

19 / Paradox and Resolution: From the Beginning

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Among the dynamic forces that shape organization in the developing infant and in the infant-caregiver system, a number of apparent paradoxes can be discerned. This brief chapter on early human development addresses only one of these paradoxes. The viewpoint is one that has emerged from nearly 40 years of experience with the subjects of the Boston University Longitudinal Study in Personality Development (Sander, 1984). As with a wide range of research on both the animal and human levels, this study has revealed the singularity, the uniqueness of each newborn, each family system, and each individual's own particular pathway of development. The other side of the apparent paradox emerges from the extensive research on the minutiae of events within the flow of interaction between infant and caregiver; these studies have been carried out at the level of microsecond film and video analysis (Condon & Sander, 1974; Stem, 1974; Trevarthen, 1979). From this viewpoint, the now well-established concepts of intersubjectivity and attunement have been defined—that is, how infant and caregiver can function rhythmically and synchronously with each other.

The paradox is that we begin with two biological "givens": the requirement for self-regulation (the agency to initiate action to self-regulate within the context of one's unique life support system must be the individual's own agency to initiate; the "being distinct from" pole) and the capacity for microsecond synchrony and attunement with an "other" (not cognitively managed by the individual; the "being together with" pole). Both givens are there from the beginning of life and provide the essential conditions for the experience of "connection with" another and for the positive affects that are the basis of motivational systems underlying healthy relationships, including the experiences of loving and being loved as we come to encounter, and then "know," them in later life. It is in the sharing of a focus of attention in these "moments of meeting" that sets the stage

for the microsecond tuning, the capability for which we are born with. The experiencing of such "attunement" organizes positive affects, their motivational role, and the organization of consciousness.

It seems evident from the diversity of possible developmental pathways that integration of these two poles is a relative matter, ranging from the derailments of gross pathology at the one extreme to what we consider "health," are the optimization of potential that lies within both the new individual and the system, at the other. Indeed, many of the difficulties in child rearing relate to the confusion and indefiniteness that obscure the presence of each pole of the paradox, the very essential role that each pole plays, and the awareness that it is their integration that lies at the heart of the early developmental process.

Infant research is intended to explore, identify, and comprehend the essential principles that govern the early developmental process. It is hoped that such findings can and will be assimilated into the way caregivers both think and feel as they begin to construct an environment for their newborn. "Essential" principles of the developmental process exist from conception and persist throughout life. This chapter offers two brief clinical vignettes and notes their relation to the highly complex, but centrally vital, task of integration that confronts caregiver and infant from the moment of conception. The real problem is the *translation* from the discovery of principles governing the developmental process to their incorporation within the exchanges and interactions that will be the shaping forces in new infant-caregiver systems.

Every field, infant research included, has its own language. If space allowed, it would be appropriate to consider here how that language applies to how caregivers think about early development. What would it mean for caregivers to think in terms of systems instead of individuals; in terms of process instead of structure; in terms of a flow

SECTION II / THEORETICAL AND CLINICAL PERSPECTIVES

of sequence, recurrence, and expectancy within the recurring exchanges between themselves and their charges instead of thinking in terms of isolated events. How does one think in terms of temporal organization (e.g., the 24-hour day and its regular recurrences, whether reflecting change or stability), or in terms of the distribution of "moments of meeting" between components of the system and the specificity such meetings convey? Space limitations preclude a discussion of the necessary background biology brings to our thinking.

In psychology, we sometimes fail to address that underlying yet unavoidable mystery of biology, *organization* which is essential for life itself. Biology constantly confronts this mystery driven on the one hand to analyze the unending process of engagement between organism and environment on a scale or hierarchy of levels—subsystems within larger systems—yet always constrained, on the other, by the vital necessity of maintaining the coherence, or unity, required for the enduring existence of both the living organism and the living system.

From such an effort at translation could emerge a way of thinking about the early developmental process—about the role of time, place, and movement in the organization of the infant-caregiver system and its processes of regulation, adaptation, and integration; about the central issue of where the impetus for initiation of action lies in the exchanges between infant and caregiver, or why the essential features of self-regulation and self-organization that are required of every living organism cannot be bypassed when dealing with the developing human infant. In exactly the same way, translation from the language of the neurosciences would enrich our thinking about longer-term consequences of infants' experiences. Relevant here are current concepts of the way anatomical and functional organization of the brain itself is being shaped, while regulatory and adaptive modifications of behavior are taking place between infant and caregiver. In the presence of this broader perspective, our thinking could be extended to include the role of conscious experience in shaping the early developmental pathway. This is especially relevant in the place being given now to experiences of awareness and self-awareness; as a result, brain organization constantly is being revised and updated through processes of categori-

zation, mapping, and, especially, reentry (Edelman, 1992). Translation at this point from neuroscience to psychology would open the door to discussing the experience of "recognition" (Sander, 1991) as being one of specificity in a "moment of meeting" between the complexities of two unique subsystems—the infant and the caregiver. Recognition can be thought of as a way of representing how one individual comes to savor the wholeness of another—that is, the experiencing by one of some configuration of the whole, some gestalt of the state of coherence of the other (Sander, 1995a, b). I propose that the experience of recognition represents a specificity in the meeting of such gestalts, one that provides the critical condition for the reorganization of both interacting partners as they progress toward new integration. Recognition, as a process moving toward increasingly precise specificity, serves as an essential operational metaphor for both developmental process and therapeutic process. It also provides a broader base upon which coherence in the larger infant-caregiver system can be built (Sander, 1995a).

Obviously, this chapter cannot provide the necessary theoretical framework required to integrate philosophies from among the complexity of disciplines involved. But it is important to recognize that such an integration can open us up to new ways of thinking. Next I illustrate and enlarge upon the two poles of the paradox and the diversity of possible developmental pathways that are available to provide resolution.

Illustrative Example of "Being Together With"

The first case example illustrates the first "being together with" pole, and opens consideration of the powerful place of intersubjectivity in comprehending the glue that binds together infant and caregiver as a living system. The following description is an example of the way that "primary intersubjectivity" (Trevarthen, 1979) can enter the caregiving situation, shape it, and yet remain

quite outside the awareness of either participant. The scene, drawn from some 3 minutes of movie film,¹ can be described as follows.

CASE EXAMPLE

The research team was filming one of our new neonatal subjects on the 8th postdelivery day out on the lawn in front of the parents' house. In those days (1958), that was 3 days after mother and baby had returned from the hospital. One of the team was standing on the lawn talking with the father. The mother was sitting nearby with the new baby talking with another member of the team. The baby became increasingly fussy, with mother trying unsuccessfully to quiet her. The mother became a bit embarrassed and decided it was time to bring out refreshments, so she gave the baby to the father, who was standing nearby talking, and went into the house. The next 2 or 3 minutes of film shows the father standing on the lawn, holding the baby in his left arm, continuing to talk to the researcher, during which time the baby simply falls asleep and the two go on talking. Run at normal film speed of 30 frames per second, this is all that can be seen.

When, however, the film is rerun frame by frame over the same few minutes, it can be seen that the father glances down momentarily at the baby's face. Strangely enough, in the same frames, the infant looked up at the father's face. Then the infant's left arm, which had been hanging down over the father's left arm, began to move upward. Miraculously, in the same frame, the father's right arm, which had been hanging down at his side, began moving upward. Frame by frame the baby's hand and the father's hand moved upward simultaneously. Finally they met over the baby's tummy. The baby's left hand grasped the little finger of the father's right hand. At that moment the infant's eyes closed and she fell asleep, while the father continued talking, apparently totally unaware of the little miracle of specificity in time, place, and movement that had taken place in his arms.

This example makes clear immediately the first pole of our dynamic: The principle of intersubjectivity. *Webster's Dictionary* defines "relation" as "connection." We begin life "connected," as part of each other. We begin in relationship. Intersubjectivity as a principle of first relationships has

¹The film sequence being described was first demonstrated to me by Daniel Stern some 25 years ago. The film itself was taken in 1958.

been demonstrated richly, both empirically and conceptually, by both Stern (1974) and Trevarthen (1979), in Stern's "attunement" and Trevarthen's "primary and secondary intersubjectivity." Opportunities for the engagements of intersubjectivity hinge largely upon the way the caregiver's attention is organized and available. As Murray (1987) points out, it is here, in the organization of attention, that postpartum depression in the mother plays such a critical role. In Trevarthen's "secondary intersubjectivity"—in the extension of the role of intersubjective organization to the enacting of play, games, and all forms of cooperative engagement between individuals—we realize that we have a further elaboration of the way each participant assimilates aspects of the complex organization of the other in order to achieve new integration at the systems level. A game represents the integration of a system; in this it is akin to the achievement of a relative stability in regulation of infant states of sleeping and waking as the case example illustrated.

Illustrative Example of "Being Distinct From"

At the same time, Tronick, Als, Adamson, Wise, and Brazelton (1978) have demonstrated vividly just how vulnerable the infant in the first months of life is to derailment of this elementary experience of connection by showing the infant's collapse in both mood and engagement when confronted with a caregiver's unresponsive, still face. This brings us to the second pole of our paradox.

Almost from the very outset, an infant begins to organize his or her own unique set of expectancies, which emerge from the diversity among recurring engagements with the caregivers; this organization is apparent in the system of the infant as "being distinct from" the caregiver. Throughout the 24-hour day, as expectancy probabilities are becoming established for both, a dynamic field of forces begins and surrounds the recurrent moments of meeting between the infant and the caregiver. Exchanges of intersubjectivity, along

with their positive emotional amplification, are being balanced by negative emotions as the infant meets a mismatch of expectancy, as when he or she encounters the still face or some equivalent interdiction. A dynamic balance emerges between initiatives for approach or for avoidance; this, in turn, begins to constrain the flow of behavior in the infant-caregiver system. The essential requirement that each living organism be self-regulating means that the initiative to choose a direction must arise from within the organism itself, not from an extrinsic source. We are all too familiar with avoidance and negative affects, but we also are beginning to track and appreciate the irreplaceable inward-motivating role played by positive affects in the initial adaptive encounters that make up "the first relationship."² Inasmuch as positive affects also energize, amplify, and motivate the infant as the "agent-to-initiate" in organizing his or her own goals, we can begin to describe both poles of the paradox as contained within the framework of positive affects. In the language of chaos theory (Gleick, 1987), rather than represent opposition and conflict, this would constitute a "strange attractor." We understand adaptation as a "fitting together" over time between infant and caregiver that constructs a new and enduring system; this builds on the idea that positive affects must embrace both the pole of "being together with" (intersubjectivity) and that of "being distinct from" (singularity). The singularity of an infant as he or she initiates action in his or her own self-organization is experienced by both the baby and the caregiver. It has been demonstrated (Papoušek, 1967) that the early infant's realization of an expectancy, or the achievement of a goal is accompanied by positive affects. At such moments, the caregiver can express positive affects that match and amplify those of the infant; whether she does so depends in large measure on the extent to which she has, in her own psychological organization, already granted the infant this essential role as agent to initiate the action re-

²By adaptive encounter (Sander, 1962), I am referring to the epigenetic, selective process of mutual modification required to reach an essential specificity of coordination over time between the uniquely organized infant and the uniquely organized caregiver. This is a "fitting together," long described in biology as that coherence in organization of exchange at the level of both the infant and the system that provides the conditions necessary for continuity of existence. The failure-to-thrive infant attests to this necessity.

quired for his or her own self-regulation and self-organization.

To glimpse how this all "works" in the earliest relationships brings us to our second case example: A state of relative stability in the regulation of the infant-caregiver system is established by means of mutual adaptations. The example illustrates an initial adaptation of this kind between the two. Biology has long pointed out that systems maintained in states of relative stability of regulation begin to show new, or "emergent" properties. The conditions under which sleep states gain 24-hour organization in the infant-caregiver system is one such emergent property that will be described. A second example illustrates the way we can think of the infant as a self-regulating subsystem. It demonstrates how the infant becomes loosely coupled or disembedded within the broader stability of regulation achieved within the larger system—that is, new, emergent property of the infant-caregiver system appears. Such loose coupling or disembedding of infant as self-organizing agent would represent the "being distinct from" pole of our paradox.

Before recounting case examples, I should clarify just what is meant by loosely coupled or disembedded ("disjoined," as Ashby [1952] has described it). Ashby introduced this concept in describing the significance of reaching the adapted state in a richly complex system. When there is a stable equilibrium in regulatory balance among a requisite variety of component functions, a selected function can itself (within its own phase-space) interact with the context—the organism's network of engagement—without a perturbation in the selected function spreading to or upsetting the stability of the rest of the system. On the other hand, a system may not be in such a state of regulatory equilibrium, or it may be trying desperately to maintain its coherence. Under such circumstances, component functions remain tightly coupled with the system as a whole, so that a slight perturbation of one part spreads at once to the rest of the system. To illustrate this Ashby uses the metaphor of someone learning to drive a stick-shift automobile:

Adaptation may demand independence as well as interaction. The learner-driver of a motor car, for instance, who can only just keep the car in the center of the road, may find that any attempt at changing gears results in

the car apparently trying to leave the road. Later, when he is more skilled, the act of changing gears will have no effect on the car's travel. Adaptation thus demands not only the integration of related activities, but the independence of unrelated activities. (p. 157)

In systems language, within the coherence of a stably regulated infant-caregiver system, conditions should allow the infant to function as a "self-as-agent," self-organizing, subsystem that becomes loosely coupled, or 'disjoined. Within yet another framework, would describe the systems condition under which Winnicott's "true self" development could begin (Winnicott, 1965b).

THEORETICAL BACKGROUND

The case example sheds light on this assumption. It is drawn from my work with associates some 30 years ago (Sander, 1979) on continuous, 24-hour, noninvasive, neonatal bassinet monitoring. With this instrument, it was possible to compare different infant-caregiving systems over the first months of life. Continuous, around-the-clock, real-time recording was made of states of infant sleep and wakefulness, including quiet sleep, active sleep, transitional states, infant crying, and movement patterns. Also recorded were timing of approach of caregiver and removal of and return of infant to bassinet. These measurements were coupled with regular daily observation and recording of feedings, and a weekly visual perceptual test of infant response to 1-minute presentations of the human face in still, nodding, and social conditions. Care was taken to select only normal newborns with normal prenatal and delivery histories. All were bottle-fed and monitored one at a time over the first 2 months of life. This array of variables gave us a rich empirical basis for comparing the process of state regulation and the way infant functions developed under different caregiving conditions. Three samples of 9 infants each were compared: Sample A infants were cared for in the neonatal nursery by a changing assortment of different nurses and fed every 4 hours around the clock, regardless of the state of the infant. This continued until the 11th day of life, when each began 24-hour rooming-in with one individual—a surrogate mother nurse who

fed only on demand—only contingent to a prior state change in the infant. Sample B infants, however, roomed-in from the day of birth similarly, with the same surrogate mother nurse, feeding only on demand until day 11, when a second surrogate mother nurse continued the rooming-in until day 30. Sample C roomed-in with their own mother until day 5, then went home and were also bottle-fed only on demand. All the mothers in group C had had at least one previous baby. Needless to say, there were great differences in the 24-hour picture of state regulation and change over days in the 3 groups.

The first illustration involves a system that is maintained in relative stability of regulation. An emergent property is drawn from the data of the first 10 postnatal days. The investigators compared samples in regard to the distribution of sleep and waking states over each 24 hours, whether located in the daytime 12 hours (6:00 A.M.–6:00 P.M.) or in the nighttime 12 hours (6:00 P.M.–6:00 P.M.). Between postnatal days 4 and 6 the infants of Samples B and C, those who were fed only contingent to a prior state change in the infant (fed "on demand"), showed the spontaneous emergence (and persistence) of a 24-hour circadian rhythm of sleep and wakefulness. That is, between days 4 and 6 they began (and then continued) to sleep more in the nighttime 12 hours and to be awake more in the daytime 12 hours. This was a new 24-hour organization of the infant-caregiver system as a whole. No such rhythm appeared in Sample A infants, for which a feeding was given every 4 hours around the clock, regardless of the state of the infant. Thus, caregiving intervention in Sample A was often an intrusion into the self-regulatory property of the infant organism. Crying and motility in Sample A far exceeded that in Samples B and C, denoting that regulation in Sample A was highly unstable. One might say that in Samples B and C the role of "infant-as-agent" in initiating his or her own self-regulation had been granted by the caregiver from the outset.

Illustration of a second emergent property was provided by the visual perceptual tests carried out twice weekly by Stechler (Sander et al., 1979) on all the infants. For the neonate, confrontation with the human face is an exciting stimulus. The 1-minute presentation turned out to be a test of limits for the Sample A infants. These infants

SECTION II / THEORETICAL AND CLINICAL PERSPECTIVES

broke down and cried before the minute was up; for them, regulation of this state of excitement was accomplished by the collapse of the state of the infant as a whole. For the sample C infant, however, regulation was achieved by means of the visual system alone. The infants could look directly at the face, become excited, look peripherally to chin or hair, quiet down, look back, then away repeatedly, maintaining their composure over the stimulus minute. On an initial level, we can think of this as the infants exercising their own agency for self-regulation under conditions of relative regulatory stability. These conditions have allowed a loose coupling or disjoin of the visual system; this was necessary to achieve the specificity—and hence adequacy—of regulation not available to the more precariously regulated, tightly coupled, Sample A neonates.

This example can be considered a systems metaphor for the state of regulation in the infant-caregiver system, one that allows the loose coupling of a self-as-agent, self-organizing subsystem. Such a loose coupling, or disembedding, would make possible the pole of "being distinct from" in the dialectic tension or polarity central to this discussion. Conditions of stability of regulation over time in the holding environment (Winnicott, 1965c) allow both poles to be organized together in a new coherence. Such an ordering would allow positive affects to be contingent on the activation of either pole.

Resolution of Paradox

The bassinet-monitoring study illustrated another emergent property of a system maintained in a state of relatively stable regulation—the appearance over the course of an infant's awake period of an "open space" (Sander, 1977) in time, one that allows the endogenously activated, self-organizing initiative of the infant to emerge and begin the process of constructing its own idiosyncratic goals—the pathway to be pursued in "being distinct from." Integration at this point, clearly, must be thought of in terms of process within a system.

Open space, as I have formulated it, begins to become recognizable during the course of an

awake period toward the end of the first month of postnatal life. The mother feels she is coming to "know" her infant within what is now a relatively stable 24-hour framework of expectable states in her infant's cycling and sequencing. During an awake period, after the infant has been picked up, changed, fed, and socially interacted with, the baby still is in an awake-active or quiet-alert state, not yet ready to return to sleep. The mother puts the infant in a reclining chair where the baby can see and hear her and goes about her other work or interests. This is a moment of disengagement but one in a state of regulatory stability, a coherence in the infant-caregiver system as a whole. During this open space in time, the infant's "primary activity," his or her agency for generating self-organization, can take off and initiate and organize an idiosyncratic network of proximal engagement of his or her own. This may involve grasping his or her own fingers, or watching mother, or banging against a mobile hanging before the infant. The infant is free from the need to manage or restore the regulation of his or her own state as a whole, and self-regulation can be carried out within a specific component sensorimotor subsystem. The infant's agency can pursue its own interests in a variety of ways; the child can engage in active selective exploration either of self or the low-intensity stimuli or discrepancies in the surroundings. Feedback and self-correcting action become related specifically to the goals of the infant's own interests and action.

Here we have a systems model, then, of equilibrium constructed by an enduring coordination between infant and mother over time, a balance that provides containment without impingement. We can apply this model to our understanding of succeeding tasks for new adaptive coordination that will arise within the system as the infant matures over the ensuing months.

In the open space segment of the awake period, there is documentation for Winnicott's paradox: "The basis of the capacity to be alone is a paradox; it is the experience of being alone while someone else is present" (Winnicott, 1965a, p. 30). And, further "it is only when alone (that is to say in the presence of someone) that the infant can discover his own personal life. The pathological alternative is a false life built on reactions to external stimuli" (p. 34). The open space segment can be thought of as a first level of Winnicott's "intermediate area"

and "true self" engagement with it. As Winnicott describes it: "The infant is able to become unintegrated, to flounder, to be in a state in which there is no orientation, to be alone, to exist for a time without being either a reactor to an external impingement, or an active person with a direction of interest or movement. The stage is set for an inner experience. In the course of time there arrives a sensation or an impulse. In this setting the sensation or impulse will feel real and be truly a personal experience" (p. 34).

If we think of the first relationship from the perspective provided by basic biological principles that govern the interactive-exchange process in all living systems, we begin to appreciate that the integration of dynamic polarities inherent within such systems is their essential direction. The idea of stages in development has provided important descriptive markers but tends to ob-

scure such common, essential, underlying dynamics. For example, the process of separation-individuation has long been conceptualized and studied as part of the early developmental process, but it has been assumed to enter the picture at some later point, after initial "togetherness" has been established. As I have tried to illustrate, if we can translate from the biological level and think in terms of systems and process, it becomes evident that the same fundamental dynamic is there in the system from the first relationship. This suggests that we can view the progress of the developmental process as one of integration, one that brings together apparently contrasting poles on levels of new and increasing complexity. Ultimately it is this process that constructs the wide spectrum of pathways that, at the same time, preserve the uniqueness of the individual.

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SECTION II / THEORETICAL AND CLINICAL PERSPECTIVES

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20 / High-Risk Environments and Young Children

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Risk, by dictionary definition, is a hazard, something that has potential for negative consequences. Developmentalists use the term *high risk* to refer to biological or social conditions that increase the probability of adverse outcomes for children. Down syndrome is an example of a high-risk biological factor; virtually every child with the condition has intellectual and language impairments. A high-risk social condition is multigenerational criminality. Children from such backgrounds show antisocial behavior as early as elementary school (Rutter, 1988). A combination of biological-social risk for an infant is exemplified by preterm delivery of a drug-addicted adolescent mother who dropped out of school. This particular constellation of risks and vulnerabilities often is associated with long-term developmental disorders (Furstenberg, Brooks-Gunn, & Morgan, 1987).

High-risk environments include settings, events, and situations that produce child experiences that are detrimental to well-being and development. Children who grow up in high-risk environments are exposed to many imbalances: too much violence, too little nurturance and care, too much poverty, too little sensitivity to needs, too much unsupervised time, too little exposure to ideas and values that foster cognitive and social growth. No childhood age period is immune to these imbalances: When risks are pervasive and major, there may be cumulative effects across age periods.

This chapter is specifically concerned with the effects of high-risk environments on the develop-

ment of very young children. The emphasis is on the early years, with special attention paid to the preschool period because of the importance of this developmental phase. The chapter begins with a useful framework for categorizing environmental risks. A review of additional issues relevant to attempts to sort out the effects of risks on development follows. The chapter continues with an in-depth examination of two pervasive risk environments, those associated with divorce and child maltreatment. The outcomes associated with these factors are noted in terms of both general research findings and those specific to young children.

As will be seen throughout this chapter, despite considerable information available about risk factors and development, causal associations between specific risk factors and specific child outcomes are complicated and difficult to delineate. As a consequence, causal statements often are couched in generalizations rather than particulars. The chapter closes with a brief discussion of research and clinical implications.

Categorizing Risks

The phrase *high-risk environment* is a designation of convenience that allows a nominal grouping of the various conditions and factors that adversely