the continuation rise, which concerns parts of the utterance and signals that the message is not complete, apparently plays a major role in French (Delattre, 1961) and may have considerable impact on melodic contours in actual speech.

Developmental issues

In the 1970s, a number of psycholinguists took an interest in the development of communicative competence in early language. Halliday (1975) analysed the functions (instrumental, regulatory, interactional, personal, heuristic, imaginative and informative) of a young child's first productions, and reported that at about the age of 1;5 there was a restructuring which led to

a distinction between pragmatic utterances, designed to obtain a response or an action from others, and mathetic utterances which organized and categorized the environment. Other studies (Dore, 1975, 1977, for instance) were designed to identify and categorize speech acts of young children such as labelling, repeating, answering, requesting actions, requesting answers, calling, greeting, protesting, etc. In their study of three Italian children, Bates, Camaioni & Volterra (1975) analysed the development of declarative and imperative performatives from the prelinguistic stages to the first linguistic phases. The findings obtained by Dale (1980) on a fairly large sample of English speaking children 'supported the view that the range of pragmatic functions expressed grows steadily during the one-word and very early two-word phases', although universal sequences of emergence of these functions were not found. These pioneering studies thus showed that a good number of functions or speech acts were identifiable in children's utterances as of the one-word phase, or even in prelinguistic vocalizations, although appropriate grammatical marking of communicative intent was absent. This prompted more systematic studies of the ways in which children employ language to differentiate these functions.

More recent research on the development of communicative functions has paid special attention to prosodic variables, and intonation in particular, in conveying these functions. This interest in intonation is not surprising, since it appears to play a major role in the first phases of language. Children have an early sensitivity to intonation changes in input, and mothers draw heavily on these variations – for example by ending their utterances on a rising tone to sustain the child's attention (Ferrier, 1985). Children also produce variations in intonation early. Infants apparently gain physiological control over these variations between the ages of 1;0 and 1;6 (Crystal, 1986), and 0;11-to-1;1-old infants are able to synchronize pitch and timing control, at least for most of their vocalizations (Bacri, de Boysson-Bardies & Hallé, 1989). Crosslinguistic studies suggest in addition that very young children reproduce prosodic characteristics of the ambient language, in particular certain intonation and syllable-timing patterns (Hallé, de Boysson-Bardies & Vihman, 1991; Whalen, Levitt & Wang, 1991; Levitt, 1993). The Hallé *et al.* (1991) comparative study of French and Japanese children at the age of 1;6 reports for instance a contrast between the predominant rising contours of the French infants, and the predominantly falling contours of the Japanese infants.

However, a number of studies also show that very young children use intonation and other prosodic devices for communicative purposes. Even in the prelinguistic period, certain intonative changes in vocalizations may be connected to the communicative context (Furrow, 1984; D'Odorico & Franco, 1991). Variations in intonation reported in early linguistic productions apparently also correspond to different communicative functions.

Halliday (1975) indicated that Nigel's final rising contours were associated with pragmatic type functions, whereas his falling contours were associated with mathetic functions. Menn (1976) also reported the use of rising contours for requests, and falling contours for 'narratives'. More recent studies – which often combine auditory and acoustic analyses of prosody – have obtained comparable results. Galligan (1987) studied two English-speaking children at the one-word phase and reports rising intonation in request utterances. Flax, Lahey, Harris & Boothroyd (1991) studied three English-speaking children from roughly the ages of 1;0 to 1;8 and show that despite high inter-individual differences, rising intonations tended to be produced more frequently in request utterances. A series of studies on request production in French children (Marcos, 1987; Bernicot & Marcos, 1990; Marcos, 1991) report analogous regularities: in vocalizations of children aged 1;2 to 1;10, rising intonation and a higher pitch range tended to be associated with requests, whereas a lower pitch range was associated with labelling, at least after 1;6 (Marcos, 1987). Analyses of the acoustic parameters of utterances produced by four English-speaking children aged 1;11 (Furrow, Podrouzek & Moore, 1990) showed that a number of prosodic parameters differed between utterances produced in an assertive context compared to a directive context (directives were higher in intensity and final frequency and began with more rising frequency contours).

What emerges from all these studies is that certain prosodic variations, in particular in intonation, can serve to express communicative functions as of the earliest phases of language. Despite high inter-individual differences, children learning different languages appear to produce a fundamental contrast in intonation as a function of communicative intent: rising final contours or greater intensity are associated with pragmatic type utterances designed to change the environment or obtain a response such as requests, whereas falling intonation appears to be associated more frequently with descriptive functions such as labelling. These regularities suggest that intonation is one of the first linguistic forms that children match with functions.

Specific purposes and hypotheses of the study

The present study investigates to what extent a French child, in the period between the ages of 1;2 and 1;9, marked contrasts between the four main modes of communication – declarative, exclamative, injunctive, interrogative – which are viewed as superordinate functions within which more specific functions of child language can be found. It explores not only how the child used intonation, but also how she used more linguistic means such as lexical and grammatical markers that serve to signal these contrasts explicitly.

The study had, thus, three main specific goals. First, a functional analysis of the child's linguistic output was conducted to describe the structure and

organization of the four communicative modalities during the period, and to define order of appearance. Second, a prosodic analysis was aimed at determining whether the child marked variations in utterance modality through intonation, and tested for differences in intonation contours as a function of the four communicative modalities. The linguistic model of intonation in French and a number of developmental results suggest that declarative utterances should present falling contours and interrogatives should present rising contours. More complex results were predicted for injunctive utterances. In French, imperatives have a falling intonation contour but developmental studies have shown that a rising tone is often associated with pragmatic type utterances such as requests in young children's speech. Thus injunctives may be split into those with rising and those with falling tones. However, it is clear that intonation in toddlers is affected by other factors than communicative modality; a feature controlled for in the present study was length of utterance. Third, a grammatical analysis was conducted to determine the extent of morphosyntactic marking of utterance modality, its first forms, and which utterance types are preferentially marked. Clearly as compared to adult language, only a minute fraction of all of the possible morphosyntactic devices could be expected, both quantitatively and qualitatively.

METHOD

Data collection

The child was a French girl, the youngest of four in a middle-class family. She was audio- or video-recorded twice a month during an eight-month period, between the ages of 1;2 and 1;9. Recordings were made at home in everyday situations (meals, plays, washing, dressing, etc.), during non-structured interactive sessions with the family. Transcripts of the sessions were made and stored on computer in the CHAT format (MacWhinney & Snow, 1990). The child's and other participants' utterances were alphabetically transcribed with information about situations, contexts and gestures. In addition, phonetic and intonation codings of the child's productions were made.

Data selection

Only attempted utterances were selected for the study, which excluded babbling and vocalizations. To qualify as an utterance, a production had to meet two requirements: to be a prosodic unit, and to include at least one element resembling a French word in shape and meaning. In addition, productions that could not be classified in any of the functional categories presented below were discarded, and those that were ambiguous from lack of

contextual information. Productions which were not likely to respond to instrumental analysis in the two sessions submitted to this analysis (whispers or high overlap with other voices or with noise) were also discarded.

In all, 60 productions were selected in each of the 16 sessions, yielding in a total corpus of 960 utterances. This corpus was divided into eight monthly units corresponding to the child's age, and into the four following two-month periods: Period 1 (1;2 to 1;3); Period 2 (1;4 to 1;5); Period 3 (1;6 to 1;7); and Period 4 (1;8 to 1;9).

Data analysis

The selected productions were coded independently by the two authors; codings (initial agreement of about 80%) were discussed until complete agreement was reached. The child's utterances were analysed in the three following ways:

(a) *Functional analysis of utterance modality.* The dominant function of each of the child's utterances (e.g. labelling, description, request for attention) was determined on the basis of its meaning and linguistic and situational contexts (gestures, mimicry, postures, mother's reactions). The observed functions mostly fit speech act analyses commonly found in previous child language pragmatic studies (see Dale, 1980; Ferrier, 1985). The dominant function was used to assign a communicative modality to the child's utterance, according to the following categorization:

DECLARATIVE

namings and labellings; descriptions; confirmations; denials;

EXCLAMATIVE

expressions of strong refusal; expressions of strong desire; expressions of emotion; ritualized interjections;

INJUNCTIVE

requests for attention; requests for objects; rejections of objects; requests for others' actions; rejections of others' actions; expressions of giving;

INTERROGATIVE

requests for information.

(b) *Prosodic analyses.* A perceptual analysis was used to classify all the selected child's utterances into three categories – falling, level and rising – as regards their final intonation contour.

In addition, an instrumental analysis was conducted on all the selected utterances in two successive sessions, respectively at 1;7.27 (session 19b), and 1;8.05 (session 20a). This method has been used in various studies of infants' prosody (cf. Hallé, Boysson-Bardies & Vihman, 1991). For each selected production, the fundamental frequency (F_0) was extracted by means of a variant of the cepstral method and was checked through visual inspection of narrow band spectrograms (incorrect values were deleted). F_0 curves were

then smoothed by fitting natural cubic spline functions to the raw values. Examples of F_0 curves corresponding to two utterances are shown in Appendix 1. The following parameters were extracted from the smoothed contours (program written by P. Hallé): F_0 onset value, F_0 offset value, F_0 minimum value, F_0 maximum value, F_0 mean value, F_0 excursion. F_0 excursion was the ratio of the 'signed' F_0 range (last Min/Max - first Min/Max) to the F_0 onset value. This parameter was specially designed to provide a quantitative evaluation of intonation contours: falling contours yielded negative F_0 excursions, and rising contours yielded positive F_0 excursions. In addition, two energy parameters were extracted: mean energy value, and maximum energy value.

Agreement between the perceptual analysis of intonation and the instrumental measure of F_0 excursion was 78% for session 19b and 80% for session 20a.

(c) *Analysis of grammatical marking of utterance modality.* This coding was designed to determine the grammatical category of the child's attempted words, and, overall, to specify whether the utterance involved a morpho-syntactic marking of utterance modality-type, and which one. The following devices found in the child's productions were considered to be grammatical marking of utterance modality:

MOODS: INDICATIVE; IMPERATIVE;

INTERJECTIONS

e.g. *oh!*, *ah!*, *coucou* 'cuckoo', etc.

INTERROGATIVE MORPHEMES

e.g. *qu'est-ce que?* 'what', *où?* 'where', etc.

An utterance length measure, which consisted of tabulating the syllables identified in the child's productions (S_1 , S_2 , S_3 , etc.) was also performed.

Quantitative measures

Number and frequency of utterances produced during each session, month-unit, and period-unit were calculated for each of the coded categories. A three-way ANOVA was conducted on period (four periods) * utterance-modality-type (four modalities) * intonation (three contours), in order to test the effect of utterance modality on intonation contour, and the effect of age on distributions of utterance types and intonation contours.

RESULTS

Functional analysis of utterance modalities

Distribution and evolution of the four utterance modalities. The ANOVA yielded a significant overall effect for utterance-modality-type on the child's utterance production ($F(3, 36) = 71.63$, $p < 0.001$). Overall, declaratives were the most frequent type of utterance (52%), followed by injunctive and

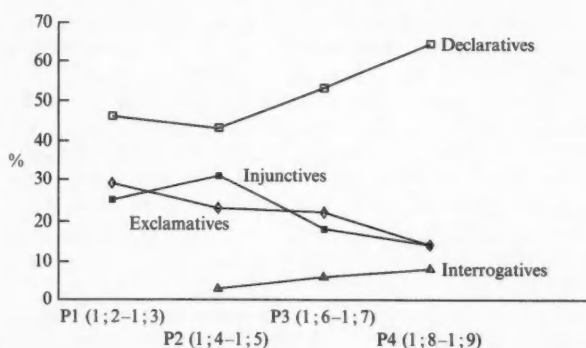


Fig. 1. Distribution of utterance types across time periods. □, Declaratives; ◇, Exclamatives; ■, Injunctives; △, Interrogatives.

TABLE 1. *Distribution of functions for each utterance type (number of utterances and percentage, by period)*

	P ₁ (1;2-1;3)	P ₂ (1;4-1;5)	P ₃ (1;6-1;7)	P ₄ (1;8-1;9)	Total
DECLARATIVES	110	104	128	153	495
Naming	65 (0.59)	30 (0.29)	46 (0.36)	32 (0.21)	173 (0.35)
Description	20 (0.18)	36 (0.35)	54 (0.42)	90 (0.59)	200 (0.40)
Confirmation	10 (0.09)	18 (0.17)	23 (0.18)	24 (0.15)	75 (0.15)
Denial	15 (0.14)	20 (0.19)	5 (0.04)	7 (0.05)	47 (0.10)
EXCLAMATIVES	69	55	54	33	211
Refusal	45 (0.65)	23 (0.42)	20 (0.37)	6 (0.18)	94 (0.45)
Desire	0	0	2 (0.04)	1 (0.03)	3 (0.01)
Emotion	22 (0.32)	22 (0.40)	22 (0.41)	25 (0.76)	91 (0.43)
Ritual	2 (0.03)	10 (0.18)	10 (0.18)	1 (0.03)	23 (0.11)
INJUNCTIVES	61	75	44	34	214
Req. attention	15 (0.25)	25 (0.33)	14 (0.32)	16 (0.47)	70 (0.33)
Req. object	4 (0.07)	12 (0.16)	1 (0.02)	5 (0.15)	22 (0.10)
Rej. object	1 (0.02)	1 (0.01)	0	0	2 (0.01)
Req. action	11 (0.18)	13 (0.17)	16 (0.36)	8 (0.23)	48 (0.22)
Rej. action	22 (0.36)	22 (0.29)	8 (0.18)	2 (0.06)	54 (0.25)
Giving	8 (0.13)	2 (0.03)	5 (0.11)	3 (0.09)	18 (0.08)
INTERROGATIVES					
Req. information	0	6	14	20	40

exclamatory utterances in an equivalent and moderate position (22 % each), and interrogatives, which were very infrequent (4 %).

As shown in Fig. 1, the frequency of declaratives tended to increase slightly across time periods (from Period 2 on), while exclamatives and injunctives tended to diminish. Despite their low frequency overall, the

production of interrogatives exhibited a clear developmental progression: interrogative utterances were not observed before the age of 1;5, and progressively increased afterwards. However, the effect of period only reached significance for declarative utterances ($F(3, 12) = 3.63, p < 0.05$) and for exclamatory utterances ($F(3, 12) = 3.77, p < 0.05$).

Specific functions of the four utterance modalities. Table 1 shows the distribution of specific functions in each of the four modality types. Examples of utterances referred to hereafter are presented in Appendix 2.

The child's declarative utterances mostly consisted of namings (35%) and descriptions (40%). Naming, which consisted of designation of objects or beings by means of nominals, such as example (1), mainly occurred in play situations, but was also observed in everyday situations. Descriptions, illustrated in examples (2)–(7), involved localizations, attributions of properties, or mentions of states or processes; they incorporated adverbs, adjectives, nominals including implicit appreciation and verbal expressions. Confirmation (15%) and denial (10%) appeared as marginal categories. Confirmation mainly consisted of affirmative answers using the marker *oui* 'yes' in more or less appropriate form, and denial consisted of the use of the forms *non*, *pas*, or *non pas* for negative answers to others' questions. Evolution of declaratives across time was characterized by a progressive increase of descriptive utterances, which fits with the greater complexity of the devices they require, and a decline of denials from 1;6 on.

Exclamatory utterances expressed different kinds of strong feelings. Strong refusals, which conveyed what the child did not want to do or have and took the same three forms of negation as denials, formed the most frequent category (45%), while strong desires were very rare (1%). The other exclamatory utterances consisted of expressions of emotion (43%) such as (8), and of rituals usually occurring in stereotyped play-situations (11%), such as (9), both mainly expressed through interjections. Evolution of exclamatory utterances was marked by a progressive decrease of refusals, which were particularly high during the first period.

Injunctive utterances covered a wide variety of functions. Requests for attention (33%) formed the largest category, involving direct calls such as (11), attempts to attract others' attention to something or somebody through a nominal designation such as in (12), or through an attentional verb such as in (13). Requests for objects such as (14), mainly expressed through nominals, were not frequent (10%), and rejects of objects almost never occurred (1%). Two other frequent functions of the injunctive modality were requests for others' action (22%) expressed through adverbs or actions verbs, such as (15) and (16), and rejections of others' actions (25%) using the various forms of the negative marker. A related category consisted of give-utterances, typically *ta! = tiens* 'take' (17). The use of *da! = donne* 'give'

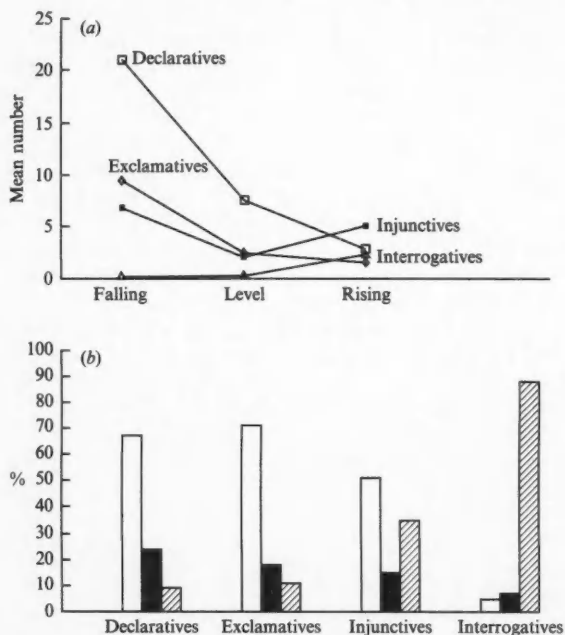


Fig. 2. Distribution of falling, level and rising intonation contours in declarative, exclamative, injunctive and interrogative utterances. (a) □, Declaratives; ◇, Exclamatives; ■, Injunctives; △, Interrogatives. (b) □, Falling; ■, level; ▨, rising.

was also observed accompanying gifts, which may reflect confusion between the two forms of exchange situations. Evolution of injunctive utterances was mainly characterized by an increase in the relative frequency of requests for attention, and a decline in the frequency of rejections of action.

Interrogatives only consisted of requests for information, which were rare and emerged relatively late (at 1;5). They were first synthetic requests employing nominals such as (18), by which the child seemed to elicit her mother's comments about the fact that she was putting on her shoes. Later came questions apparently used to obtain information about object identity or location, such as (19) and (20).

Prosodic marking of utterance modality

Perceptual analysis of intonation contours. All the child's utterances were perceptually analysed as a function of their final intonation contour, and classified into falling, level or rising intonation. The ANOVA yielded

UTTERANCE MODALITY IN FRENCH

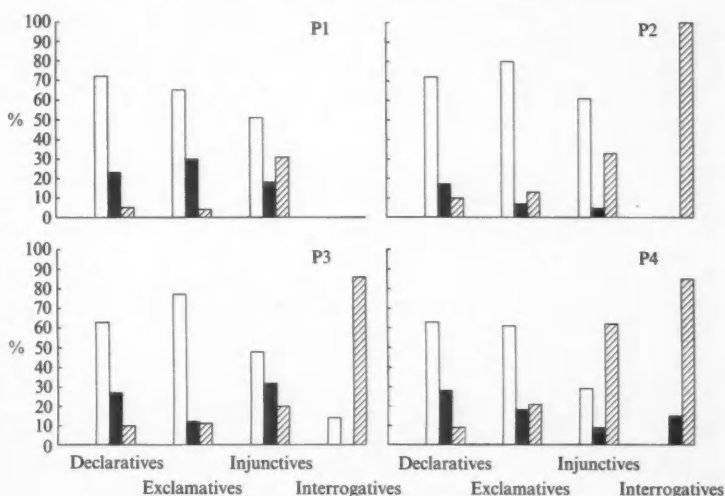


Fig. 3. Distribution of intonation contours in each utterance type, for each of the four periods.
□, Falling; ■, level; ▨, rising.

significant differences in the overall distribution of intonation contours ($F(2, 24) = 37.60$, $p < 0.001$): most of the child's utterances (62%) had a falling final contour, 20% were considered as level, and 18% presented a rising contour. Analysis of the temporal distribution of intonation types indicates that the frequency of falling contours tended to diminish slightly over time from period 2 on (65%, 69%, 60%, 53%), while the frequency of rising contours tended to increase (12%, 20%, 17%, 24%), and the frequency of level contours to increase from period 2 on (24%, 11%, 23%, 23%). However, the effect of period did not reach significance for any of the three intonation types.

As expected, the ANOVA on the entire corpus yielded a highly significant interaction between modality-type and intonation ($F(6, 72) = 27.50$, $p < 0.001$). The effect of intonation was significant for the declarative modality ($F(2, 24) = 36.61$, $p < 0.001$), the exclamatory modality ($F(2, 24) = 29.03$, $p < 0.001$), the injunctive modality ($F(2, 24) = 13.61$, $p < 0.001$), and the interrogative modality ($F(2, 24) = 12.67$, $p < 0.001$). As shown in Fig. 2, most declarative and exclamatory utterances had falling contours (67% and 71% respectively). These two utterance types showed an identical pattern: the highest frequency of falling contours, a moderate role of level contours, and the lowest frequency of rising contours. By contrast, injunctive and interrogative utterances involved relatively more frequent rising contours. A

large majority of interrogatives had rising contours (88%), and injunctive contours were divided into falling (51%) and rising (35%).

The utterance type $\times$ intonation interaction was significant for each of the four time periods: P1 ($F(6, 18) = 5.82, p < 0.01$); P2 ($F(6, 18) = 7.81, p < 0.001$); P3 ($F(6, 18) = 4.91, p < 0.01$); P4 ($F(6, 18) = 13.84, p < 0.001$). This indicates that intonation varied as a function of utterance modality as of 1;2. Fig. 3 shows the distribution of intonation contours in each utterance type for the four periods separately. Patterns were very similar across time periods. In declarative and exclamatory utterances, falling intonation remained the dominant contour over time, although it tended to be less frequent in periods 2 and 3. The most important change concerned the distribution of intonation contours in injunctive modality: falling intonations decreased over time, rising increased, and, in period 4, only 29% of injunctive utterances presented a falling contour, while 62% were produced with a rising intonation.

Specific analyses of intonation contours associated with the different functions of both declarative and injunctive modalities were conducted. Fig. 4 shows the intonation contour patterns in the declarative modality. Denials,

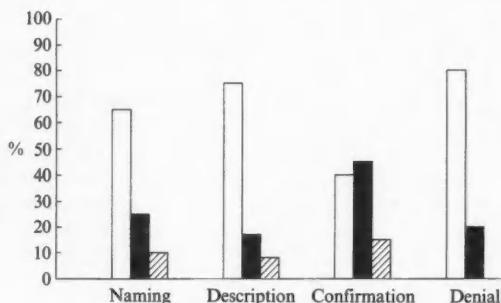


Fig. 4. Intonation contours in declarative utterances, by function. $\square$, Falling; $\blacksquare$, level; $\square$, rising.

descriptions and to a lesser extent, namings were clearly produced with falling contours; confirmations were most frequently produced with level rather than with falling contours. Fig. 5 indicates that in the injunctive modality requests for attention and requests for objects were mostly produced with rising contours, while requests for action, rejections and giving were mostly produced with falling contours.

Instrumental analysis of prosodic parameters. Prosodic parameters were obtained for two consecutive sessions at 1;7 and 1;8. Table 2 presents the mean values for the different utterance modality-types, for each session.

UTTERANCE MODALITY IN FRENCH

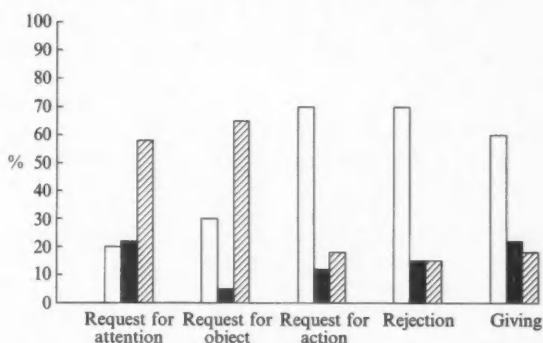


Fig. 5. Intonation contours in injunctive utterances, by function. □, Falling; ■, level; ▨, rising.

TABLE 2. Mean prosodic parameter values for each utterance type, in sessions 19b and 20a

	DECLA	EXCLA	INJUN	INTER	Total
Session 19b	(N = 28)	(N = 8)	(N = 21)	(N = 3)	(N = 60)
F ₀ mean value (Hz)	381	320.5	405.6	473	386.1
F ₀ onset (Hz)	356.6	329.2	373.5	420.5	362
F ₀ offset (Hz)	397.9	285.6	412.8	527.9	394.6
F ₀ minima (Hz)	315.8	276.3	329	403.1	319.5
F ₀ maxima (Hz)	442.1	368.5	472.2	564.1	448.9
F ₀ excursion (%)	+16.6	-24.6	+25.1	+37.2	+15.1
Energy max. value (db)	74.8	75.8	74.7	73.4	74.8
Energy mean value (db)	65.1	64.7	64.7	63.1	64.8
Session 20a	(N = 40)	(N = 10)	(N = 7)	(N = 3)	(N = 60)
F ₀ mean value (Hz)	313.4	289.5	351.2	268.33	311.5
F ₀ onset (Hz)	317.9	294.6	367.9	236.9	315.8
F ₀ offset (Hz)	295.3	267.6	340.1	268.4	294.5
F ₀ minima (Hz)	269.4	256.6	279.2	219.5	265.9
F ₀ maxima (Hz)	353.9	312.4	403.4	290.7	349.6
F ₀ excursion (%)	-6.9	-8.5	+3.0	+19.26	-4.73
Energy max. value (db)	73.4	72.5	73.8	70.5	73.1
Energy mean value (db)	62.4	60.7	62.5	58.9	61.9

F₀ values : mean, onset, offset, minimum and maximum values. For all these basic parameters, the utterances in session 19b presented the following pattern: exclamatory utterances had the lowest values, declaratives were a little higher, injunctives and finally interrogatives presented the highest values. The pattern for session 20a was virtually identical, except for

interrogatives which had the lowest values; exclamatives, declaratives and injunctives ranked in the same order as in session 19b as regards the height of the parameters values.

F₀ excursion value. This parameter provides a measure of intonation contour. Contrary to the general intonation trend, utterances in session 19b mostly presented rising intonation contours. The global mean *F₀* excursion was positive (+15.1), and 67% of the utterances in this session presented a positive *F₀* excursion. Given this overall rising intonation trend, it is not surprising that the modality-types did not present the expected contrasts. However, exclamatory utterances were clearly falling (75% had a negative excursion; mean value: -24.6). Declaratives were mostly rising (68%; mean value: +16.6), but less systematically and less frequently than injunctives (81%; mean value: +25.1) and interrogatives (100%; mean value: +37.2). Intonation contours in session 20a were overall falling. The global mean *F₀* excursion was negative (-4.73), and 47% of the utterances presented a negative *F₀* excursion (against 35% with positive *F₀* excursion). Exclamatory utterances were mostly falling (50%, mean value: -8.5), as well as declaratives (50%; mean value: -6.9); by contrast, injunctives tended to be rising (43%; mean value: +3), and interrogatives were rising (100%; mean value +19.26).

Energy mean and maximum values. As shown in Table 2, energy parameters values corresponding to the different utterance modality-types were similar to each other in both sessions. Utterance types did not differ as regards energy.

Grammatical marking of utterance modality

Utterances can be classified into three categories as regards grammatical marking of modality type:

- (i) No explicit grammatical marking of utterance type.
- (ii) Non-specific grammatical marking of utterance type. These utterances involve devices which are preferentially but not always associated with a specific utterance modality type, and can be found in others. The indicative mood is a typical non-specialized marking for declaratives (serving a descriptive purpose), but can be used in all the other types of utterances.
- (iii) Specific grammatical marking of utterance type. This refers to utterances that involve a grammatical device exclusively used to mark one of the modality-types. This exclusive association of a device to a modality type provides formal evidence for the nature of the communicative act. The imperative mood, for example, is a specific mark of injunctive modality in adult language.

Overall, most of the child's utterances (76%) did not involve any grammatical marking of utterance modality type, and this high proportion of

unmarked utterances remained stable across the four successive time periods (78 %, 77 %, 73 %, 77 %). These productions typically consisted of nominals, adverbs, affirmative and negative markers (*oui* 'yes', *non* 'no'), adjectives, and verbs in the infinitive. For example, the nominals (1), (14) and (18) were classified in terms of their contextual function as declarative, injunctive and interrogative utterance respectively.

A quarter of the child's utterances involved an explicit grammatical marker of modality-type: 16 % exhibited specific marking, which consisted of interjections (a specific marking of exclamatory modality), verbal imperative forms (marking injunctive modality) and interrogative morphemes (marking interrogative modality), and 8 % presented non-specific markers, which were verbal indicative forms. Specific marking decreased slightly across time (18 %, 19 %, 17 %, 10 %), while non-specific marking increased from the third period on (4 %, 5 %, 10 %, 13 %).

The developmental distribution of these different categories of device is shown in Fig. 6.

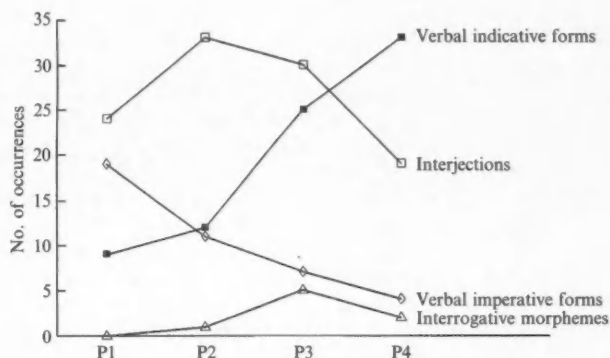


Fig. 6. Distribution of grammatical devices marking utterance modality across time periods (number of occurrences).

Interjections formed the most frequent category overall (42 %) and were also the earliest and most frequently used during the first period, and until 1;8. They consisted of emotional interjections (*oh!*, *ah!*), which were used steadily across time, and of ritualized interjections (*coucou!*), which appeared at 1;3 and were mainly employed during the second period. The global use of interjections, at their height between 1;4 and 1;6, marked a pronounced decline in the last period. This evolution is congruent with the assumption that interjections, particularly emotional ones, form a very primitive class of devices that are on the borderline of linguistic marking.

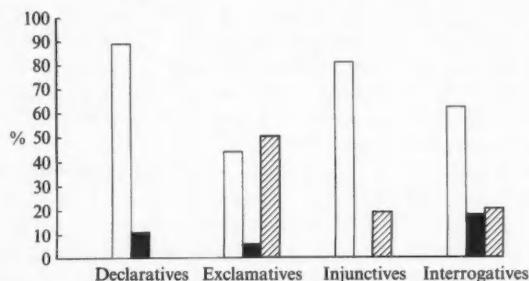


Fig. 7. Grammatical marking of each utterance type. □, No explicit marking; ■, non-specific marking; ▨, specific marking.

Verbal imperative expressions – see examples (13), (16) and (17) – represented 16 % of all devices. Imperative verbal forms often could not be formally differentiated from indicative ones. In spoken French, as in other languages, these forms mainly differ with respect to the presence/absence of subject-pronoun, and subject-pronouns are omitted by young children. Differentiation between indicatives and imperatives was based on previous functional analyses, i.e. on contextual information. They were relatively frequent as of 1;2, but decreased progressively across time. These imperatives had simplified phonetical forms, they showed little lexical variety and appeared as stereotyped formulations, associated with a restricted number of situations: object exchange, and later calls for attention.

The most infrequent category of specific markers, and the last to appear, was interrogative morphemes (3 % overall). Used in request for information about object identity or location, they were also produced in a very approximate way, and in syncretic formulations, such as in (19) and (20).

Verbal expressions in the indicative (31 % overall) – see examples (3) to (7), (10), (19) and (20) – were mostly found in declarative utterances (22 %), but sometimes appeared in exclamatory and interrogative ones (5 % each). Contrary to imperative forms, a small proportion of indicatives were found during the first period and they steadily increased across time. They mainly employed the verb *être* 'be', firstly included in stereotyped forms such as (4), and thereafter diversified in more analytical formulations, such as (5) or (6). Some modal verbs were also found: mainly *vouloir* 'want', first observed at 1;3 in approximate form such as in (7) or (10), and some uses of *pouvoir* 'can' and *savoir* 'know', observed at 1;8 in approximative forms. Utterances consisting of *peux pas* could not be discriminated formally from those consisting of *veux pas*, since the same form /øpa/ was produced, and differentiated interpretation was based on contextual information.

As shown in Fig. 7, modality types varied in degree of grammatical marking. Overall, 90% of the declaratives did not involve any grammatical marking, and the remaining 10% naturally had non-specialized marking (indicative mood). Injunctives also were mainly non-marked utterances (80%), but the remaining 20% had a specialized marking, the imperative mood. As for the few interrogatives found in the whole period, 60% were unmarked utterances, 20% had a specialized marking (an interrogative morpheme), and the remaining 20% involved a non-specialized device. The most frequently marked utterance-type was, proportionally, the exclamatory type: overall, 50% of all exclamative utterances exhibited specialized marking (an interjection), and 5% involved a non-specialized device.

DISCUSSION AND CONCLUSION

The present study was aimed at investigating the emergence of utterance modality in language, and analysed the linguistic output of a French child between the ages of 1;2 and 1;9.

The first purpose of these analyses was to determine the functional bases of the four utterance modalities in this age period. The underlying assumption was that utterance modality, as defined in adult language, could be observed in a child's productions at the outset of the verbal stage. In other words, utterance modality was expected to be reflected in the different functions of the child's speech. The assignation of modality values to the child's utterances required certain decisions. First, not all the language functions in the corpus fell easily into only one utterance modality category, which called for choosing criteria that ensured unequivocal classification. For example, the request-for-attention category was defined as part of the injunctive modality because it consisted of utterances addressed to others, although it could have been classified in the exclamatory modality with respect to other criteria. Second, some utterances could serve more than one function. The decision was made to classify according to the dominant function to determine modality. For example, the child sometimes used a mention of an object to attract attention. Although these utterances involved labelling, they were considered basically as requests for attention and were therefore classified in the injunctive modality. Finally, utterances which initially appeared to serve the same function in fact covered different modalities. Typical cases were desire-utterances, which may be declarative if they consist of a description of an internal state, exclamatory if they express a strong feeling, or injunctive if they involve a request for others' actions.

The functional analysis indicates that all four communicative modalities were present, but frequencies and age of appearance differed. There was a high proportion of declarative modality, a lower but important proportion of exclamatory and injunctive modalities as of 1;2, whereas interrogative

utterances only emerged at around 1;6 and were rare. In addition to the emergence of the interrogative modality, two quantitative changes concerning specific functions occurred at roughly the same age. The negative functions expressed in different modalities (denials, refusals and rejections of objects and others' actions), which predominated in the first part of the corpus, declined sharply (pooled, these functions formed 30% of the utterances in periods 1-2, and only 10% in periods 3-4). In contrast, descriptions increased in the declarative modality. One likelihood is that the child's development of linguistic abilities – the lexical spurt which takes place at around 1;6, and, in particular, the expansion of verbs and other lexical items that express predicative meanings, documented for instance in Bates, Bretherton & Snyder (1988) – allowed her to express more sophisticated functions to the detriment of more primitive ones.

One of the main issues is the degree of generalization of these findings. Various factors, ranging from local effects to universal processes of language development, are likely to have influenced the distribution of utterance types observed here. Local factors in particular include situational differences in setting. For instance, play situations such as puzzles or book reading are likely to induce declaratives, whereas everyday situations may prompt injunctive or exclamatory utterances. These contextual factors could account for the inter-sessional variations observed in the frequencies of utterance types. However, some of the overall trends mentioned above probably reflect basic patterns in the development of children's communicative competence. The early use of declarative and injunctive utterances has been reported in various previous functional studies (Bates, Camaioni & Volterra, 1975; Halliday, 1975), which suggests that these types of utterances are rooted in the most basic functions of communication. The early use of exclamatory utterances documented in the present study indicates that they also serve a primitive function. By contrast, the later emergence of the interrogative modality is congruent with the view that request for information is not an initial component of communication (Halliday, 1975; Lyons, 1977). Thus, the present findings could give a synthetic view of the emerging organization of the communicative competence: the three declarative, exclamatory and injunctive types are clearly shown to be primitive modalities of communicative competence, contrasting with interrogative type, which appears as a secondary or differed modality.

The second focus of the study was an analysis of prosodic features of the child's productions, in particular intonation contours. Overall, most of the child's utterances exhibited falling final intonation contours, which fits the general theoretical intonation pattern in French. The predominant falling trend observed in the present study, however, is not consistent with the Hallé *et al.* findings (1991), in which rising intonation – viewed as a reproduction of the continuation rise – was predominant in the 1;6 old French children's

productions. This discrepancy may be due to differences in the productions analysed. In the Hallé *et al.* study, only disyllables were selected for analysis, whereas the present study took all the child's utterances into account. These productions were overall mostly monosyllabic (51 %) or disyllabic (39 %), and the remaining 10 % consisted of three syllables or more. The possible effect of utterance-length on intonation was controlled for by performing an ANOVA, which showed a significant interaction between intonation and utterance-length ($F(4, 48) = 35.42, p < 0.001$). Although the majority of disyllables presented falling intonation, falling intonation occurred more frequently in monosyllabic utterances, and the frequency of rising intonation increased with utterance-length. Rising intonation also increased with age, although this trend was not statistically significant. The age period covered by the present study and the high proportion of monosyllabic utterances in the child's corpus could thus have favoured falling intonation patterns, as compared to Hallé *et al.*'s children. However, none of these factors seems to be clearly determinant, and situational and inter-individual differences should also be taken into consideration. As discussed hereafter, the present study focuses on possible utterance-type differences, and it can be noticed that the child under study produced a high number of declarative utterances.

The main prosodic hypothesis was that the child would use intonation to mark variations in utterance modality. A perceptual analysis conducted on all the child's productions showed that the distribution of intonation contours was significantly dependent on utterance modality type as of the first time period. The intonation patterns observed for each modality type matched expectations in that declarative and exclamatory utterances were mostly falling, interrogatives mostly rising, and injunctive utterances were split between falling and rising contours depending on their specific functions. These tendencies were confirmed by the results of the instrumental analysis performed on session 20a. The declarative and exclamatory utterances had negative mean excursion values (which correspond to falling contours), whereas positive excursions corresponding to rising contours characterized injunctive and, above all, interrogative utterances. Session 19b presented an atypical majority of rising contours, which may have been due to the particular emotional situation of this recording (the child was very upset by having wet her pants); despite this specific trend, analyses showed a general falling intonation for exclamatory utterances, and less rising intonation for declaratives than for injunctives and interrogatives. Moreover, systematic differences were found in all the F_0 parameters of the three main utterance types. In both sessions, exclamatory utterances presented the lowest F_0 values, declaratives showed intermediate values, and injunctive the highest values.

Certain of these results confirm tendencies reported in most early developmental studies that falling intonation tends to accompany descriptive

functions such as naming and labelling, while rising intonation tends to be associated with requests (Halliday, 1975; Galligan, 1987; Marcos, 1987; Furrow *et al.* 1990; Flax *et al.* 1991). In the present study, the child clearly opted for rising intonation in requests for information, and in the injunctive modality in requests for attention and requests for objects, i.e. appeals to others. On the other hand, the observed trends are also in agreement with predictions drawn from the linguistic model of utterance type intonation in French, where declarative, imperative and partly exclamatory utterances are characterized by falling contours, and interrogative utterances alone are clearly marked by rising intonation. The child's declarative and exclamatory utterances were mostly falling, and, among her injunctive utterances, imperatives (requests for others' actions, rejections) were associated with falling intonation. An interpretation of the apparent discrepancy between the developmental and the linguistic models regarding injunctive utterances is proposed hereafter.

The third purpose of the study was to examine the emergence of grammatical marking of utterance modalities. Analysis shows that utterance modalities started to be marked grammatically through elementary linguistic forms, since a quarter of the child's productions involved grammatical marking. There was no clear-cut quantitative progression over the period of study, but qualitative changes could be observed. Two of the grammatical devices used to mark utterance modality were found with some frequency as early as 1;2 – interjections, serving the exclamatory modality, and the imperative mood, serving the injunctive modality. At about 1;6 other markers were consistently added to the two primitive ones: indicative expressions and the first interrogative morphemes. However, most of these devices were rudimentary, with approximate phonetic form, and tended to be syncretic formulations (particularly interrogative morphemes). They were used in stereotyped situations (especially imperatives), and presented little lexical diversification. They could thus be considered as phonosyntactic – more than true morphosyntactic – devices.

The imperative mood has also been found to appear early in other languages, at least in stereotyped uses. It has been reported as early as the age of 1;2 in Italian children (Bates, Camaioni & Volterra, 1975), and in the first periods studied (from 1;6 on) for English- or Greek-speaking children (reported in Stephany, 1986). The imperative mood thus appears to be one of the earliest grammatical features acquired by children in various languages. Although other studies did not focus on the role of interjections in child language, these morphemes, on the border-line between the prelinguistic and linguistic, are probably used very early in all languages. The present analyses proposed to distinguish between specific and non-specific marking of utterance modality, and pointed out that interjections and imperative forms are both specific markers that were exclusively associated to one of the

utterance types, by contrast with non-specific devices such as indicative forms. This suggests that specialized grammatical devices, devolved to the expression of a specific function, emerge earlier than non-specific (pluri-functional) devices.

In the light of the data concerning the two main types of marking used by the child, we propose to hypothesize interactions between grammatical and prosodic means in language development. The marking of injunctive utterances provides an example of such an interaction. In adult language, 'imperative requests' are marked grammatically by the imperative mood, and 'gentle requests' are often expressed through indirect formulations using interrogative forms. The child used the imperative mood early to mark imperative injunctions, but had no syntactic means of expressing 'gentle' injunctions. The rising intonation could be used to differentiate gentle injunctions, namely requests for attention and objects which were produced with the same intonation pattern as interrogatives, from imperative injunctions produced with the non-contrastive falling intonation characteristic of adult language. Thus, the child may have used intonation to mark communicative features she could not mark through syntax. This interpretation suggests a possible complementary relation in the child's uses of intonation and grammar. Grammatically marked utterances were too infrequent in the corpus to test this complementarity hypothesis. However, data tend to support this assumption, in particular the fact that interjections as well as imperative forms, which are specific grammatical markings of utterance type, were typically produced with a falling non-contrastive intonation. Interrogatives were infrequent in the period under study; in a more advanced stage of language, this type of utterance, ranging from no marking to a wide variety of syntactic marking, would be a good candidate for further investigation of the relations between prosodic and grammatical marking.

In conclusion, the present study shows that all four communicative modalities are present in early language, although onset differs: the declarative, exclamatory and injunctive modalities can be found from 1;2, but interrogative utterances only appeared at 1;6 and were rare. The data also indicate that the child can use both prosodic and, to a lesser extent, grammatical devices early to mark variations in utterance modality. As soon as 1;2, intonation contours were to a large extent in accordance with the patterns for the different modality types in French. The grammatical marking started between 1;2 and 1;9, since a quarter of the productions involved an elementary phonosyntactic marking of utterance type, which first emerged with specialized devices such as interjections and imperative verbal forms. These findings support a functional interpretation of language acquisition, that posits that children develop different types of formal devices in their language as a means of expressing communicative functions, an interpretation which is encouraging for further investigation of interactions

between prosodic and grammatical markings of functions in the course of language development.

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APPENDIX I

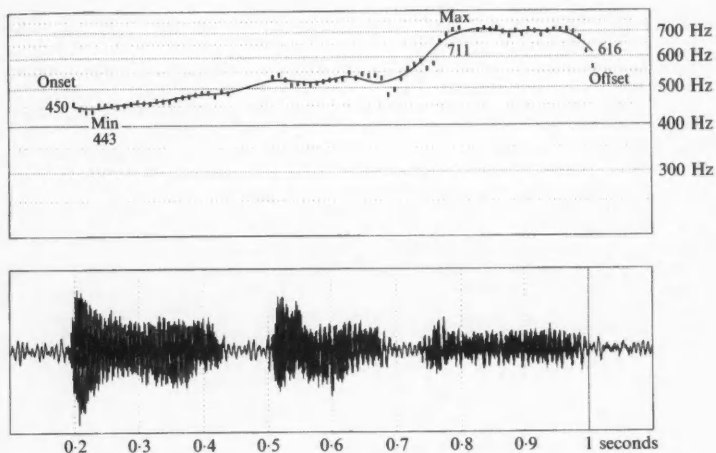
Smooth F_0 contours for two utterances

Fig. A 1. /ə bebe/ le bébé 'the baby' (Interrogative).

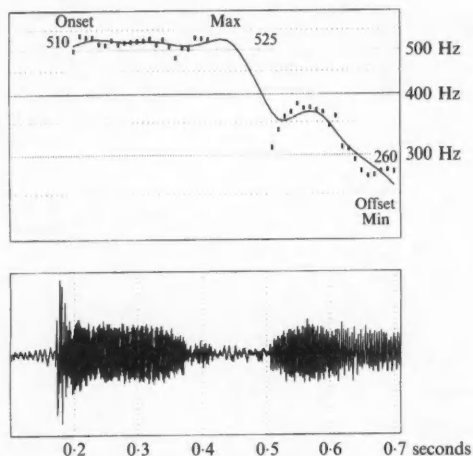


Fig. A 2. /bebe/ bébé 'baby' (Declarative).

APPENDIX 2

Examples of utterances

DECLARATIVES

- (1) /so/ *seau* 'pail'
- (2) /la/ *là* 'there'
- (3) /empa/ *aime pas* 'don't like'
- (4) /aje/ *a y est = ça y est* 'all done'
- (5) /ɛfa/ *est chat* 'is cat'
- (6) /ɛfwa/ *est foid = c'est froid* 'is cold'
- (7) /opa/ *eu pas = veux pas* 'don't want'

EXCLAMATIVES

- (8) /o:/ *oh!* 'oh'
- (9) /kuku/ *coucou!* 'cuckoo'
- (10) /a:opa/ *ah, eu pas! = ah, veux pas* 'ah, don't want'

INJUNCTIVES

- (11) /mamã/ *maman!* 'mummy'
- (12) /ado/ *ado!* = *sac à dos* 'rucksack'
- (13) /aga/ *aga!* = *regarde* 'look'
- (14) /lolo/ *lolo!* = *de l'eau* 'water'
- (15) /ākɔ̃/ *encore!* 'again'
- (16) /da/ *da!* = *donne* 'give'
- (17) /ta/ *ta!* = *tiens* 'take'

INTERROGATIVES

- (18) /ɛʃe/ *éché?* = *chaussure* 'shoe'
- (19) /akase/ *a qu'a c'est?* = *qu'est-ce que c'est* 'what is this'
- (20) /uisõ/ *où i sont?* = *où ils sont* 'where are they'