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THE ROLE OF PROSODY IN MOTHER-INFANT COMMUNICATION IN THE FIRST YEAR OF LIFE

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1. Prelinguistic parent-infant communication

Human infants seem to be extraordinarily well prepared for establishing and maintaining communication with their caretakers. Infants prefer faces to other visual stimuli (Goren, Sarty and Wu 1975) and the eyes, described by Locke (1995:281) as "vital components of our social signaling", seem to have a special appeal for them (Haith, Bergman and Moore 1977). Thus, very early in interactions with other people, children focus on the stimuli carrying an enormous amount of information in the process of communication. Moreover, infants much prefer moving faces and react with upset to still ones (Tronick et alia 1978), which might indicate that at a very early age they already are capable of treating a still face as a signal of a breakdown in communication. Additionally, ten-week-old babies are able to appropriately respond to emotional expressions of their mothers: they react positively to smiles and vocal encouragements while sad faces cause their upset (Termine and Izard 1988). Another communication enhancing ability was discovered by Wertheimer (reported in Bower 1974): within seconds of birth infants can correctly identify a sound source, an ability which requires not only auditory localization, but auditory-visual coordination as well: infants seem to be born with an expectation that "there will be something to be seen at a sound source" (Bower 1974:672). Aslin's (1987) finding that human speech is particularly salient for newborns completes the picture of a communicatively-oriented infant, who from his or her

first hours focuses on the two most powerful carriers of communicative intent: the voice and the face. Infants' perceptual preferences suggest that, as Trevarthen (1974:230) has put it: "the foundations for interpersonal communication between humans is 'there' at birth".

2. Infant-directed speech

The issue of Child Directed Speech (hence CDS) has featured prominently in the study of language acquisition since the early 1970s, though interest in this special register appeared much earlier (e.g. see Ferguson 1977 for a review of early views on CDS). Yet only in the 1970s, following the nativists' claims about "the poverty of the stimulus", the speech addressed to children started to be analysed in detail. The findings demonstrated that the language children hear is far from being a mixture of grammatical and ungrammatical sentences full of false starts and hesitations, as the nativists have suggested. On the contrary, CDS turned out to be a speech register in its own right with its own rules, whose aim is not so much to facilitate language acquisition, but rather to assist the adults in communicating with a linguistically immature child (cf. Brown 1977, Wexler 1991).

Of special interest in this paper are modifications in a type of CDS known in literature as Infant Directed Speech (hence IDS), i.e. language used to communicate with prelinguistic children. Kaye (1980), who studied IDS when infants were 6, 13 and 26 weeks old, identified the following five general characteristics of this speech register:

1. prosodic features: higher pitch, greater range of frequencies, more varied intonation (studied by Garnica 1977, Sachs 1977)
2. lexical features: special forms
3. complexity features: shorter utterances, fewer embeddings, fewer auxiliaries (see Snow 1977, Furrow, Nelson and Benedict 1979)
4. redundancy features: repetitions
5. content features: restriction of topics to the "here and now" (Snow 1977).

This paper will focus on the prosodic properties of IDS in relation to the development of the child's communication abilities.

2.1. Prosodic characteristics of IDS

The first study aimed at an experimental identification of the prosodic characteristics of IDS was conducted by Garnica (1977). She compared the speech of mothers to their 2- and 5-year-old children as well as to adults. Six major prosodic modifications were found:

1. greater fundamental frequency in IDS (267.3 Hz) than in CDS (206.4 Hz) or in ADS (197.6 Hz to 202.8 Hz)
2. frequency range was greater for both IDS and CDS, but in the case of IDS the increase was higher
3. sentence final pitch terminals constituted 25% of the intonation contours in IDS while 9% in CDS and 0% in ADS*. 85% of the sentences with rising contours were imperatives.
4. frequent whispering
5. duration of verbs (and colour terms) is longer in IDS
6. more than one primary stress in one sentence unit in IDS.

Garnica's results have been confirmed so far in numerous studies: Andruski and Kuhl (1996), Fernald and Simon (1984), Snow and Ferguson (1977), as well as Stern et alia (1982, 1983).

Fernald and Kuhl (1987) in a series of experiments manipulated prosodic variables in order to identify which of them may be particularly appealing for 4-month-old infants. They found a strong preference for F_0 patterns (pitch) whereas for the amplitude or duration no preference was found. However, Kitamura and Burnham's (1998) experiment threw a different light on the question of which prosodic modifications appeal to infants most. In one experiment, they equated pitch while manipulating positive affect and infants exposed to such stimuli preferred high affect to low affect. But when affect was held constant and pith was changed, no preferences were found, which suggests that affective qualities of IDS might be a source of infants' preferences. Interesting findings were also reported by Cooper and Aslin (1994). Their study has shown that 1-month-olds's preference for IDS depends on a wider range of acoustic features than is the case with 4-month-olds. Cooper and Aslin's explanation is that "exaggerated pitch contours (...) may become salient communicative signals for infants through language-rich, interactive experiences with caretakers and increased perceptual acuity over the first month after birth." All these findings point to the importance of emotional aspects of IDS as well as to the significance of interaction in gaining experience, but at the same time they indicate that the issue of which prosodic modifications in ADS hold special appeal for infants needs further research.

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* Verbal tasks in the experiment included 1) telling a story based on a set of pictures, 2) reading a story, 3) a puzzle task-giving a series of instructions. None of these required using rising contours.

2.2. Universality and variation in prosodic modifications in IDS

A growing body of research findings indicate that the phenomenon of prosodic modifications is a universal feature of IDS. The use of modifications described in the previous section has been documented for a number of European and non-European languages. A short overview of these studies is presented in Table 1 below.

Table 1. Prosodic modifications in IDS crosslinguistically

Language	Study
French, Italian, German, British and American English	Fernald et alia 1989
Latvian	Rūķe-Dravina 1976
Japanese	Chew 1969, Masataka 1992, Fernald and Morikawa 1993
Chinese	Grieser and Kuhl 1988,
Thai	Kitamura, Thanavishuth and Burnham 2002
Comanche	Ferguson 1964
Xhosa	Fernald 1994

In all these languages, parents were found to employ higher pitch, exaggerated intonation contours and greater pitch modulation while communicating with their prelinguistic infants. The demonstrated cross-linguistic appearance of the phenomenon indicates that there may be a biological basis of prosodic changes in IDS (Fernald 1994, Locke 1995).

2.2.1. Cross-linguistic variation

Although the above shown data may suggest universal tendencies, data from some other languages point to a need for caution in formulating strong generalizations. For instance, in Quiché Mayan (Pye 1986 and 1992, Ratner and Pye 1984), mothers talk to their babies in low monotonic speech while Harkness (1971) reports that Guatemalan parents employ low pitch and rapid style of talking during interactions with their babies. These examples seem to indicate that prosody modifications may be restricted to a number of languages and as such cannot be considered universal. Snow (1995:185), however, points out, that in many cases "culture can always override linguistics" as is the case in Quiché Mayan. In this language, high pitch is used when addressing people of higher status and since infants are considered low-status beings, the cultural consideration might override the universal tendency to use high pitch in interacting with them.

Thus, it seems that though there is ample evidence in favour of the universal and, by extension, biological basis of pitch modifications in IDS, further research into the interplay of cultural and universal factors in IDS is needed.

2.2.2. Individual variation

Some findings indicate that, apart from crosscultural variation in prosody modifications in IDS, there occurs considerable individual variation as well. Individual differences in the use of IDS prosody will be discussed with reference to several factors, such as: experience of the primary caretaker, family background and personal qualities of the caretaker, and perception of the infant by the primary caretaker.

(a) Experience of the primary caretaker

Shute and Wheldall (1995, 1989) studied British mothers interacting with their babies and although they found an overall increase in pitch and in pitch range, a wide range of individual differences was revealed as well. Surprisingly, for approximately 30% of the subjects no exaggerated prosodic features in IDS were found. Some mothers even used lower instead of higher pitch when addressing an infant. An important finding was that pitch modifications occurred more frequently in women who had some experience with childcare. A possible influence of previous experience with infants on use or non-use of IDS prosody was further confirmed by Masataka (2002), who studied IDS in Japanese mothers and non-mothers. He found that substantial modifications occurred in both groups, yet childless women modified their speech considerably less than mothers, though a within-group individual variation must be recognised as well. Thus, it seems that previous experience with infants influences the use of prosodic modification typical of IDS.

(b) Family background and personal qualities of the caretaker

Another interesting factor influencing the use of IDS prosody was discovered by Ikeda and Masataka (1999). In their study of 61 Japanese women with no children they found that the only variable which could account for the use vs non-use of IDS prosody was the family background, and more precisely, growing up as an only child or with siblings. Women who had siblings were significantly more likely to modify their IDS prosody. As a possible explanation of this behaviour, Ikeda and Masataka quote Jiao et alia's (1986) findings that

growing up with siblings promotes the development of such qualities as persistence and cooperation. They have also noted that they are precisely the two qualities that Shute and Wheldall (1989, 1995) regard as crucial for interacting with infants.

It is worth mentioning here that Dunn and Kendrick's (1980, 1982) studies demonstrated that children as young as two years of age and who had siblings can modify their prosody when addressing infants while only children cannot. This suggests that children who grow up with siblings learn very early on that the style of speech varies as a function of the addressee and this knowledge contributes directly to the emergence of better communicative abilities. All these results open a very interesting area of research into the psychological basis of IDS use and, in a broader context, may be used to indicate how differences in communicative experience in childhood may and, in fact, does influence communication patterns employed in adult life.

(c) Perception of the infant by the primary caretaker

Another factor which influences IDS prosody modifications is also of psychological nature. In relation to modifications involving not so much prosody as syntax and vocabulary Bingham (1971) has noted that mothers who believe that their children can understand them use IDS while mothers who judge their babies to be incapable of understanding their words and actions do not use simplified speech. Similarly, Kaye (1980) has found out that the language the mother uses in communicating with her child is a reflection of her expectations of the baby as a person. I am not aware of any studies on the relation between the use of IDS prosody and the perception of infants' communicative abilities but such research is certainly neede, fot it would be invaluable in determining at least some of the reasons for the use and functions of IDS.

Perception of the infant as a communicative partner may determine the use of IDS not only in individual terms, but in cultural terms as well. Examples of non-use of IDS mentioned in section 2.2.1. clearly show that the perception of the infant as incapable of communication does influence the way the infant is spoken to. For instance, Quiché Mayan speakers perceive babies as "especially physically and spiritually vulnerable and needing to be kept calm and quiet" (Lieven 1995: 59, based on Pye 1986 and Pye 1992) and hence they use low monotonic speech.

The factors described above indicate that individual differences have considerable influence on the use of IDS modifications and as such they need to be taken into account in any consideration of and theorizing on IDS.

3. Infants' perception of IDS

A prerequisite of successful communication is the ability of the addressee to decode the message sent. If infants cannot discriminate between IDS and ADS prosody, or if discrimination is not followed by preference, then the importance of IDS prosodic modifications in parent-infant communication would be none. If, on the other hand, infants prefer IDS over ADS, this would provide a good starting point for further analyses of the role of prosody in interactions with prelinguistic infants.

A growing body of research indicates that highly developed perceptual abilities for certain auditory stimuli are already present at birth. For instance, newborns exhibit preference for human voice and especially for the mother's voice. Shortly after birth they are able to discriminate between the voice of the mother and that of another woman (see DeCasper and Fifer 1980). This discrimination ability is not limited to female voices only. DeCasper and Prescott (1984) have demonstrated that newborns can also discriminate between male voices but show no preference for their father's voice. This finding indicates how important prenatal experience is in the development of the infants' perception of speech.

An especially salient feature of IDS speech appears to be its prosody. It has been shown that newborns as young as two days prefer exaggerated prosodic features characteristic of ID to AD prosody (see Cooper and Aslin 1990), which suggests that this preference is present from birth. The preference seems to be independent of the language used: 5-month-old English and Cantonese speaking infants tested by Werker et alia (1994) consistently preferred the speech of a Cantonese woman talking to her child over her speech to another adult. This does not mean, however, that infants are insensitive to cross-linguistic differences in prosody. Mehler and his colleagues (Mehler et alia 1988) have demonstrated that French newborns can discriminate between utterances in French and in Russian, even when the utterances were low-pass filtered at 400 Hz, which eliminated the phonetic content while leaving rhythm, stress and intonation intact. The ability to use prosodic information to distinguish between languages might be especially useful for infants growing in a multilanguage environment (Jusczyk 1995). Further research (Nazzi et al. 1998) showed that in this case infants ability was based on the discrimination of the rhythmic structure of a language (stress-timed vs syllable-timed vs mora-timed), since newborns can discriminate between languages from different rhythmic classes but not within one class.

Some researchers have suggested that the ability to discriminate between ID and AD prosody may also give the infant an advantage in evolutionary terms. For example, Locke (1996) based this hypothesis on Abraham and Cooper's (1994) findings that one-month-olds' preference for ID intonation is restricted to

the voices belonging to strangers. In the case of the mother's voice, no preference was found at this age. This finding might seem surprising but Locke's explanation seems plausible: "This is exactly what one would expect" writes Locke (1996:256) and adds: "if infants learn that their mother is usually nurturant, but that strangers must be taken on a case by case basis."

Thus, it appears that prelinguistic infants not only discriminate but also prefer IDS prosody over ADS prosody and that they make use of prosodic information in terms of both linguistic and biological development. Table 2 (see Vihman 1999:1271-2) presents a recapitulation of prosodic advances made by the prelinguistic child in its perception of prosody.

Table 2. Prosodic advances made by the prelinguistic child in the perception of prosody (Vihman 1999:1271-2)

AGE	PERCEPTION OF PROSODY
At birth	Prefers own language based on prosody
	Prefers IDS prosody
	Discriminates own mother's voice from other female
By 2 months	Responds to changes in both pitch and duration
	Discriminates syllables embedded in a trisyllabic pattern-ID prosody only
By 4 months	Prefers uninterrupted clauses in ID prosody
	Prefers own name pattern
By 6 months	Prefers word lists in own language to prosodically dissimilar language

4. Communicative functions of prosody in IDS

The infants' amazing abilities for the perception of prosody and their preference for IDS prosody as well as parents' tendency to use special prosody when addressing their babies have given rise to the following set of important question: what is the purpose of using special prosody in IDS? What important information does it carry?, and how is it used by infants?

From a considerable body of research it transpires that IDS prosody exhibits various functions which are crucial to the infants' emotional, social, communicative and linguistic development. The three main functions listed by various authors include the following:

1. attention-getting
2. communication of affect
3. aiding linguistic development.

Each of these functions will be described in turn with respect to their importance for communicative development, manifestations in IDS prosody and infant perception.

4.1. Attention-getting

In terms of communicative development the attention-getting function seems to be of special importance. As Garnica (1977:81) writes: "The child must know, among other things, the rules for how to engage in a verbal exchange with another person. (...) Getting the initial attention of your interlocutor in a conversation is a primary prerequisite to beginning a communicative exchange." The task may seem trivial in the case of an interaction involving two adults, however, when it comes to engaging an infant's attention, a number of difficulties appear. For example, the capacity for directing attention in a voluntary way emerges only around six months of age (Ruff and Rothbart 1996).

The importance of attention-eliciting properties of IDS prosody in the development of communicative abilities goes far beyond establishing and maintaining communicative interaction. At later stages of linguistic development, children make extensive use of joint attention, according to recent theories of word learning (e.g. Tomasello 2001). As Dominey and Dodane (2004) have noted: "(...) Joint Attention focuses his attention on the relevant aspects of the referential world, significantly reducing the poverty of stimulus problem."

The features of IDS prosody which are believed to have attention-getting properties are the following: an overall high pitch, extra high pitch peaks, and rising tones (Cruttenden 1994). Moreover, Fernald (1984) put forward a hypothesis concerning the role of the first two factors in eliciting attention. Firstly, the use of higher pitch contributes to the audibility of IDS which is then not easily masked by background noise. Secondly, high pitch peaks create the figure/ground effect segregating low and high tones. The third attention-getting property, namely rising intonation, has been a subject of a few studies which have demonstrated that it plays a considerable role in eliciting and maintaining infant attention. Stern et alia (1982) have shown that rises are used by parents to elicit eye contact. In turn, in Ryan's (1978) study, twelve-month-olds only rising intonation made children shift their attention from a toy they were holding to a toy held by the mother. More evidence for attention-arousing properties of rises comes from Floccia et alia's (2000) findings that rising but not falling information helped in discriminating bisyllabic words.

Some other studies point to the fact that attention-related properties of IDS may facilitate general learning in infants. For example, Ryther-Duncan et alia's

study (1993) has shown that four-month-olds were better at associative learning when IDS was played in the background. Kaplan and his colleagues (Kaplan et alia 1995), in turn, have demonstrated that IDS and ADS have different arousing properties. Namely, IDS is generally arousing and makes infants more attentive to various auditory stimuli while ADS generally decreases attentiveness.

IDS prosody, then, seems to possess various attention-getting, holding and directing properties, but are infants sensitive to them? Some of the evidence that IDS prosody demonstrates attention-eliciting characteristics has already been presented in section 2.1. where the infants' perceptual abilities and preference for IDS prosody were briefly discussed. In all the studies mentioned (Fernald 1985, Fernald and Kuhl 1987, Werker and MacLeod 1989), the infants' preference for IDS was measured by means of attention paid, hence each of these studies showing preference for IDS at the same time demonstrates that IDS succeeds in eliciting the infants' attention.

In conclusion, it appears that IDS has a number of attention-related properties which are crucial for the development of communicative abilities and that infants can take full advantage of them in the process of social interaction.

4.2. Communication of affect

Undoubtedly, emotions play a significant role in the development of communication. Through the non-verbal channel they regulate a considerable number of elements of any interaction; thus learning to decode them is a vital part of the infant's communicative development. Most importantly, the infant has to learn to identify and respond to various emotions in order to become capable of entering into and successfully carrying out interactions with others.

The role of IDS prosody in communicating affect seems especially important since infants in the early stages of their lives obtain most information about emotions through the auditory channel rather than through the visual modality. One reason for it is that auditory perceptual abilities develop faster than visual ones (Katz et alia 1996). Secondly, as Caron et alia (1988:604) have put it, "emotional expressions (...) are not fixed entities but events or happenings in time (...). As such, the important information specifying an emotion must reside in its overall dynamic flow". It appears that it might be much more difficult for a child to identify affect from "an overall dynamic flow" of visual information than from the voice quality. The subsequent observation is that "the voice is a much more potent vehicle for the communication of affect in infancy than the face." (Caron et al 1988:612)

How does IDS prosody serve a function of affect signaling and how do infants decode this emotional message? Fernald (1989) conducted an ingenious experiment to test it. She collected samples of five types of utterances both in

IDS and ADS. The utterances expressed different communicative intentions involving various types of emotions: attention-bid, prohibition, approval, comfort and game/telephone. In the experiment, all phonetic content was removed so as to leave only prosodic information as a marker of emotion. Then adults identified the types of utterances. It turned out that listeners were able to identify the intent of the message with higher accuracy for IDS samples than for ADS speech only on the basis of prosodic cues. This finding has significant consequences, since it demonstrates not only that IDS prosody provides more information about the speaker affect, but, more importantly, that, as Fernald has stated: "the relation of prosodic form to communicative function is made uniquely salient in the melodies of mothers' speech to infants, and that these characteristic melodies are potentially accessible and informative to the preverbal infant" (Fernald 1989:1505). These unusual properties of IDS in conveying emotional states and communicative intents were demonstrated not only for adult comprehension. In addition to the above, Slanley and McRoberts (2003) had reported that their speech discriminator could correctly identify affective message in IDS utterances nearly 70% of the time.

The question remaining to be asked is whether infants can use these IDS properties to identify affect and communicative intent. Fernald (1993) attempted to resolve this issue. She presented five-month-olds with approval and prohibition utterances under different conditions. Three of the conditions involved presentation of approval and prohibition in languages unfamiliar to the child, in this case German, Italian and Japanese. With respect to the two remaining conditions, infants heard approval and prohibition vocalizations in IDS or ADS and in IDS in non-sense English. In this study, five-month-old infants demonstrated an overall tendency to respond with more positive affect to approval vocalizations than to prohibitions. In one of the experiments, Fernald matched both types of vocalizations in F_0 range and F_0 variability, and found out that infants were still able to discriminate the two. Thus it has been proposed (Fernald 1993) that acoustic features other than F_0 modulation are responsible for the production and perception of affect.

Summing up this part of the paper, one may say that extensive research shows that IDS prosody is particularly effective in conveying affect and that infants can take advantage of this property of IDS prosody from the very early stages of the development of their communicative competence.

4.3. Aiding linguistic development

In the foregoing discussion, IDS prosody has been shown to facilitate and enhance the infants' communicative development by gaining and directing their attention and helping in identifying affect and communicative intent. But at this

point an important question arises: can IDS prosody facilitate the acquisition of the most potent vehicles of communication, that is, language?

A considerable body of evidence gathered to date indicates that IDS prosody does exhibit properties which help in first language acquisition and that children can perceive and make use of them. The idea that children can acquire some information about the grammatical structure from perceptual analysis of prosodic (and phonetic) cues in the input is known in pertinent literature as "prosodic bootstrapping" (cf. Gleitman and Wanner 1982, Morgan 1986, Gerken et alia 1994, Morgan and Demuth 1996, Morgan et alia 1987). Their research has demonstrated that IDS does contain cues which facilitate word recognition and mark the phrase structure. As has already been mentioned in section 2.1., acoustic markers of phrase and sentence boundaries such as pauses and final syllable lengthening are especially prominent in IDS. Thus, as Cruttenden (1994:146) has stated: "infants are receiving clearer indications of the major constituents of the grammatical structure of the adult language." However, it must also be remembered that prosodic phrases do not map consistently onto syntactic phrases (cf. Nazzi et alia 2000 after Nespor and Vogel 1986 and Selkirk 1984). Still, the existing correspondence seems to facilitate the task of prosodic bootstrapping well enough.

In this case, again, the same question appears: are infants sensitive to such information? Can they take advantage of prosodic modifications in IDS that could help them break up the language code? The results of a number of studies indicate that this is precisely the case. Infants younger than twelve months prefer to listen to utterances where artificial pauses were inserted at clause boundaries over speech where the pauses occurred in the middle of clausal units. This preference holds for IDS but not for ADS. (see Hirsh-Pasek et alia 1987, Kemler Nelson et alia 1989). Additionally, Jusczyk (1989) and Kemler Nelson (1989) found that this type of preference for English clausal units appears in English-speaking infants as early as at 4.5 months of age and for phrasal units at nine months (see also Jusczyk et alia 1992). The most important finding, however, was that the preference was still observed for low-pass filtered samples, where only prosodic information was available. "Accordingly", write Nazzi et alia (2000:125), "in distinguishing pauses at boundary and non-boundary locations, infants appear to be tuning in to prosodic information that is potentially useful for segmenting fluent speech in syntactically relevant ways."

Nazzi et alia (2000) have asked another important question: does infants' sensitivity to prosodic cues in IDS play a role in their processing of natural speech? They report Mandel and his colleagues' findings (Mandel et alia 1994, 1996) which have shown that this is indeed the case. Their studies indicate that the prosodic structure does have a bearing on how infants encode and remember

speech. In the 1994 study, two-month-olds were shown to have better memory for phonetic content of new words if these words were linked prosodically in a single clause as opposed to words presented in prosodically ill-formed clauses and in lists of disconnected words. In addition, the 1996 study demonstrated an even more powerful effect of prosody: two-month-olds retained the word order better if they heard it in a prosodically well-formed clause. Nazzi et alia (2000) further investigated the influence of prosody on speech processing in six-month-olds.They found out that still another role of prosody in the acquisition of language consists in facilitating recognition of the reoccurrence of phrases in fluent speech. This may be explained by two factors: firstly, prosodic well-formedness enhances extractability of units from the stream of sounds that infants have to process. Secondly, as has already been mentioned, prosody enhances memorability. These two properties of prosody, extractability and memorability, promote a better recognition of recurrent clauses, which, overall, can greatly facilitate first language acquisition.

Since this paper focuses on communicative functions of prosody, phonetic properties of IDS which promote first language acquisition will not be discussed in detail here. However, it needs to be mentioned here that newborn infants can discriminate between content and function words only on the basis of their differing acoustic and phonological cues (Shi et alia 1998). This finding indicates that IDS exerts a powerful influence on the process of grammatical acquisition right from the beginning of mother-infant interaction.

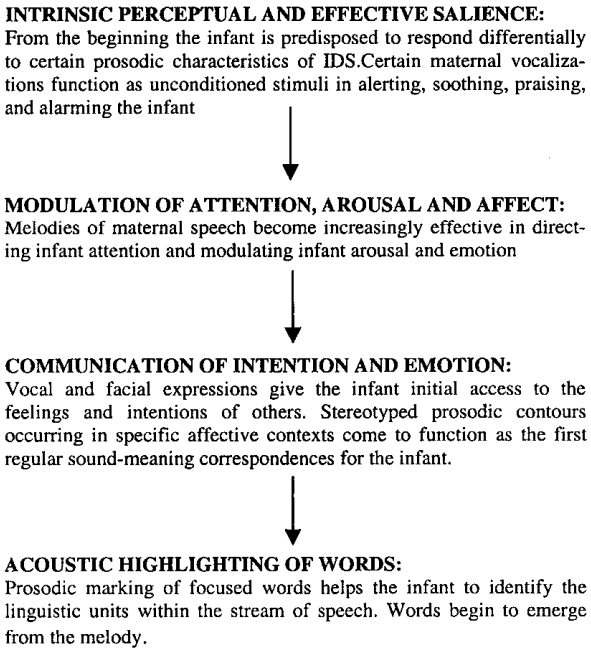
It must be remembered, however, that "prosodic bootstrapping", as any other theory of first language acquisition, has its limitations (for a summary discussion of the conditions for prosodic bootstrapping and the limitations of the theory see Nazzi et al 2000 and Slobin 2001). Nevertheless, the results of various studies have shown that IDS prosody may be characterized by a number of properties which could and which do facilitate the process of grammatical acquisition and that again, as was the case with the two other functions of prosody, infants seem to be able to make full use of the help provided by means of prosodic cues.

5. Modifications of ids in the course of the infant's communicative development

In the discussion presented thus far, the evidence for three functions of IDS prosody in prelinguistic mother-infant communication has been revised. However, IDS prosody shows another property which enhances communicative development, namely it changes together with the infant's growing communicative as s/he proceeds through the different stages of development.

Fernald (1994) put forward a comprehensive model of the developmental functions of prosody in IDS presented in Figure 1 below.

Figure 1. Developmental functions of prosody in IDS (Fernald 1994:65)



Fernald's model neatly integrates much of the research on the communicative functions of IDS prosody and at the same time it provides a useful starting point for further discussions and further research. Ten years after Fernald put forward her model, a considerable body of data point to possible modifications and refinements of the model. Studies described in the previous section indicate that the language acquisition function is present in IDS and used by infants from birth. Thus, it is obvious that more research needs to be done on the development of the functions of IDS prosody with respect to the relative prevalence of any of the functions at different stages of the child's linguistic and communicative development as well as across individual linguistic differences.

6. Conclusions

The present paper has aimed to review the problem of prosody in first language acquisition. More specifically, it has focused on the presentation of the evidence for the importance of IDS prosody in the development of communicative abilities in prelinguistic infants. A large body of research which has been referred to has shown that prosodic modifications occurring in IDS serve important communicative functions. Firstly, it has been demonstrated that IDS prosody has attention-related properties: namely, it helps to engage, direct and maintain infant attention, which is a crucial ability for successful communication. Secondly, IDS prosodic characteristics convey emotional information whose importance for regulating any social interaction (for example, the mother-infant interaction) cannot be underestimated. Lastly, IDS prosody has been shown to play a significant role in facilitating the child's linguistic development, thus aiding the growth of a very potent and uniquely human communication medium, that is, language. Moreover, it has been demonstrated that IDS prosodic modifications change with time such that tuning into the child's developing communicative needs and abilities is attained. All these findings indicate clearly that mother-child communication is an extremely complex process which involves many perceptual abilities and in which the infant is by no means a passive recipient but instead is an active participant whose actions can and do affect and alter the process of communication.

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