

# Linguistic Mythology and the First Year of Life

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It is perhaps natural that the first year of life should be the most neglected and misunderstood by students of language development in children. Our traditional models of language are based upon such notions as syllable, vowel, consonant, word, clause, and sentence, and few of these concepts seem applicable to the utterance of the child during its first year. There is therefore a ready tendency to dismiss most of this period as a "prelinguistic" stage of development, of little relevance for the understanding of the processes of language acquisition when they "really" begin – which is usually assumed to be towards the end of the first year. And even when people do decide to take infant vocalization into account, they find themselves faced with considerable difficulties as to how they can set about studying it, in view of the absence until recently of appropriate techniques of analysis – especially for recording a child's behaviour and for transcribing its utterances. For such reasons, it is not surprising to see very little serious discussion in the child language literature of the nature of vocalization in the first year, and of the implications of this for subsequent language development.

But the general absence of scientific knowledge of what goes on during this period has not stopped people from speculating at length about the matter, and producing their own theories about what happens, when it happens, and why. A good example is all the theorising about why a child babbles – for enjoyment, practice, kinaesthetic feedback, communication – which contrasts sharply with the miniscule amount of research that has attempted to transcribe what actually happens in the so-called "babbling period". What range of sounds are in fact used in the babbling of a normal child? Will one find there all possible sounds from all the world's languages, as some have suggested? "One cannot fail to hear all the vowels and consonants, diphthongs, aspirates, sub-vocals, nasals, German umlauts, and tongue trills, French throaty trills and grunts, and *even the Welsh L*" (my italics), said C. H. Bean in the *Journal of Genetic Psychology* (1932), voicing a quite general opinion. The reality is quite different, as phoneticians are now beginning to discover. And one may find similar speculation about other aspects of early vocalization – not excluding the birth cry. The eighteenth century philosophers were very prone to put interpretations on early cry patterns, one of the better known comments being Kant's, that "the outcry that is heard from a child scarcely born has not the note of lamentation but aroused wrath"!

In the last ten to fifteen years, the research journals have begun to report an increasing amount of work on first-year vocalization, and while the task is still only in its early stages of investigation, it is quite clear from the findings that have already been made that we must re-assess the importance of the first year in relation to later development of language. It is no longer possible to make the kind of simple generalizations about infant vocalization which have been so common. Babbling seems not to have a single

function, but a multiplicity of functions. The onset of language cannot be left until the appearance of the "first word", at around ten or twelve months, as most of the standard textbooks suggest. And the study of "prelinguistic" vocalization is by no means irrelevant for the study of later language development: for some, indeed, it is an indispensable perspective for any understanding of the early character of language. In a word, there have been a large number of "myths" current about language in the first year; and what is needed – to borrow a term from the theologians – is demythologization.

Let us begin with one of the most widely held myths, that infant – and particularly neonatal – vocalization is a relatively simple phenomenon, both structurally and functionally, comparable at best with animal noises. The research that has been taking place in Scandinavia, the United States, and elsewhere during the past decade has shown very clearly how complex the factors are which have to be considered in order to arrive at a satisfactory description and classification of infant vocalization. This research is recent, because it has only been possible to make progress in this area since the devising of more satisfactory techniques of recording, analysis, and measurement – developments, such as the sound spectrograph, which took place largely in the 1940s and 1950s. The aim of this work is to specify the range of parameters needed for the accurate and economical description of infant vocalizations, and to provide precise empirical data in these terms. Most of this work has used acoustic criteria of various kinds. The most widely known group use sound spectrography to classify a number of types of normal and pathological vocalizations, especially neonatal pain cries (see Wasz-Höckert *et al.*, 1968). Their most recent results are certainly impressive, as this quotation from Vuorenkoski *et al.* (1971) indicates:

In order to get practical determinations of normality or degree of abnormality in the pain cry of an individual newborn and young infant, a new rating system, *cry score*, has been constructed. Sound spectrographic analyses were made of the pain cries obtained from 240 infants ranging in age from 0 days to 8 months. The values in 13 different cry characteristics were transformed into ratings between 0 and 4. Cry score, the sum total of the different ratings, was designated abnormal when it exceeded 3. The correspondence between diagnosis and cry score was very good: both the sensitivity and the specificity of the score exceeded 90% for groups of 120 normal infants and 120 infants in various types of serious pathological conditions and diseases . . . Repeated measurements of cry score in three pathological cases during the newborn period showed an interesting possibility to follow the clinical development in certain rapidly changing conditions (p. 74).

The main parameters which need to be set up in order to make this classification are length of the cry, length of the latency (the time between the pain stimulus and the cry onset), fundamental frequency of the voice (seen both as an average and in terms of overall range), and the occurrence and height of voice shifts (i.e. sudden upward or downward changes in frequency). Other parameters may be articulatory or auditory – for instance, classification of the cry in terms of whether it is voiced or voiceless; falling, rising, or level in pitch contour; whether it contains fricative or plosive sounds; how continuous it is; whether there is any nasalization; and so on. Two points should be noted about this approach: the classification is not complete, and further research may show the relevance of fresh parameters or fresh groupings of parameters; and secondly, some of the parameters seem to be much more important than others as indices of normalcy or deviance. Length, continuity, and fundamental frequency variations seem particularly significant. Using this general kind of approach, a number

of pathological conditions have been characterized – various types of chromosome abnormality, brain damage, neonatal conditions (such as hyperbilirubinemia), and heart disease, as well as the more “obvious” syndromes, such as cleft palate. There is a considerable correspondence between the results of the Scandinavian group, and researchers in the United States such as Karelitz and Ostwald (see Ostwald *et al.*, 1968, and the valuable review of this whole field by Wolff, 1969).

None of these results is final, of course. The Cry Score technique is the first of its kind, and it will undoubtedly be much improved; but its potential significance for diagnosis is obvious. And it will probably be possible to extend this kind of approach to other pathologies. It is likely, for instance, that the so-called “deaf voice” which is developed by deaf children after an earlier period of normal babbling (cf. Fry, 1966) is ultimately correlatable with modified frequency direction and range, and accompanying factors. Luchsinger & Arnold (1965: 348), for example, say: “Another sign of early deafness in children is a typical change in the crying pattern. It sounds melodically distorted, more screeching and less emotionally differentiated than in normal children”. This is but an impression, not based upon a scientific survey; but more recently evidence has begun to be collected which substantiates their impression – Manolson, for instance (1971), has shown that hearing-impaired infants of 12-24 months had significantly more and larger changes in fundamental frequency and amplitude, and used certain bandwidths more than normals. And it is likely that other types of frequency change (see below) could bring the age of potential diagnosis down even earlier.

All this research clearly shows the formal complexity involved in the classification of early vocalizations. Moreover, most of this work has been done on children within the first two months of life. As they get older, the task of classification naturally becomes more difficult, as the cries become more differentiated, and there are more variables to be controlled. Wolff (1969) makes the important point that any of the predicted vocal effects may vary if the “state of the organism” varies: a baby in an excited state will produce a different response to a given stimulus from one in a contented state, for example. The question is: To what extent is it possible to classify the various “states of the organism”? What range of environmental and other factors are there which exercise some influence on infant vocalization types? Here, too, the view that vocalization in the first year is a relatively simple matter is shown to be quite mythical. Factors which affect the quantity and quality of the vocalization include the baby’s weight, size, physical development and general activeness, the amount of attention he is used to receiving, his hunger-state, whether he is clothed or not, the kind of light in the room, the room’s temperature, and so on. A very important factor, according to a recent study (Tomlinson-Keasey, 1972), is the effect of an institutionalized environment, which tends to reduce both amount and qualitative range of vocalization. The complexity is evident, and the central problem which researchers have to face is to ensure that environmental conditions are as standardised as possible when eliciting a vocalization or describing the context of their occurrence. The difficulties involved in doing this, of course, mean that we are still a long way away from any comprehensive explanation of the differentiation of vocalization in infants. It would, accordingly, be premature to talk of developmental norms. But the research is already valuable, because it has a cautionary role: it tells us the *kind* of factor which is important, warns us not to be too slick in our judgements about development on the basis of vocalization quantity or quality, and suggests the aspects of vocalization which we should be listening out for as being of potential significance.

If we move now to the second half of the first year, the obvious question which has to be answered is when does language proper begin? Here, the main myth is the assumption that language begins with the advent of the "first word" – that is, the first recognisable segment of utterance which is used consistently and stably by the child to designate some observable feature of the environment. The "myth within the myth" here, of course, is that we should strictly be talking about the first *sentence*, and not word, as the utterances ("mama", "bubu", or whatever) invariably have a sentential function (identifying mummy, wanting mummy, etc.) and are not simply being used in the dictionary sense of "mother". The point has been thoroughly discussed for early sentences by Bloom (1970), so I will not go into it here. But whether we call them first words or sentences, what I want to emphasise is that they are said not to emerge in most children until the last few weeks of the first year; and it is therefore assumed that this is the point at which language begins. But this is a fallacious conclusion, stemming from a "verbal" view of language as consisting of vowels, consonants, syllables, syntax and lexical items – and nothing else. What this view ignores is the important role which intonation and other prosodic features of language have in adult communication (Crystal, 1969); for when one carries out intonational analysis in the context of child development, one finds that certain prosodic patterns are in operation in the vocalization of the child well before the development of recognizable "words". Most observers have concluded that the most likely period for the emergence of language-specific prosodic features in production is around six-seven months (see, for example, the summary in Menyuk, 1971). Before this period, no difference has been observed between the vocalization patterns of children from different language backgrounds. After this period, the children begin to take on some of the prosodic characteristics of their native-language – such that by the age of 18 months, almost all the distinct intonational movements of the adult language have been used (though not all the adult meanings, of course). A point to be made here is that it is not solely pitch-movement which is involved: apart from pitch-direction and -range, the meaningful vocalizations of a 9-month-old may use rhythm, loudness, speed, nasal and laryngeal effects, and many others, all as learned features of behaviour, and all able to be consistently interpreted by parents as "meaning something". Very often, it is not possible to identify accurately what the child is saying because of its phonetic immaturity, until much later, when the utterance has developed into something more immediately recognizable. But by the use of longitudinal recording techniques, it is quite possible to trace back 18-month utterances, such as "allgone", "ta", and "that(s) daddy", to the eight-month stage: the individual phonological segments are very different, but the intonation and rhythm of the later utterances are present, even at this early age.

Experienced therapists are well aware of the importance of intonation during this period; but on the whole the textbooks pay little attention to it, and few studies have been made which give adequate analysis of the development of intonation in children after its first appearance. This is true not solely for the study of its formal patterning, but also of its function. The role of intonation as a means of segmenting disjointed vocalization into organized "sentence-like chunks" (as Ruth Weir put it, 1962) is one such function – a *grammatical* function. This is the most important function of all, as without this use of intonation, it would be extremely difficult to interpret utterance (imagine interpreting writing which lacked spaces, capitalization, or punctuation of any kind); but it has been little studied. The *attitudinal* function of intonation is a little more familiar. But the *social* function has been almost completely ignored. For example, role-play in children is an important feature of their development, though not

normally discussed until the child is about three. But there is evidence that by the age of one the child has already acquired a considerable amount of information about the linguistic characteristics of different roles, and is attempting to put them into practice. In a previous paper in this Journal, I referred to a child who adopted a falsetto voice when he was playing with his rabbit, and a chest voice when playing with his panda. This example has brought some correspondence from readers, some correspondents concluding that what the child was doing here was identifying the rabbit with his mother, and the panda with his father, and approximating his own voice to the pitch-range distinctiveness involved. This may well be. Certainly at 3 months there seems to be no differential effect of male v. female reinforcement on vocalization (cf. Banikiotes *et al.*, 1972), but by 10 months there does (Lieberman, 1967: 44-6). Perhaps what happens is that the father's role, having had minimum importance before 3 months (as discussed by Rebelsky & Hanks, 1971), becomes increasingly important thereafter, thus providing the child with a clearer set of contrasts. It is difficult to say, and this is really my point: that there is still a great deal of ignorance about the functional development of prosodic contrastivity in children – even about such a “straightforward” aspect of social role as the male v. female distinction.

By around seven months, then, we have to talk about the development of language proper, within a background of non-linguistic vocalization. But this date is significant from the point of view of production only. If we now introduce the notion of comprehension, and the more general question of the point at which the child begins to discriminate the phonological contrasts of his language, then the concept of ‘language acquisition’ must be brought forward even further. There is, for instance, a whole tradition of agreement, reported in Lewis (1936), that the child's response to intonation and tone of voice develops very early – most of the references cite somewhere between two and four months. The “experimentation” referred to was very informal and uncontrolled, but this time-period has come to be substantiated in more recent work. For example, it has been shown, using habituation tests involving such criteria as change in heart rate, that differential response to certain pitch contrasts is clearly present by four months (see Kaplan & Kaplan, 1970). Other studies, also using habituation techniques, have shown that infants – some as young as one month – can distinguish phonemic contrasts. A good review of the issues involved is Friedlander (1970). While we are a long way from the establishment of norms of receptive linguistic development, I think it is already clear that the answer to the Kaplan's question “Is there any such thing as a prelinguistic child” is “No” – or, at least, not in the usual sense of “prelinguistic”, which is a notion based entirely on productive differences in vocalization.

The link between studies of infant vocalization and language development should now be clear. Whatever our hypothesis about the onset of language development – for instance, that intonation patterns will appear in production at around seven months – it is prerequisite to know the characteristics of the “norms” of non-linguistic vocalization, which provide the yardstick against which the language-specific features can be plotted. The neonatal studies are important to the linguist because they provide descriptive information about the physical characteristics of vocalizations which ties in remarkably well with those that the linguist will need to refer to (fundamental frequency, length, etc.), and also because they indicate methodological problems and guidelines which researchers into the later months would be foolish to ignore. The problems involved in determining the contextual variables at the 3-month period are no less at

the 8-month, where the researcher has in addition to cope with the problem of describing the meanings of the linguistic patterns being used.

The problem of semantic description in infants brings me to my final myth, which is the view that early child language is simply a reduced form of adult language, and capable of description in adult terms. This is not a problem restricted to the first year, of course (cf. the misleading term "telegraphic" for the syntactic patterns that appear around 18 months), but I think that it is more difficult to see why this is a problem in the first year. The danger is in uncritically describing and categorizing the features of the child's vocalization in terms originally defined for the study of the adult language. A certain amount of adult orientation is of course unavoidable in interpreting early vocalization, but the researcher must be on his guard lest he read in too much adult meaning into the child's utterance, or use inappropriate categories for his classification of phonological or grammatical patterns. A good example of reading in meaning is the uncritical classification of cries into such types as "hunger", "pain", "pleasure", "distress", "fear", "anger", etc. It is generally assumed that it is possible to identify a vocalization on the basis of the physical characteristics of the cry signal alone, whereas in fact to do this consistently one needs to know a great deal about the co-occurring situation. That this is a problem has been known at least since Sherman (1927), who showed in a detailed study that judges were unable to identify vocalization types of hunger, fear, anger, or pain when the situational stimulus which gave rise to them was hidden from them, and concluded that knowledge of the stimulus was the deciding factor in applying a name to a vocalization type. In other words, a mother may think she knows a hunger cry when she hears one (at feeding time); but when presented with a sequence of hunger and other cries mixed up on a tape, she is unable to label them correctly – though performance in this task does improve with practice, evidently, and there seems to be some correlation with experience (the more experienced the judges in child-contact, the better the identification), according to Wasz-Höckert *et al.* (1964). Determining the causes of a vocalization, as Wolff makes very clear (1969), is an extremely complex task. One cannot assume that in any given situation what the adult sees as the obvious causative factor is in fact the real cause. This is particularly evident in the case of the "hunger" cry: "The term is misleading if it implies a causal relation between hunger and a particular pattern of crying, since this is simply a "basic" pattern to which the infant sooner or later reverts from other crying, and it has no unique causal relation to hunger" (Wolff, p. 82). A pain cry, for example, begins distinctively, but after a while it takes on the characteristics of the basic pattern – in other words, while in one sense a pain cry is a response to a pain stimulus, it is not the case that the characteristics of the cry are constant throughout. The tendency to read in meanings into infant vocalizations is common and unfortunate, particularly in the early reports on the subject; and while much less work has been done on the developing intonation system than on vocalizations, it is clear that there has been little attempt to impose careful controls on semantic labels here either. This is even more disturbing, in view of the fact that as intonation contours do not have single "meanings", but can be used in a variety of semantic contexts, the likelihood of misleading labelling is correspondingly much increased.

The second point – the use of inappropriate categories for phonological or grammatical classification – is easily illustrated by the tendency to transcribe the non-linguistic patterns of neonatal vocalization and early babbling using a system of transcription originally devised to handle adult linguistic utterances. It is common to find people talking of the *a*-vowels of the 3-month-old (or even, at times, of his

“phonemes”), of the bilabial consonants of a 6-month-old, and so on. But this is very misleading, for two main reasons. First, it has been shown that any such analyses are inevitably skewed due to the influence of the phonological structure of the adult language, which leads one to interpret sound qualities in terms of the adult set of distinctive features, and to ignore qualities which are functionally irrelevant in the adult language (see, for example, Lotz, *et al.*, 1960). A given quality may sound like an /æ/ to an Englishman, an /e/ to an Italian, and so on. Secondly, while perceptual units of infant vocalization approximate to certain adult units in some cases, the physical configuration underlying these units is by no means similar. This point has become perfectly clear since the advent of spectrographic analysis. Even the spectrograms of an adult trying his hardest to imitate an infant show major differences (see Wolff, 1969: 104, for examples). The formant structure, the transitional features, the onsets and terminations of sounds all differ. Lynip (1951) suggests that even approximate equivalence to adult vowels and consonants is not achieved until the end of the first year. The general point is made again by Lenneberg (1967) who, after considering spectrographic characteristics, points out that one cannot call these features “speech sounds”, neither in functional terms nor in articulatory/acoustic terms: degrees of glottalization and labialization occur which are normally absent from adult articulations, and there is a generally erratic articulation and poor co-ordination between the various mechanisms. Lynip’s summary is worth quoting (p. 226):

It is totally impractical to try and express in adult sounds an utterance of an infant prior to his speech maturation. Infant utterances are not *like* any of the well defined values of adult language. They are produced differently and they are shaped differently, their relationships with adult sounds are at first only fortuitous. Infant sounds cannot be described except in terms of themselves. There is no International Phonetic Alphabet for the utterances of a baby.

Developing new systems of transcription of course is not easy; and handling early vocalizations in the more “neutral” metalanguage of acoustic phonetics is for many impracticable. In fact I have no objection to people using some of the adult terminology as long as they give it some explicit gloss to show they are aware of the problem – that the phonetic output of a babbling child is totally different in status from the phonological output of the child who is developing language. Both 6-month and 2-year-old children may use *l*-sounds, but they have no systematic function in the former in relation to other sounds, whereas in the latter they are part of a “system” of sounds, /l/, /b/, /t/, etc., which combine to produce the various meaning-contrasts of the language’s phonology.

Readers will perhaps have noticed my use of the word “hypotheses”, at different points in this lecture. The scientific study of language development has produced many promising hypotheses, and many usable methods, but a relatively small number of agreed facts. It would be arrogant, then, for me to refer to my talk of demythologizing as the replacement of myth by fact. Rather, it is the replacement of one kind of myth by another kind – but by calling these new myths “hypotheses”, I mean to imply that they are in principle based more on experimental evidence, and are more amenable to rigorous testing, than were the impressionistic and speculative claims of the older traditions of thinking. The facts are, indeed, slowly emerging. But more important than these, in a way, are the critical attitudes which underlie them, which have prompted our reconsideration of the significance of infant vocalization. There is little, chance, it seems, of the first year of our linguistic life being comparably neglected again.

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