

Cross-Cultural Studies of Mother-Infant Interaction: Towards a Structural-Functional Approach

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It is rare for a discussant in a symposium to get a set of papers that really are about the same thing. These papers are closely related, and their authors have used comparable methods to a truly remarkable degree. For this reason, I felt an obligation and a challenge to try to put the pieces together and come out with an integrated picture. The attempt was fascinating, but made me realize that the puzzle still lacks many pieces. For this reason, the outline of my discussion is going to be a set of questions, with very incomplete answers and a fair amount of theoretical speculation.

Although the title of our symposium has an environmentalist overtone, in that it suggests looking at infant behavior as a consequence of mother-infant interaction. I would first like to discuss a logically and ontogenetically prior question: Are there innate differences among babies from different cultural groups? The BRAZELTON, ROBEY and COLLIER research on neonates among the Zinacantecos makes this question a live one for this symposium. Looking at the two Zinacanteco babies examined at birth, we see that they are different from their American controls, less physically active, more sensorily alert. Differences occurring this early can be attributed either to genetic differences, intrauterine experience or conditions at the time of birth. One possible explanation of the difference between American and Zinacanteco newborns is subclinical malnutrition which affected the Zinacanteco babies *in utero*. Another possible explanation is the high altitude and extremely cold environment into which they are born. Although the behavioral evaluation of newborn Africans does not bear directly on the question of the source of the Zinacanteco newborns' behavioral characteristics, the African data do raise the possibility of a genetic root to behavioral differences. In an article published in 1957, GEBER and DEAN reported on 37

Ugandan babies less than 24 h old. Although the behavioral evaluations were not nearly as sophisticated as BRAZELTON's test for newborns, they did report that East African children were born at a much more advanced stage of behavioral development than the normal European child. I suspect that malnutrition was not present in this group, for GEBER and DEAN report that 95% of their sample was born in the African hospital in Kampala, Uganda. My knowledge of customs in Uganda indicates that hospital birth is restricted to an extremely elevated educational and socioeconomic level. It is therefore very interesting to note that when GEBER and DEAN compared these newborns with infants born in the European or Indian hospitals in Kampala, they found very little behavioral overlap with the Africans. The behavior of European and Indian newborns was much more immature in all respects. Since there is no reason to think that European colonials would have poorer nutrition than natives of Uganda, and since hospital conditions ought to have been comparable, it seems to me that the only explanation for these differences is a genetic one. Thus, genetic factors remain a theoretically possible explanation for the cultural differences in newborn behavior observed by BRAZELTON and ROBESY.

Before addressing myself to the main question of the symposium, the relation of infant care to behavioral development, I feel compelled to remark that, both in Zambia and in Zinacantan, Mexico, the type of baby, the way adults in his environment interact with him and the values of the culture all fit together to form a harmoniously-functioning system. Since a change in any one part of the system would have repercussions in the rest, it may be meaningless to try to distinguish cause and effect. This interdependence is particularly dramatic in the Zinacanteco case where we begin with knowledge of the baby at birth. The baby who starts life physically inactive is then rather tightly swaddled and carried horizontally on his mother's back in such a way as to restrict his movement. Note, however, that this swaddling is a successful adaptation to the cold. What if the Zinacanteco baby were very active and resisted swaddling? A newborn who kept kicking off his covers would have small chance of survival in the cold climate of highland Chiapas in houses that go totally unheated during the night. A question for thought is whether the fit between baby, infant care practices and cultural values is as smooth and clear in our own culture.

Now to the second and main question: the relation of mother-infant interaction to child development. The GOLDBERG paper presents an interesting hypothesis about one way in which early care affects infant behavior. She proposes that the way in which Ugandan infants are carried in a sling

on their mother's back stimulates reflexes which have heretofore been thought to lack functional value for the newborn. Reflexes such as grasping and stepping become useful in the baby's struggle to hold on to his mother's back. This hypothesis makes a great deal of sense in the light of what is currently known about the relation between reflex behavior and voluntary movement. TWITCHELL's [1965] studies on the development of the grasping reflex show in a dramatic way that for each stage of reflexive behavior there is a corresponding stage of voluntary behavior based on that particular form of the reflex. Note that we are not talking here about quantity of stimulation or about contingent stimulation. What we are talking about are the formal and functional characteristics of stimulation: its appropriateness to behavioral capacities at a given level of maturation. For example, the up-and-down posture in the sling provides a stimulus specific to the stepping movement. Similarly, head-lifting is stimulated by putting an infant in a position in which he has difficulty breathing. The formal and functional match between the stimulation provided by Zambian care and behavioral capacities of the newborn may be responsible for the outstanding motor development observed by GOLDBERG at 2 months of age.

If we now look at the *visual* rather than *kinesthetic* stimulation that the Zambian infant is receiving, it is possible to draw the same conclusion: that its structure has a peculiar developmental appropriateness. Remember now that the baby is being carried about on its mother's back. It is outdoors a good part of the time. Thus, much of its visual world is a distant one. There are not many objects in its immediate environment. Remember, too, that a newborn baby sees clearly at about his arm's length. Only gradually, with age, does visual acuity at greater distances improve. Thus, the main source of stimulation for the very young African baby is his mother and other people who take care of him. According to PIAGET's [1936] description of development in the first few months, the main type of conceptual development is a widening of the reflexes, so that they become anticipatory in nature. This development depends upon learning the meaning of visual and kinesthetic cues, especially as they relate to the feeding situation. It would appear that close visual and kinesthetic contact with the mother would be the ideal means for learning cues relating to sucking and feeding. This is precisely the type of stimulation received by the Zambian infant. No wonder that Zambian infants show outstanding intellectual development, even when they begin life grossly dehydrated, as BRAZELTON *et al.* [1971] describe in their research report.

The contrast of the Zambian with the Zinacanteco experience of infancy in the first few months of life is striking. Although the Zinacanteco is carried

on his mother's back, he is put in a position which makes active motor behavior impossible. Indeed, he is given no stimulation of the reflexes which could come into voluntary control under appropriate circumstances. At the same time, his head and eyes are covered most of the time to protect him from the evil eye. Consequently, he receives very little visual stimulation. It is no wonder, then, that at a few months of age, development in all areas lags behind the American norm by about 1 month.

In terms of their behavior at 3 months, the infants studied by LEWIS and WILSON from all social classes in America looked very similar to the African infant. To me, it was quite surprising to find that all babies were scoring about a month ahead of the norms for 4-month-old infants. Could it be that, in 1971, American upbringing has shifted in the direction of the African experience because of increasing awareness of the role of stimulation in the development of children's capacities? Interestingly enough, the main systematic differences in maternal behavior according to class occurred in the frequency of touching, holding and smiling at the baby. In all of these respects, the higher the class, the lower the frequency of behavior. And, correlatively, the only cognitive measure of infants in which a class difference was found was a measure of visual attention and schema development. In other words, the more the mother held and touched the baby, the more advanced his visual behavior. This result fits my hypothesis that the developmentally appropriate form of visual stimulation at this age is in the person of the caretaker. The act of holding the baby brings the mother near as visual stimulus. The results of REBELSKY and ABELES [1969] fit with these ideas about the relationship between the visual environment and visual behavior. They found among Dutch babies, usually left alone in their crib without human contact much more than American babies, that the more time spent out of their crib, the more the babies explored their environment visually.

The LEWIS and WILSON paper presents yet more evidence that each type of behavior at a given developmental level has its own appropriate form of environmental stimulation. They noted that the various classes in their sample differed neither in quantity of stimulation offered to the infant, nor in contingency of stimulation. They conclude that there are certain class differences in style of response. Although I believe they have isolated an important phenomenon when they talk about style, I should like to argue that the word 'style' is a bit misleading. When we talk about style, we imply that different behaviors are functionally equal, but different in their non-essential characteristics. An example given in their paper of such style differences among the different classes is the mother's response to her infant's

vocalization: Middle-class mothers respond to infant vocalization by vocalizing themselves about four-fifths of the time; lower-class mothers do so only two-fifths of the time, although they respond in other ways, mainly by touching. As LEWIS and WILSON point out, both sets of mothers give contingent reinforcement. Thus, according to the contingency theory, vocalization ought to be equally reinforced and encouraged in all classes. But if we look at PIAGET's [1945] descriptions of behavior at this stage in development, we can learn something of the structure and function of vocalization. At this stage, schemata take the form of the secondary circular reaction, in which the goal is to repeat effects. Thus, when an infant vocalizes, he is stimulated by the sound of his own voice to repeat the vocalization. It is a kind of chain reaction. Similarly, he can be stimulated to continue his vocalization by hearing another person imitate him. Thus, vocalization is clearly the appropriate form of reinforcement for this behavior, a form consonant with the objective and structure of the behavior itself. This class difference in appropriate response to vocal behavior would lead one to expect, as has often been found, that vocal behavior would differ by classes at later ages. My account cannot explain, however, why lower-class babies vocalize much more than middle-class ones at the age at which they were assessed by LEWIS and WILSON.

Their findings about class differences in response to fretting may be similarly interpreted. Lower-class mothers respond more often to fretting by talking to their babies, middle-class mothers by touching or holding them. In terms of what we know about why a baby frets, and what the objective of this fretting is, it seems quite clear that vocalizing is an inappropriate response on the part of the mother which does not further the baby's own objective, although it is a contingent response. In talking about an objective or an intention, I know that this idea is not accepted as scientific by behavioristic psychologists. Yet I think that scientific evidence is accumulating which permits and, in fact, obliges us to include the notion of intentionality or feed-forward in our explanations of human behavior. Most notably, neurological evidence indicates the reality of the psychological intention and the role of intention in the direction of subsequent behavior.

The third question raised by this symposium concerns the continuity of infant care and development with later development. GOLDBERG tells us about a break in continuity in both care and development at weaning in urban Zambia. The attitudes of the mother and, indeed, the Zambian culture towards the infant change dramatically. Whereas before weaning the

infant was treated as an individual whose every desire was to be respected and fulfilled, he is now expected to make no demands at all upon his mother for attention. This was also true among the Wolof of Senegal whom I studied; indeed, among this group, it was part of conscious ideology that, from the age of weaning, the child was to integrate himself with the group, to subordinate his own desires to those of the collectivity [ZEMPLENI-RABAIN, 1966]. GEBER [1956] noted in Uganda a very sharp break in development at around age 2, a break which, interestingly enough, was lessened by the extent to which African children were brought up in the Western way. In one Ugandan group where children went to a nursery school at approximately 2 years of age, this effect was very much lessened, although the same passivity of the children, noted by GOLDBERG in her paper, was noted upon their entrance to nursery school. This developmental break, which appears as a lag on our tests of African babies, can be explained by another factor as well—one that is also brought out in GOLDBERG's paper. This is the fact that the African's experience with manipulation of the physical world is not nearly as systematically planned or as comprehensive as his experience of the social world. This is in sharp contrast with the typical environment of the American infant. The African infant's role in his early interaction with the environment and the resulting cognitive attainments are of a more passive sort, whereas, at least as the tests measure it, later intelligent behavior takes on a more active nature. As this happens, inanimate objects may become increasingly important to the stimulation of conceptual development. In line with this idea, GEBER [1958] found that African infants brought up the European way—socially isolated in cribs, yet given toys, etc.—show no precocity of development after 1 month of age, but show no break in development at 2 years of age; they develop in a continuous fashion, much like American or European infants.

The Zinacanteco infants, in a sense, show a pattern more similar to American infants. Although they begin very protected, their world of experience becomes wider and wider with age; there is no sharp break in the attitude of those in their environment at the time of weaning. Indeed, comparing my experience in Senegal, and in Chiapas, my own subjective impression is that the Zinacanteco children end up much more similar to American children than do the African children. In line with my hypothesis about the importance of the inanimate world for the advanced stages of cognitive development measured by our tests, I must say that the Zinacantecos stress material culture and economic matters much more than Africans seem to do, and thus stress the social world a bit less.

The question of continuity in care and development in Zinacantan seems to have a slightly different answer than in Zambia. Adults in the Zinacanteco environment are very consistent in the kind of learning they expect of the child; in turn, the child develops in a consistent way, in line with the values of the culture. For the last two summers, I followed up the work of BRAZELTON, ROBESY and COLLIER [1969], studying development among Zinacanteco children from 10 months of age to adulthood, with the collaboration of CARLA CHILDS. I would now like to discuss briefly the continuities I found with the infant observations already reported.

First, in looking at children from 10 months to 5 years of age doing a manipulative task with seriated cups, I found that although the stages of development were precisely the same as in the United States (despite the fact that Zinacanteco children had never seen this type of toy before), the investment of the Zinacanteco children in the objects themselves was much less. Thus, a 1-year-old Zinacanteco can let go of a nesting cup after placing it inside a second cup. An American child at the same age cannot; the cup becomes part of his hand in a seemingly egocentric fashion. The Zinacanteco behavior is more advanced in one way, but it does cut off manipulation of the objects at an early stage of task development.

Similarly, in a pattern continuation task, Zinacanteco children from 4 to 18 years of age passed through seemingly universal stages of representational development [CHILDS, 1970]. But against this background of similarity, there appeared a specific cultural effect related to BRAZELTON's observations on Zinacanteco infants. One of our pattern continuation tasks could be treated by going beyond the given information. In this pattern, the child was shown a series of red and white stripes in the following configuration: 1 red; 1 white; 2 reds; 2 whites; 3 reds; 3 whites; 4 reds; 4 whites—a so-called growing pattern. Of the Zinacanteco children who did not go to school, no child at any age could complete this pattern by making it grow—the oldest unschooled children succeeded only in repeating it, a valid, but more imitative, representation. The only children who completed the pattern by continuing to increase the width of the stripes had been to school. In the Zinacanteco culture, there is but one clearly prescribed way to do every task; our task was treated the same way: the growing pattern was copied stick-by-stick. School learning, in contrast, places a premium on mental manipulation of concrete facts. It is possible to see this behavior as continuous with BRAZELTON's observations of adequate imitation, but lack of motivation to experiment with objects. Certainly, learning by observation continues to be extremely important long after infancy in learning adult skills central to the

Zinacanteco culture. In the summer of 1970, we studied how Zinacanteco girls learn to weave. One obvious fact was that girls of 8 to 10 years of age, sitting down at a back-strap loom to weave their first piece of cloth, already know a tremendous amount about weaving, although they have not yet taken part in the process; observation rather than experimentation constitutes the crucial learning technique. From that point on, an adult intervenes at difficult parts, often taking over from the novice. Thus, observation of another person continues to be critical. Because the points of adult intervention are in fact based on a sensitive analysis of the weaving task and the learner's ability, instruction is remarkably effective and the learning process a very smooth one. If innovative ability had been a desired goal of the instructional process, rather than a taboo attitude in the Zinacanteco culture, a more verbal, self-conscious learning process, giving more initiative to the learner and less to the teacher, would probably have been more appropriate. On the other hand, an independent, innovative middle-class American would make a most unsuccessful Zinacanteco.

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