The Emotional Experience of the Fetus: A Preliminary Report

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Full Text: Headnote ABSTRACT: From the observation of the bonding behavior that the newborn shows even during the first hours of life, the high degree synchronization and transaction that he shows during interaction with his mother, and the capability that many mothers have of immediately establishing a relationship with him, we can arrive at the conclusion that bonding after birth, described by many authors as a separate entry, is really the continuation of the intrauterine contact that began long before. The Affective Syntonization between mother and child is a continuum of the Affective Syntonization (i.e., resonance) between mother and fetus. One of the most surprising and interesting aspects of the mother-fetus relationship is the bond of emotional dialogue that will take place between them. Through analysis of i) Fetal Heart Rate; ii) Maternal Heart Rate (before delivery); iii) Fetal Movements; iv) Movements of the Newborn; vi) Newborn Heart Rate (for a total of 15 expectant mothers), the symbiotic relationship between the emotional state of the mother and that of the fetus is evaluated to ascertain if this type of relationship is still present after birth. That is, if the emotional state of the mother (Activated vs. Relaxation) [visually induced with the Affective Picture System, Lang, P. J.] might influence that of the fetus, and if there is a link between the fetal and the newborn conditions, when in this latter state intrauterine emotional stimuli and situations are represented in the cradle. And what type of behavior does the newborn have when he is made to listen to the heart beat of a different mother (control group). From the analysis of the results it is possible to conclude that: 1) The newborn is more capable of recognizing his emotional state with regard to his own mother when compared to an experience with different mother; 2) When presented with another mother's heart beat, he only responds to the rhythm of a noise he heard in the past nine months, whereas with his mother he not only responds (reacting or relaxing) but also is capable of recognizing the heart beat and gives more creative responses; 3) It could be hypothesized that in the intrauterine environment different "Prenatal Ego States" exist that make the newborn capable of distinguishing between different emotional states of his mother (from birth). INTRODUCTION From the observation of the bonding behavior that the newborn shows even during the first hours of life, the high degree of synchronization and transaction that he shows during interaction with his mother, and the capability that many mothers have of immediately establishing a relationship with him, we can arrive at the conclusion that bonding after birth, described by many authors as a separate entity,1,2 is in reality the continuation of the intrauterine contact that began long before.3 The Affective Syntonization {i.e., resonance} between mother and child is a continuum of the Affective Syntonization between mother and fetus. One of the most interesting aspect of the mother-fetus relationship is the bond of emotional dialogue that takes place between them.4,5,6,7 The hypothesis and the questions of this research are: a) Could the emotional state of the mother (Activated vs. Relaxation) influence that of the fetus? b) Is there a link between the fetal and the newborn conditions, when after birth intrauterine emotional stimuli land situations are represented in the cradle? c) How do Fetal Heart Rate and the Fetus' Movements change when the Maternal Heart Rate varies in activation and in relaxation state? d) What type of behavior does the newborn have when he listens to the heart beat of his mother and with a different mother (control group)? e) Is it possible that in intrauterine life there are some "Prenatal Ego States" (8) that make the newborn capable of distinguishing between the different emotional states of his mother (from birth)? METHODOLOGY In accordance with the literature8,9,10,11 the physiological analysis included Maternal Heart Rate (MHR), Fetal Heart Rate (FHR), Fetal Movement (FM),12,13 Neonatal Heart Rate (NHR) and Neonatal Movement (NM). The study is divided in two principal phases: 1. Phase One: Prenatal Activated vs. relaxation: The mother's emotional states are

induced with 12 slides from the "Affective Picture System."14 The duration of the stimulus was divided in this way: - 15 min. inchoate of adaptation: connected subject to the unities of mapping, without changing, without incitement; - 15 sec. of base line: connected subject to the unities of mapping, with changing, without incitement; - 20 sec. of exposure (slide): connected subject to the unities of mapping, with changing, with incitement (for a total of 240 seconds for 12 slides); - 120 sec. of break: among the first 6 slides (Activated) and the second 6 slides (Relaxation), connected subject to the unities of mapping, with changing, with incitement, to controlled the return to base line level. The physiological analysis includes: 1) Fetal Heart Rate: registered with cardiotocograph; 2) Maternal Heart Rate: registered with phonocardiograph 3) Fetal Movements: registered with ecograph (connected to VCR). 2. Phase Two: Neonatal The stimulus was the mother's heart beat (registered in "Prenatal phase"), and the physiological analysis includes: 1) Newborn Movements: registered with video camera; 2) Newborn Heart Rate: registered with neonatal ECG monitor. The control group situation was obtained by having the newborn hear the heart beat of another mother. In this case it was possible to examine the babies' different characteristics and their abilities to recognize their own mother or a different one. The analysis of the babies' responses included: 1) Extension movement of the inferiors limbs 2) Extension movement of the superiors limbs 3) Rotation and movement of the head 4) Opening and closing of the mouth 5) Hands explore the uterine and placental surfaces (for the fetus) 6) Hands explore the cradle surfaces (for the newborn) The tonic-movements were counted in the time of exposure to the stimulus-slide (in the prenatal situation) and in the time of exposure of the mother and extraneous-mother heart beat stimulus (registered in the Prenatal phase). The movements of the inferior limbs were particularly analyzed (according to the literature). For the study of the result three different statistical models were used i) Variance Analysis; ii) Co-Variance Analysis; iii) Co-Variance Analysis type 3 ×2. 3. Subjects The group of subjects included 15 expectant mothers at about 30 weeks gestation. Characteristics: Years Range 23/34 Type primipara Social level medium Neonatal APGAR 1° = 8.9 2° = 9.7 3° = 10 Important characteristics of the subjects to consider are that they were healthy, without any pre- or postpartum complications. They each achieved a pregnancy and childbirth of absolute normalcy. QUALITATIVE ANALYSIS Since Van den Berg3 created a study that analyzes the emotional fetal experience and the relationship of mother-newborn, it seemed to me opportune to develop an investigation of a more qualitative type on the behavior of the fetus and newborn. These data have allowed me to check the contingent relationship between the "maternal character" and the "character of the child." In fact, the nurses of the Neonatal Department were asked to attribute a value from 1 (calm) to 10 (Agitated) for each child (during the two days after the birth) and to report the type of behaviors that the newborn expressed during the day and to add these to the report of the infant's behavior with the mother during breast-feeding. RESULTS: "OWN MOTHER" SITUATION 1. Expectant Mother's Emotional State In Figure 1 it is possible to see that the stimulus has brought a degree of change in the condition of the expectant mothers. When they see the activation slides their heart rate increases, but when they see the relaxation slides their heart rate decrease. The variance analysis, the covariance analysis and the different rapport between BL/ACT., BL/REL., ACT/REL., on the MHR have a significance for $p < .001$-the result that we expected based on the standardized nature of the "International Affective Picture System: Slide Catalog" from which we obtained the stimulus-slide. 2. Fetal Emotional State From Figures 2 and 3 it can be deduced that to the change of the emotional maternal state there is a change of the values of heart rate and fetal movement. In fact these values increase or decrease (respectively from the baseline) when the expectant mother enters into a state of activation or into a state of relaxation. The variance analysis, the covariance analysis and the different rapport between BL/ACT., BL/REL., ACT/REL., on the HR and the movement of the fetus have a significance for $p < .001$. The induction of an Emotional State in an expectant mother brings on a significant change of the HR and of fetal movement. The principal result that we can deduce is that the fetus participates in the Mother's Emotional State.

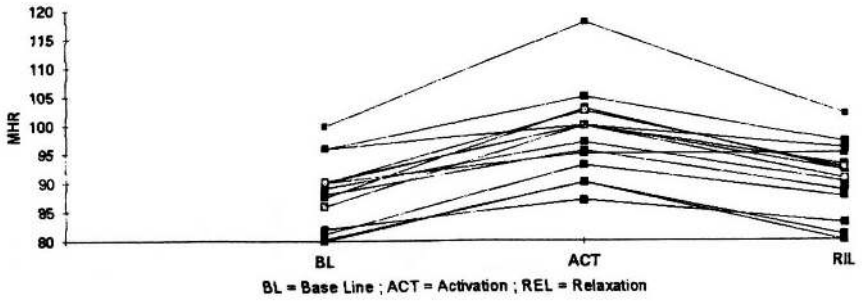

Fig. 1. Level of Maternal Heart Rate (Act./Rel. slide).

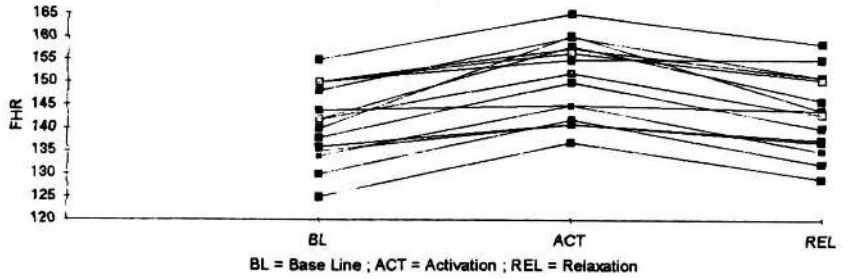

Fig. 2. Level of Fetal Heart Rate.

3. Neonatal Emotional State Figures 4 and 5 "Neonatal situation" when the newborn feels the audioregistration of the cardiac pulsation of his mother in activation (recorded in Prenatal Phase) there is an increase of the HR and of the movement pattern that it decreases when he feels the maternal relaxed pulsation. The variance analysis, the covariance analysis and the different rapport between BL/ACT., BL/REL., ACT/REL., on the HR and the movement of the newborn have a significance for p <.001. The result reveals the relationship of the Mother-Fetus-Newborn emotional state. Additionally, to confirm this emotional rapport variance analysis type 3 ×2 crossing MHR with FHR, MHR with NHR was used. From these cross comparisons some significant results for p <.001 appeared.

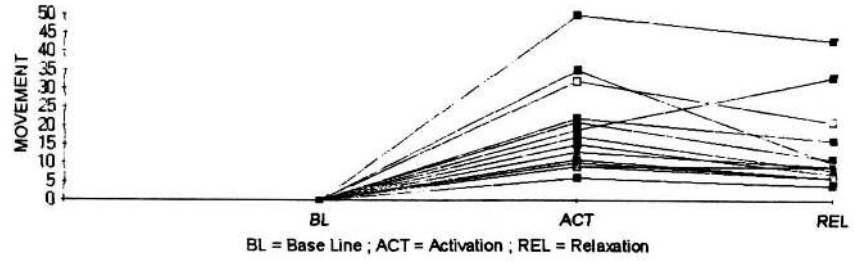

Fig. 3. Number of Fetal Movement.

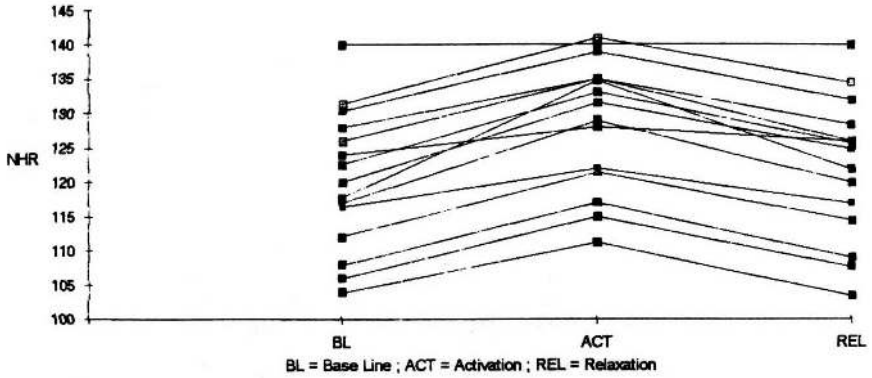

Fig. 4. Level of Newborn Heart Rate.

RESULTS: "EXTRANEOUS MOTHER" CONTROL SITUATION Figures 6 and 7 present the HR and newborn movement values in the situation "Another Mother." The situation is linear and flat. In fact it is possible to highlight a change only among Base Line and Activation but not among Activation and Relaxation, this could mean that the newborn responds only to "noise" without recognizing distinctive emotional state. The statistical analysis confirms a significant result.

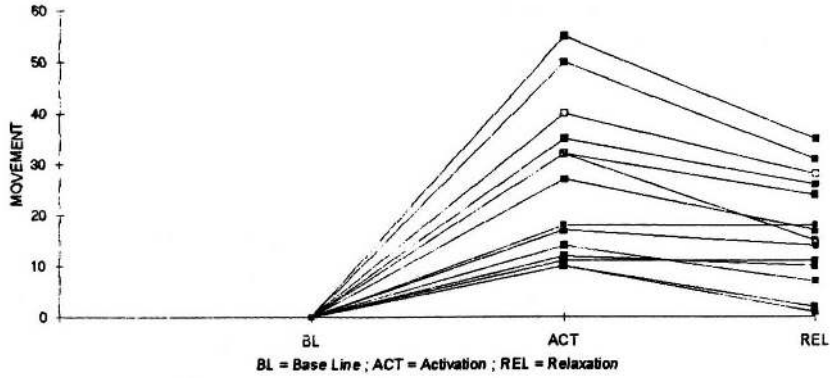

Fig. 5. Number of Newborn Movement.

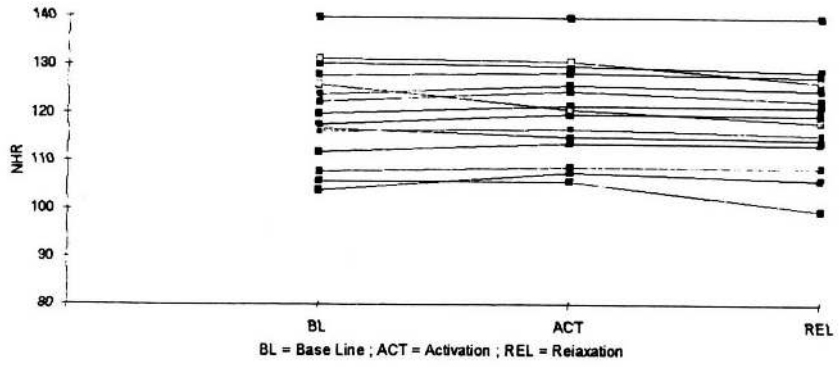

Fig. 6. Level of Newborn Heart Rate with Control Stimulus "Another Mother."

CONCLUSION 1. Example of Qualitative Analysis An examination of Mattia (son of subject 05) illustrates that

the physiological changed values (with Mattia) are very expressive. The woman subject 05 entered a strong state of nervousness at the sight of the slide #4 Active (serpent) and it is just in the fraction of these 20 seconds of exposure that the more interesting data registered. The MHR achieved a value of 100 (from BL = 90.2) while the fetus HR has elevated to 150 (on BL = 138). With the preceding slides 4 movements (tonic) have been changed while for this slide only (#4 Active) 5 movement have been changed (for a total of 11) adding the time of exposure to the slides 5 Active and 6 Active of which three tonic, one reflex (pseudo-respiratory), and one tonic strong movement brought the fetus from a right cephalic position to a left cephalic position with a kind of "twirl" around the central axle of the body.

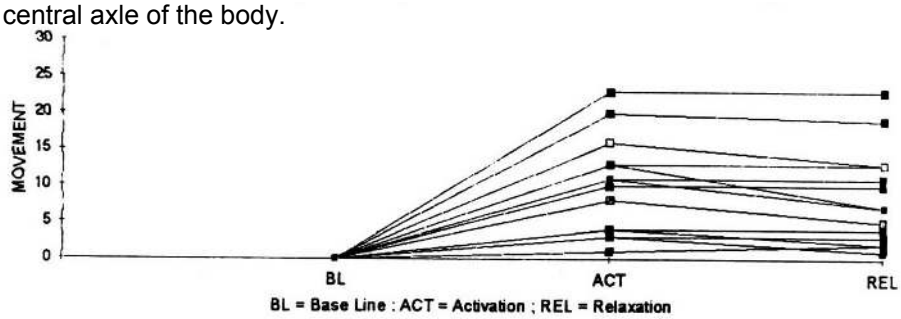

Fig. 7. Number of Newborn Movement with Control Stimulus "Another Mother."

This coincides with an increase of MHR and a movement so marked in the fetus (with adjunct increase of FHR) to establish the correlation between the variation of emotional states of the mother and fetus. In the relaxed condition, subject 05 achieved a calmer posture with a cardiac value of 92 pulsations to the minute. The fetus made 6 movements and had a HR of 140. A similar situation in the neonatal phases with "Own Mother" yielded data of (NHR = 117 Vs 129 Vs 120; Movement = 14 Vs 7). With the "Extraneous mother" the NHR have few significant changes from the baseline values (117 Vs. 115.3 Vs. 115) and the movements were 4 in Activation and 2 in Relaxation. During the period in which I followed the pregnancy of this subject I observed the peak emotional and psychological implication that had determined the delay in her delivery of her son. Emotional states which developed in the wife were also reflected in the husband, whom I saw duplicate his wife's affect on each occasion. It is as if the husband participates in each emotional state and psychological indication of the wife and of his future-son (before birth) and son (after). In the case of this family I can confirm the implications that the emotional connection of Mother-Fetus-Newborn also includes the father and reinforces the importance of his incorporation in this "ardent chain" linking the formation of a family. The Emotional Mother-Fetus-Newborn Dialogue has been examined using the two levels of Activation and Relaxation that, as the psychophysiology has indicated, could be adopted to explain any form of emotional reaction during the pre- and post-partum period. The research illustrates that a Mother in activation state (or the contrary, a state of relaxation) induces a concomitant emotional and physiological change in the fetus and clearly a strong emotional relation exists between the two. With this research it has been possible to highlight that, i) the emotional maternal state influences that of the fetus, and that; ii) the newborn recognizes the cardiac pulsation of his mother when, after the birth, he listens to the phonocardiac-signal registered as activated or relaxed (during the pregnancy). It seems that newborn has better ability of recognition toward his mother than toward an extraneous mama. In comparisons with an "Extraneous Mother" the newborn answers only to the "rhythm" he listened to during the nine preceding months in the womb. With his own mother beyond just answering with activation or relaxation responses, the newborn infant seems also, in some degree, to recognize and then to offer to her a more "creative" response. The statistic study of the result has allowed us to give a precise meaning to the ideas formulated during the experimentation, while the qualitative analysis and the psychological inferences have offered possible interpretations among those that have been changed (HR and Movement) and those that have

been observed (e.g., character of the mother, role of the future-father, attitudes and behaviors of the newborn). From the analysis of the results obtained it is possible to hypothesize that there is a more established Ego State during the prenatal period than psychologists originally believed and that other researchers have proposed.15,16,17 The inaugural idea, to base this work on the existence of Prenatal Ego State, maybe legitimately retained. See Figure 8. In this experimental research the relation among the emotional states Mother-Fetus and Mother-Newborn, has been investigated. You have been apprised of the connections that exist between preand perinatal life. But above all (at least in part) you have had confirmed that the prenatal period is characterized by many emotional incidences (and incitements) which offer the fetus the opportunity of apprehension, of form, and then of being gifted with a big "baggage of experience" and abilities. We can finish this study with this Bible sentence:

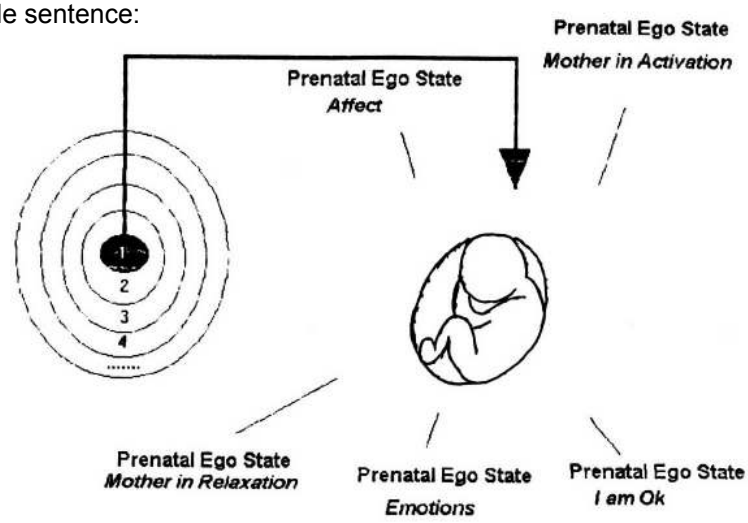

Fig. 8.

" . . .esultavit Elisabeth. Et factum est, ut audivit salutationem Mariae Elisabeth, exultavit infans in utero eius . . ."* Footnote * Editor's note: The Revised Standard Version of the New Testament renders this wonderful verse from Luke 1:41 as: "And when Elizabeth {the Mother to be of John the Baptist) heard the greeting of Mary, the babe leaped in her womb," illustrating that the old notion that everything may be found in the Bible holds true for prenatal psychology as well. References REFERENCE NOTES 1. Bowlby, J. (19889). Una base sicura, Milano: Raffaello Cortina Editore. 2. Stern, D. N. (1987). Il mondo interpersonale del bambino, Ibrino: Boringhieri. 3. Van den Bergh, B. R. H. (1990). The influence of maternal emotions during pregnancy on fetal and neonatal behavior. Pre- and Peri-Natal Psychology, 5-2, pp. 119-130. 4. Verny, T., Kelly, J. (1981). Vita segeta prima della nascita, Milano: Mondadori Edit. 5. Righetti, P. L. (1995). Fetus Ergo Sum. Sulhlnizio delliEsperienza Emotiva, Tesi di Laurea, Universit degli Studi di Padova, Facolt di Psicologia. 6. Righetti, P. L. (1995). Le esperienze emotive del feto, Consultorio familiare, Anno IX, N. 3. 7. Nathanielsz, P. W. (1995). Life before Birth and a Time to be Born. Ithaca: Promethean Press. 8. Righetti, P. L. (1996). Gli Stati dellflo Prenatale, Atti I Convegno Nazionale ANEP, Milano 20 Aprile 1996. 9. Ianniruberto, A., Iaccarino, M., Tajani, E. (1978). Lo studio del feto con gli ultrasuoni a tempo reale, Simposio Internazionale di Medicina Fetale, Gorizia, Bologna: Monduzzi Ed. 10. Ianniruberto, A., Tajani, E. (1980). Functional evaluation of fetal movements by real time, pp. 537-541, in, Kurjak, A., iRecent-Advances in ultrasound diagnosis Hi, Amsterdam: Excepta Medica. 11. Ianniruberto, A., Tajani, E. (1981). Ultrasonographic study of fetal movements, Seminar in Perinatology, 5-2, pp. 175-181. 12. De Casper, A. J., Sigafoos, D. (1983). The intrauterine heartbeat: A potent reinforce for newborns, Infant Behavior and Development, 6, pp. 19-25. 13. Murooka, H. (1974). Sound of the main artery of the mother, Lullaby from the womb, Capitol Records. 14. Lang, P. J., Ohmann, A., Vaitl, D. (1988). International Affective Picture System: Slide catalogue, Center of research in psychophysiology, University of Florida: Gainesville. 15.

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