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ABSTRACT

Assuming that an infant's first stage of verbal communication is melodic and the result of controlling the motion of the vocal cords, a question arises concerning the second stage in development. Is it the shaping of the oral cavity of the direction of the articulators? The author's observation of an infant through his first year of development indicates that the conscious shaping of the oral cavity appears to precede the communicative use of lip articulation. From the use of pitch by itself, the child introduces the element of shaping the oral cavity, and this produces a vowel. Later, the child adds a third element, articulation, and produces consonants. (VM)

The relationship of intonation to first vowel articulation in infants.

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INTRODUCTION

A. (1) The working hypothesis which I offer is grounded on a series of premises. Not all of them are universally accepted, but for the purposes of this paper they will be taken for granted.

(2) Furthermore, most aspects of the current controversy over innateness and over forms of conditioning are not directly relevant to what I am about to explore and will therefore not be touched upon.

GENERAL PREMISES

B. (1) Language is primarily a system of conscious communication.

(2) Developmentally, the complexity of the system increases as the child's expressive needs become more varied in accordance with the greater intricacy of desires to be satisfied -- at the same time that mothers exert less energy to deciphering the child's needs from his rudimentary means of expression.

SPECIFIC PREMISES

C. (1) Language develops through levels of linguistic abstractions, cutting partly across linguistic tiers. Thus, the second abstraction of one tier may be acquired after the first abstraction of another tier has already been mastered. To give an actual example, the abstraction of syllabication precedes that of phonotactics whereas phonotactics follows the word which pertains to the lexical level.

(2) In the infant, the first stage of verbal communication is melodic. Research by Tonkova[1] and by Karelitz[2], a.o.,

demonstrates the purposeful varience in the intonation curves of baby cries.

(a) It follows that physiologically a three-month-old infant has control over the movements of his vocal cords.

(b) It is also apparent that psychologically the infant is capable of recognizing different needs and has the power to express them in a distinctive manner.

STATEMENT OF THE GENERAL PROBLEM

D. (1) During the melodic stage, the infant does not seem to have conscious control over the shape of his mouth nor the movement of the articulators.

(2) Between the tenth month and the end of his first year, the average child exhibits a coordinated - although not yet fully perfect - mastery over the movements of the vocal cords, the shape of the mouth, and the articulators.

STATEMENT OF THE SPECIFIC PROBLEM

E. (1) Granted that the first element within the vocal tract which the child can purposefully control is the motion of the vocal cords, what is the second element? Is it the shaping of the oral cavity, or the direction of the articulators?

(2) Are newly acquired forms of control immediately superimposed on previous capacities or do they at the outset develop independently, to be correlated later - even if very quickly? Does

this happen in the same fashion for all new forms or are some of them immediately superimposed while others match at a period following their separate acquisition? Is a third form immediately correlated to the two preceding ones or to one at a time; and if so, to which one? Does a third form develop before or after the other two are matched?

GENERAL HYPOTHESIS

F. (1) Among the articulators, the lips are also used for sucking. The baby has control over them almost immediately after birth.

(2) Zazzo[4] has shown that a two week-old baby can control his tongue for purposes of kinesic imitation.

(3) Why then is the message of the first vocal expression conveyed melodically and not articulatorily? The answer obviously must must be that the infant does not connect vocalization with articulation, and vocalization with pitch variation.

(4) On the surface then, the onset of babbling affirms more of a psychological than a physiological achievement. In pedolinguistics, however, psychological and physiological factors cannot easily be separated. As a matter of fact, physiologically, babbling combines articulation and intonation. The syllabicity of the babbling sounds and the rhythmic quality of the babbling process have been extensively researched and are well established. (Controversies over Stetson's theory are not essential to the broad concept involved here.)

(5) Sucking also requires a certain amount of shaping of the mouth. The oral cavity is formed into a narrow channel in ~~precisely~~ the same manner as for the sound æ common to whining.

SPECIFIC HYPOTHESIS IN GENERAL

G. (1) In whining, mouth shaping and vocal cord opening are controlled simultaneously; but it is still only the pitch variation which conveys meaning, while the channelling of the air through the mouth seems to be an automatic secondary feature, slightly varying but in a non-contrastive manner.

(2) To state that of the two features, the intonational variation is contrastive while the vowel sound is secondary is not an arbitrary decision. From the analysis of the way mothers talk to infants it becomes apparent that the primary contrastive feature is the pitch variation. Intonation as a major clue persists even after, into the fourth year of life, as shown by Scholes research on the recognition of sentencehood by young children.[4]

SPECIFIC HYPOTHESIS IN PARTICULAR

H. (1) The question now arises as to when the child starts to shape the oral cavity as a distinct means of vocalization, Does mouth shaping become functional before, after, or contemporaneously with babbling articulation? Do all children behave in the same manner, or are there racial, social

and/or individual differences?

(2) From the linguistic literature I have consulted, the problem does not seem to have received much attention, if any at all. My own work, for the moment, is limited to one child. In that particular instance, the conscious shaping of the oral cavity appeared to precede the communicative use of lip articulation. The time lapse, however, was extremely slight and has to do only with the first vowel, and not the entire system, which as a whole seemed to develop contemporaneously with the first monosyllabic.

(3) The first independent vowel occurred at the beginning of the eighth month, that is before the child uttered a sound related to the actual language of his environment. This first language specific vocalization occurred during the middle of the eighth month: ča for Italian ciao, "by-by". What finally emerged was a system of three vowels which, for lack of any established term, I decided to call emotive vowels. Each of these three vowels carried a distinctive meaning to be inferred from the different circumstances under which each vowel occurred: The child said i: while pointing with his forefinger at an object he wanted. He said u: in sign of disapproval when he wanted to change the situation to his liking, as when upon awakening at dawn, he sought more attention from his mother who preferred to get some more sleep. He said U as an expression of inquiring marvel

when discovering some unfamiliar object in his room.

(4) Physicologically speaking, the three vowels are all hi·h, the more central vowel being short, open, and lax while both extremes are long, closed, and tense. In Jakobsonian terms, we observe a "linear vowel system" even though not a completely straight one and one of a highly asymetric distribution.

(5) In acoustic terms the first formants of i, u, and U are in a very close range, whereas the second formants differ sharply.

(6) On a semantic level, the child's emotive system should be considered as a unit, but it would be hard to classify these three vowels within the accepted pattorning of sound symbolism. The utterance ča is of a totally different kind. It is not only holophrastic but owes its origin to a process of imitation. From a purely physiological standpoint, ča is produced both purposefully and repeatedly. To divide č and a into distinct phonemes is, of course, theoretically quite correct. As U was the last emotive vowel to appear, we can observe the "fundamental triangle" before its expansion to one more phoneme. This does not alter the basic triangular shape but destroys the symmetry.

(7) On a articulatory basis, it remains questionable if č and a can be separated, as no such single phoneme was produced independently. The use of ča lasted for one month and then underwent what Leopold terms "word mortality." It

reappeared during the twelfth month after several other vowels and consonants had been mastered. Speaking of these, it is important to note that the second, third and fourth holophrases did contain the vowel a. The fifth contained the vowel U. On the other hand, before i was incorporated into a word, there were words containing o and ɛ. The problem verges on the broader controversy between autonomous phonemics and underlying forms.

CONCLUSION

I. (1) More strictly relevant to the issue this paper attempts to deal with is the fact that the child whose language development I recorded from birth throughout his first year of life manifests a functional contrast in vowels before the contrastive articulation of consonants. He had the ability to alter the shape of the mouth resonator before he would use his articulators. The term "ability", as used here, implies the power to effect a psychological command, not merely a physiological operation. It also implies that the shaping of the oral resonator was a primary and not a secondary feature, as was the case for whining and crying.

(2) Articulation as a secondary feature was present by the end of the fourth month in the child's communicative vocalization. As this paper concerns itself with communicative expressions only, motor exercises, such as gurgling, are excluded from my analysis. The voiced bilabial nasal of the cooing period

evolved into the child's carrier sound. Having devoted an entire book to an examination of how the intonational variation present in crying eventually branches off into the intoneme of the carrier sound, I shall not elaborate on the subject. The primary feature of the carrier being melodic, its articulatory quality is non-contrastive.

(3) The link connecting crying with carrier/sound, and with emotive vowel is evidenced also by the fact that all the examples of carrier sounds I have so far gathered from the literature and from direct observation, are voiced. The one exception proves the rule. The repertoire of Hildegard Leopold included a glottal stop.[5]

SUMMARY

J. (1) To recapitulate, the child moves the vocal cords for communicative purposes while the shape of the oral cavity is secondary. He then converts the secondary feature into a primary feature on a new level, and from pitch alone (melody) we have pitch and shape which produce a vowel. Later, with the first consonant, the child adds a third level within the phonological tier, that of articulation.

(2) The comprehension of articulation precedes its production; but the relationship of passive and active language in the melodic stage is far more intricate. The consideration of these complexities, however, would go beyond the scope of the present paper.

FOOTNOTES

[1] R. V. K. Tonkova-Yampol'skaya, voprosu o stanovlenii rechi (On the development of speech.) "Phonetica" 12, 34 (1965), 209-17.

[2] Besides his various publication, of particular importance is the recording prepared by Dr. Karolitz and his associates at the Department of Pediatrics, Long Island Jewish Hospital; Samuel Karlitz, M.D., Infant Vocalizations.

[3] Robert H. Scholes, The role of grammaticalness in child and adult imitation of word strings, paper presented at the 1 Southeastern Conference on Linguistics, Florida State University, March 1969.

[4] René Zazzo, Le problème de l'imitation chez le nouveau-né "Enfance" 2(1957), 134-142.

[5] Werner F. Leopold, Speech development of a bilingual child, Evanston-Chicago 1939-1949, vol. III, 8.