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ABSTRACT

This paper discusses the analyses of antecedent correlates of the behavior of 60 infants as measured by the Brazelton Neonatal Assessment Scale on the third day after birth. The data include two sets of antecedent variables: maternal adaptation to pregnancy as reported in prenatal interviews and measured describing the conditions of labor and delivery (including duration, administration of analgesic and anesthetic medications, infant birth weight, and Apgar scores). The results indicate that both sets of antecedent variables show some relationships to infant behavior. The two perinatal variables which were found to correlate significantly with baby behaviors involve the analgesia and anesthesia administered during labor and delivery. Several explanations are offered for the drug effects. It was also found that the woman who reports a satisfying pregnancy, has no marked symptoms of anxiety, and is confident about mothering is more likely to have a motorically mature, attentive baby. Further analyses of the possible relationships between the two sets of antecedent variables indicate that the correlations between maternal adaptation to pregnancy and maternal medication during childbirth are not impressive. (SDH)

Prenatal and Perinatal Correlates of Neonatal Behaviors

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For theoretical and methodological discussion of this research project, see L. J. Yarrow's presentation in the same symposium, "Parents and Infants: An Interactive Network".

I am going to discuss our analyses to date of antecedent correlates of infant temperament. We know that parents and infants in interaction are different and we look to the characteristics of both parents and infants for sources of their respective contributions to such interaction. We think, for example, that among the many determinants of early parental behaviors are the characteristics of the newborn.

Our interests extend to sources of neonatal and parenting behaviors even before the infant and the parent become a socially interactive dyad. We are looking to prenatal and perinatal data for correlates of infant temperament 3 days postnatally..

Infant temperament in this study was measured by the Brazelton Neonatal Assessment Scale on the third day after birth. In this phase of the study we have data on approximately 60 babies and their parents. The Brazelton technique for evaluating newborn behavior assesses habituation to stimuli, responsivity to animate and inanimate stimuli, state and the requirements of state change, neurologic status and motor development. Through factor analysis and conceptual considerations, a number of Scale items were combined into three clusters. One cluster is alertness or orienting: the infant's responsivity to visual and auditory, animate and inanimate stimuli--for example, visual tracking of a red ball. The irritability cluster reflects the frequency and conditions of irritable behaviors. An infant scoring high on this cluster of items would likely show frequent state swings as from drowsiness to crying, prompt irritability to aversive stimuli, and considerable crying. The third cluster--motor maturity--reflects the smoothness of the baby's movements, tremulousness, and frequency of startling.

The data of our project include two sets of variables antecedent to the baby's condition at three days of age. First, we have data on aspects of maternal adaptation to the pregnancy as reported in prenatal interviews with the mothers in the month before their deliveries. For this discussion, I will present only the six clusters of items from the interview schedule and will ignore the individual items. The clusters are 1) the woman's report of her pregnancy experience; 2) her psychophysiologic reaction to the pregnancy, including symptoms of anxiety; 3) her evaluation of the marital relationship she shares with her husband; 4) her measure of the social support of others given her during the pregnancy; 5) her expectations of the labor and delivery experience to come; and 6) her expectations of the baby and of parenting.

Second, we have some measures which describe the course of labor and delivery; these we can also correlate with infant temperament. These data are not as extensive as we would now like them to be, but were taken from hospital records. We have information on duration of labor, administration of analgesic and anesthetic medications, infant's birth weight and Apgar scores.

The analgesia score for each child was computed as dosage x time of administration before delivery. The most frequently administered agent was Demoral in conjunction with Phenergan or Vistaril. The woman who was assigned the highest analgesia score had received 50 mg. Demoral and 50 mg. Vistaril three hours prior to delivery and 75 mg. Demoral within the hour before she delivered.

Anesthesia was scored as to whether or not local-regional anesthesia was administered--whether by pudendal, paracervical, epidural, or saddle block. (No women were given general anesthesia.) Anesthetic solutions used were lidocaine, tetracaine, mepivicaine, and bupivaciane. We realize that this variable is not well-delineated in that it combines all agents and dosages, routes and times of administration. However, this is the only information that was available to us and our sample size does not allow more sophisticated statistical breakdown of these components of drug administration. We are left with a dichotomous grouping: administration or not of local-regional anesthesia.

The results indicate that both sets of antecedent variables--maternal adaptation during pregnancy and the conditions of labor and delivery--show some relationships with infant temperament. The table gives the correlation coefficients which obtain statistical significance.

Let's look first at the relationships between the variables of labor and delivery and the newborn behaviors. Only two perinatal variables are significantly correlated with baby behaviors three days later and these are both concerned with maternal medication: the analgesia and anesthesia administered during labor and delivery.

For analgesics, higher drug dosage administered closer to delivery is related to lower scores on motor maturity, Jerky movements in small arcs, startles and tremulous motions were more common in babies whose mothers had received more analgesia. This finding is consistent with a growing body of literature on obstetric medication effects on infants.

In addition, the results give us new information on the infant behavior correlates of local-regional anesthesia. Anesthesia is associated with depression of neonatal functioning: decreased motor maturity and greater irritability. It is known that anesthetic agents cross the placenta and enter fetal circulation, but there is no pharmacologic evidence that such drug concentrations are present in infants into the second day after birth. Mepivacaine has been detected in infants' blood as long as 24 hours after birth and lidocaine 8 hours; these infants were tested at three days of age. However, a drug effect is still possible in that medication no longer present in the circulation could still be bound at unspecified CNS sites.

An alternative explanation is that the anesthesia effect is not a drug effect, per se, but rather represents a number of aspects of the labor and delivery. The important variable may actually be difficulty of delivery. However, we find that none of the three Brazelton Scale clusters correlate significantly with other perinatal variables which might be thought to express delivery difficulty--length of labor, use of forceps (in the anesthetized group), Apgar scores, and infant birth weight. Parity and gestational age are not considerations since all mothers were primiparous and delivered term infants.

Another explanation of these apparent medication effects is that the analgesia and anesthesia variables are expressions of the mother's personality. A woman's enduring personality characteristics could be the source of her attitudes about childbirth and her need for pain relief and these characteristics could be transmitted genetically or in utero to the fetus and then manifested in the baby's temperament. In other words, both the delivery medication scores and the Brazelton neonatal behavior scores could be dependent outcome measures of maternal personality. For example, a woman who is anxious during her pregnancy may need more medication for the childbirth and may produce an irritable baby, resulting in a spurious relationship between maternal medication and infant behavior.

Our data from the prenatal interviews with the prospective mothers can be directed toward this question. Does the woman's adaptation to her pregnancy determine the delivery medication she will receive and the temperament of her child? Or apart from maternal adaption as some expression of personality, is childbirth medication a separate source of variation in infant behavior.

There are six categories of maternal adaptation during pregnancy and three Brazelton Scale clusters. Eight of these correlations are significant and most involve three of the maternal measures: 1) the woman's pregnancy experience as she reports it; 2) her psychophysiologic reaction to the pregnancy; and 3) her expectation of parenting. Of the three Brazelton Scale clusters, it appears to be the infant's motor behavior which is expecially related to prenatal factors. The alertness cluster of the Scale also shows some significant relationships but of less magnitude than motor maturity. The woman who reports a very satisfying pregnancy, has no marked symptoms of anxiety and tension, and looks forward with confidence to mothering is more likely to have a motorically mature, attentive baby.

We arrive then at the question of possible relationships between the two groups of antecedent variables--prenatal interview and childbirth medication measures. Is only one of these truly related to infant behavior while the other shows statistically significant results through the association between the antecedent variables? Our results suggest not: the correlations between maternal adaptation to pregnancy and maternal medication during childbirth are not impressive. 1 re are only three significant correlations and two of them relate very similar variables--the woman's expectation of her labor and delivery (including her anxiety about it and the medication she prefers to receive) with the childbirth medication she then receives. The other significant correlation also has to do with anxiety: the woman's psychophysiologic reaction to the pregnancy is related to the administration or not of anesthesia during childbirth.

Thus we have evidence that the two groups of antecedent variables bear independent relationships with the behavioral measures. Both prenatal adaptation of the woman to her pregnancy and the childbirth medication she receives are significantly correlated with some aspects of her infant's behavior, expecially motor maturity. The meaning of these prenatal and perinatal variables is somewhat speculative and mechanisms of influence belong to fantasy, but the evidence demands that the search for origins of interaction between mother and child be pursued with the data of pregnancy and childbirth.

RELATIONSHIPS BETWEEN MATERNAL ADAPTATION TO PREG

CHILDBIRTH MEDICATION AND INFANT BEHAVIORS

		Childbirth Medication		
		Analgesia	Anesthesia	Alertness
Maternal Adaptation to Pregnancy	Evaluation of Pregnancy Experience	--	--	.26*
	Psychophysiologic Reaction	--	-.34**	.27*
	Marital Relationship	--	--	--
	Social Support	--	--	--
	Expectation of Parenting	--	--	.26*
	Expectation of Labor & Delivery	-.40‡	-.47‡	--
Childbirth Medication	Analgesia	--	--	--
	Anesthesia	--	--	--

Only statistically significant correlations are given; for df=60, r=.250, p=.05
* p≤.05, ** p≤.01, ‡ p≤.001

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IPS BETWEEN MATERNAL ADAPTATION TO PREGNANCY,

DBIRTH MEDICATION AND INFANT BEHAVIORS

birth Medication		Brazelton Newborn Scale Clusters		
	Anesthesia	Alertness	Irritability	Motor Maturity
	--	.26*	--	.38**
	-.34**	.27*	--	.36**
	--	--	--	--
	--	--	--	--
	--	.26*	-.28*	.43‡
	-.47‡	--	--	.35**
	--	--	--	-.26*
	--	--	.26*	-.37**

; for df=60, r=.250, p=.05