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**THE INDIVIDUAL FEATURES OF MATERNAL SPEECH LINKED TO THE**  
**NORMALLY DEVELOPING CHILDREN DURING THE FIRST YEAR OF LIFE**

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*The individual features of maternal speech linked to the children and characteristics of the children's speech development during the first year of life in 15 dyads with single-born children and in 5 triads with twins were analyzed. The differences in organization of vocal-speech interaction in dyads and triads with the expressed individual features of maternal speech and the levels of children's speech development were shown. Maternal speech links to the twins in different age and in the different triads had as similar organization and as different one. The level of speech development in twins was lower than that in single-born children.*

Language acquisition is a complicated process for a child. The success of this process depends on the great number of factors, which influence is various at the different periods of infant's life. The way of adult's (mainly mother) interaction with babies determines following cognitive and mental development of a child at the early stages of his life. Well-known phenomenon motherese includes the whole complex of behavioral reactions of mother when interacting with child such as modification of speech features when interacting with infants of the first months of their life as compared to speech addressed to the adults. As we showed, the acoustical features of maternal speech (MS) have been changing with the age of the child [1, 2]. The level of speech development and psychophysiological status of a child determined these characteristics. The specific organization of MS contributes to the appearance of the different types of vocalizations and its complication with the age of a child, it gives an opportunity of imitation of the maternal voice by a child, and leads to appearing of sounds which are specific for the language environment of a child [3].

The aim of the study was to consider the individual features of MS linked to the normally developing single-born children and to the twins during the first year of their life. The study also was aimed to reveal the possible influence of MS to the early speech development of the children.

The recording of maternal speech and the baby's sounds in mother-child interaction situation were conducted in 15 dyads with single-born children and 5 triads with the twins (4 triads with dizygotic twins, 1 triad with monozygotic twins). The recordings of single-born children were made once in 3 months, recordings of the twins were made monthly. The recordings were made by the "Marantz PMD222" recorder with a "SENNHEIZER e835S" external microphone. The child's sounds and mother's speech were spectrographic analyzed in the Cool Edit 2.1 (Syntrill. Soft.Corp.USA) sound editor [1,2]. The analysis of macro and microelements [4] of maternal and infant's behavior were realized on a base of examination of the video recordings and the determination of the elements of behavior. Video tests, including the fragments of mother-child interaction for each triad at the age of the children 3, 6, 9, 12 months, were performed. Examination of the behavior elements was made by the experts that worked with the child's speech (n=4), and by the adults with the experience (n=10) of interacting to the children and without one (n=9).

The results of the study showed the presence of motherese for all the mothers of the single-born children and showed the individual features in organization of speech behavior.

Analysis of MS, addressed to the children included the following parameters (scheme 1):

1. Sound play, made up => 25% of the whole number of categories of MS;
2. MS is emotional (=> 50% of the whole number of utterances) by assessment of auditors;
3. Interrogative and exclamatory sentences made up => 50% of the whole number of utterances;
4. Imitation of infant's sounds;
5. The number of imitations of the infant's sounds by the mothers significantly exceeded the number of imitation of maternal sounds by infant. The number of imitations were considered as a percent of the whole utterances (for a mother) and of all non-cry sounds (for a child);
6. The presence of words (first type), pronouncing with hyperarticulation [1,2];
7. Pitch (F0) variability of the utterances linked to a child was bigger than that in a speech addressed to adult:  $(F0_{max} - F0_{min})_{ch} > (F0_{max} - F0_{min})_{ad}$ ;
8. Stressed vowels duration in the words of the first type was longer than that in 12-months-old;
9. Stressed vowels duration in the words of the first type was longer than that in emotionally marked words in a speech, addressed to adult;
9. The pitch of the stressed vowel in the

words of the first type in the maternal speech was higher than that in emotionally marked words in the speech, addressed to adults; 10. The presence of sounds and words repetitions in MS; 11. The maternal voice sounded at one time with the child's voice no more than in 10% of all utterances 'child-pause-mother'; 12. Pauses duration between the end of the child's voice and the beginning of maternal voice was longer than pauses duration in adult's speech (Wilkokson-Mann-Whitney criterion); pauses duration when interacting to the 12-months-old was longer than that for the 9-months-old; 13. The pauses duration between the sentences in utterance linked to a child ( $\geq 50\%$  of utterances), was longer than that in the speech addressed to adult (Kruskal-Wallis criterion); For the 12-months-old – pauses duration in utterance, addressed to a child, was longer than that to a 9-month-old; 14. Presence of the second type words in MS [2]; 15. The number of the words of the second type exceeded the number of the words of the first type.

Points 1-10 were assessed when analyzing MS linked to the 3-months-old; 1-11- in a speech addressed to 6-month-old; 2-14 (1,3,8,9 were excluded) – in a speech, addressed to the 9-months-old; 2-15 (1,3,8,9 were excluded) – in MS, addressed to the 12-months-old.

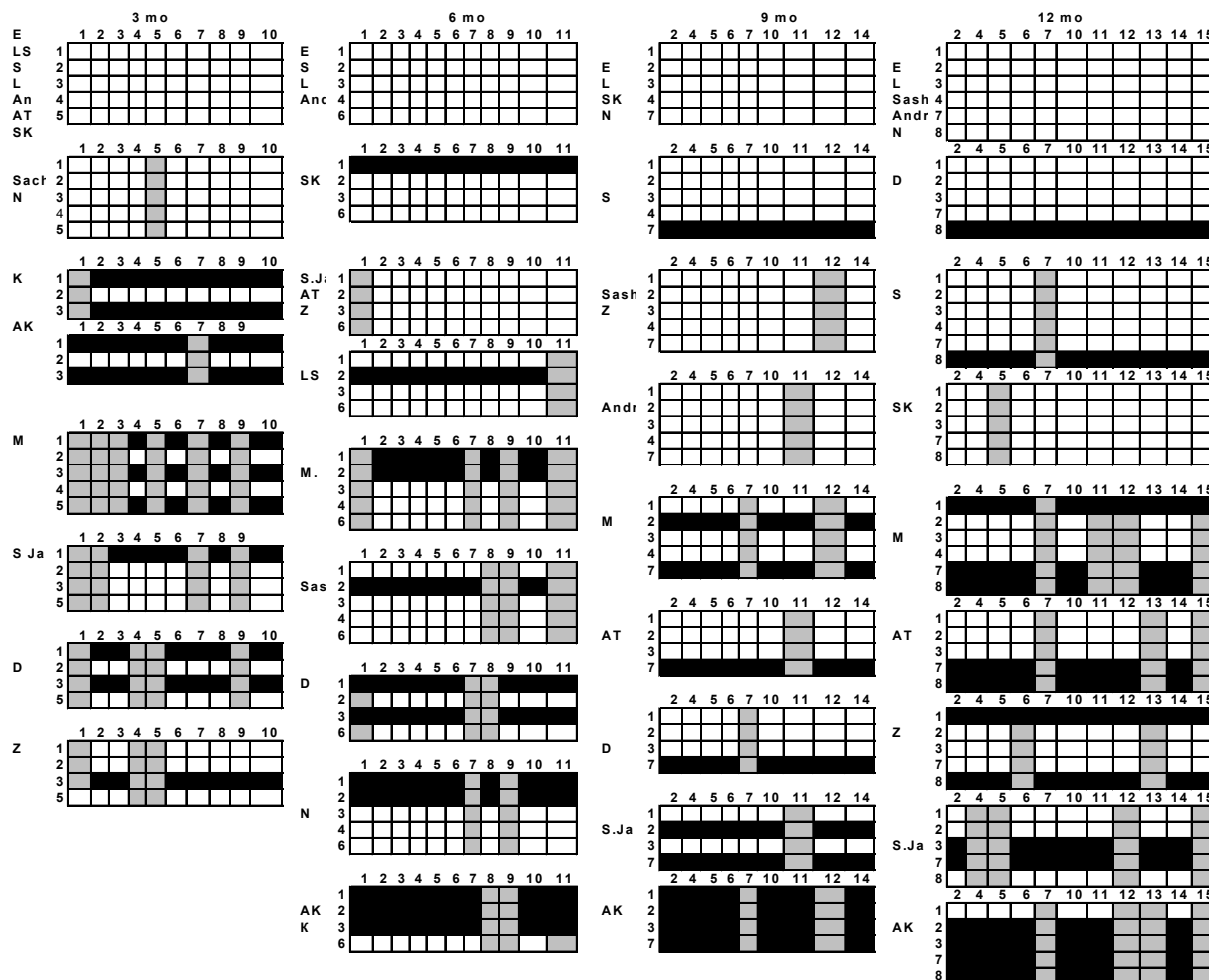
The assessment of children's speech development:

1. The number of non-crying sounds for all time of interaction was  $\geq 50\%$  - for 3- and 6-months-old;  $\geq 30$  –for 9- and 12-months-old (because vocalizations became longer);
2. The rate of vowel-like sounds was  $\geq 70\%$  of the whole number of vocalizations for 3-months-old; appearance of syllables at the age of 6 months; the rate of syllabic constructions was  $\geq 20\%$  of the whole number of vocalizations for the 9-months-old; the rate of syllabic constructions was  $\geq 25\%$  of the whole number of vocalizations for the 12-months-old;
3. Imitation of MS;
4. The possibility of phonetically description using IPA and SAMPA symbols for the sounds of 3-months-old (no less than 10% vowel-like sounds); the increasing of the number of sounds, which could be transcribed using the Russian vowels with the age of the child;
5. Fixation of the look at the mother's face no less than 3,5 minutes at a 5-minutes "face to face" interaction;
6. Presence of the speech-like constructions that contained consonant-like sounds;
7. Correspondence of the acoustical features (pitch and the one or several formant frequencies) of the infant's vowels to that in adult's vowels:  $\geq 10\%$  - for the 9-months-old,  $\geq 20\%$  for the 12-months-old;
8. Presence of the simple words, which meaning were recognized by mother in a situational context.

Parameters 1-5 were accounted when analyzing the level of sound development of the 3-months-old; 1-6 (without 5) – for the 6-months-old; 1-7 (5-6 were excluded) –for the 9-months-old; 1-8 (5-6 were excluded)- for the 12-months-old.

The question whether the level of child speech development or the organization of MS was initial didn't consider in the present study. The results of the work showed that when the all parameters were presented in MS, the all parameter of child speech were presented too (dyads E and L – at the all age periods). The absence of such parameters in MS as the less number of imitations of 12-months-old sounds as compared to a number of imitations for the child (dyad SK) or the simultaneous sound of maternal voice and the voice of the child (dyad Andr, 12 months) didn't influence to the speech development of children. The positive dynamics, consisting in appearance of all parameters in MS with the age of the children, and appearance of all features that are typical for the normal early speech development of children was considered in two dyads (Sash., N.). The appearance of all parameters in MS with the age of the child didn't lead to the significant improvement of the child speech development in dyad D. The absence of features that distinguished the MS linked to the children of the second half of life versus MS directed to the children of the first half of life led to the significant lag in the early speech development of children in 4 dyads (S., SYa, AT, Z). The significant lag in speech development of the children was considered (dyads M., AK, K) in the absence of the great number of parameters in MS, addressed to the children at the different age (for example, in maternal speech, addressed to the children M - 6 parameters of 10 ones were absent). As a rule, the speech development of a child lagged for a number of parameters in the absence of the number of parameters in maternal speech.

The differences in speech interaction in triads with the twins as compared to the mother's interaction with the single-born children were considered. The analysis of MS addressed to the twins included the great number of parameters which corresponded to the parameters that were accounted in



**Scheme 1.** The individual features of maternal speech behavior and the speech development of a child in each dyad for each age period. Across – the parameters of maternal speech (look to the text), vertical – parameters characterizing the level of sound and speech development of a child (description in the text). Gray color – absence of some parameter in maternal speech, black color – absence of the feature in a speech development of a child. At the side – near the each scheme – names of the children.

MS addressed to the single-born children (1-10, 13, except for 5, 11, 12, 14, 15) and contained a number of additional parameters (scheme 2):

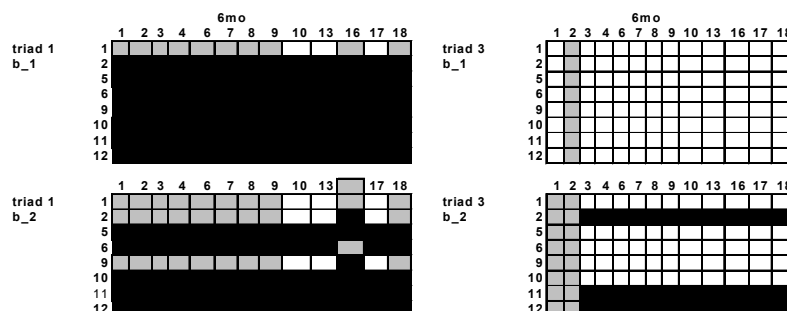
16. Grammatically simple speech; 17. Fixation of the look at the face of child; 18. Face expression.

The parameters 1,3,6-9 of MS for the triads were determined on a base of assessment of video recordings and on a base of acoustical spectrographic analysis. The rest parameters of maternal speech were determined on a base of express-analysis. All the parameters of maternal speech behavior in triads 2,4,5 were determined on a base of assessment of video recordings (3 and 9 using the data of acoustical analysis).

When analyzing the level of speech development of twins taking into account the twin situation the parameters 9-12 were introduced, parameters 1,2,5,6 were similar to that in a case of single-born children, parameters 3,4,7,8 were not analyzed.

9. Pronounce a lot of sounds when interacting to the mother; 10. Pronounce sounds in response to MS; 11. The most time of interaction looks at the mother; 12. Active interaction with mother.

The estimation of points 1,2,10 for triads 1,3 were considered on a base of acoustical spectrographic analysis and on a base of assessment of video recordings. At the present time the analysis of video tests material was conducted by the experts and adults with experience of interacting to the children or without one for triads 2,4,5.



**Scheme 2.** Features of maternal speech behavior and the early speech development of the first and the second (by the order of the birth) twins in triads 1 and 3 at the age of 6 months. Legends – see scheme 1.

The absence of a single feature or several ones in MS, which are typical for motherese and the absence of the whole number of estimated parameters that are typical for normative level of early speech development for the each analyzing age period were shown. The first child from the third triad at 6 months of age was the exclusion, see the scheme 2. It was shown that the absence of the bigger number of features in MS (up to 10 of 13 analyzing parameters) corresponded to the absence of the bigger number of points in the children behavior (up to 7 of 8 estimated parameters) (triads 1,3,5). For triads 2,4 another dependencies between the presence of features of MS and the level of child speech development were revealed. 3 months: in condition of the different number of MS parameters, the parameters of child speech development were equal; 9 months – triad 2 – at the same number of parameters in MS the differences in child speech behavior were determined; 12 months – triad 4 - the equal organization of MS when interacting to the both children (absence of 9 points of 13) and the similar low rate of speech development of children (the absence of 6 points of 8) were shown.

The data, obtained in this study, showed the differences in organization of vocal-speech interactions in dyads and triads. The absence of the bigger number of features and the bigger lag in a level of child speech development were shown in triads. At the present stage of study the dependence between the features of MS and the absence of specific parameters characterizing the level of child speech development wasn't revealed.

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