CHAPTER

2

A DYADIC SYSTEMS VIEW

During Burton’s treatment, the developmental views of Jacobson, Kohut, and Mahler were essential in our conceptualization of his chaotic experience. I (Beatrice), however, increasingly felt that I was living in two different worlds: one view of development as I sat with my patients and a totally different view of development as I did infant research. So, after Frank and I wrote up the ninth year of Burton’s treatment, we took a year off to study infant research together. I continued to spend half my time doing infant research with Daniel Stern, and later Joseph Jaffe, at New York State Psychiatric Institute. Frank and I decided that together we would study the course on infant social development that I had been teaching at Ferkauf Graduate School of Psychology. I now had a way of reciprocating Frank’s years of supervision, and we now had a new forum for continuing our intellectual development. In our dialogue attempting to relate infant research to psychoanalytic treatment, we educated each other.

I (Frank) was intrigued by the possibility of using infant research as a new port of entry into psychoanalysis, not from the couch, not from pathology, but through the eyes of many ingenious researchers who studied normal babies and what they could do. I found in the research an opportunity to revive my interest in research that I had held from high school, college, and graduate school. As we examined the studies, I came upon a picture of early development that
was radically at variance with the psychoanalytic view. The empirical infant was an extraordinary phenomenon.

We became increasingly impressed by the role that dyadic interaction played in the early organization of experience. This remarkable infant was involved in a reciprocal, split-second, mutually adjusting system with a caregiver. At the same time, this infant had hitherto unsuspected capacities to regulate his own state. The various ways in which inner state and interactive process were linked in infant research defined an array of organizing principles of interactions. We began to draw on empirical infant studies to expand our understanding of patient–analyst interaction (see, e.g., Beebe and Lachmann, 1994, 1998, Lachmann and Beebe, 1996a, b).

Sander’s (1977) work on the role of interactive regulation in the organization of sleep–wake cycles in the early weeks of life guided our thinking about the integration of self- and interactive regulation. In reviewing the literature, we noted that behaviors used to illustrate self-regulation could just as easily be examined for their role in influencing, and being influenced by, the partner and vice versa. This intimate connection between self- and interactive regulation became the core of our “systems” view of the dyad. That year of discussions set the foundation for our collaboration on the relevance of infant research for psychoanalysis. Over the past two decades we have continued these discussions for two hours weekly, generating the views that we are presenting here.

Much previous work on the relevance of infant research for psychoanalysis has focused on the infant origins of adult psychopathology. Our interest in writing this book is quite different. We are interested in infant research as it may illuminate basic processes of interaction. Thus our concern is psychoanalytic process. A systems model of the dyad sets the stage for our study of the intimate connections between self- and interactive regulation, which we will apply to the psychoanalytic process.

The real payoff from infant research comes as a surprise. It is fruitful in psychoanalysis not because earlier states may be recapitulated in adult treatment, as speculated by older theories, although this might occur. Instead, infant research is most fruitful because the
A Dyadic Systems View

The empirical view of the role that dyadic interaction plays in infant experience. This remark-
ably, split-second, mutually exclusive view of infant behavior suggests that the vari-
able process was linked to the principles of infant studies to expand the concept of interaction (see, e.g., Beebe and Beebe, 1996a, b).

A global view of the early weeks of life guided the research question: what behavior is used to regul-
ate the behavior of the dyad by the partner and vice versa? The regulation of the dyad was closely related to the regulation of the infant. The data from the past two years for two hours weekly, presenting a picture of the infancy of the dyad. We have seen that the process of regulation, which we will...

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Greenberg, 1995; Aron, 1996; Stolorow, 1997; Shane, Shane, and Gales, 1998).

Approaches that integrate the contribution of the individual and that of the dyad to the organization of behavior and experience can be considered systems models. Although Piaget (1937) and Werner (1948) did not use the term systems theory, their emphasis on the continuous interaction of the organism and environment contained many of the central ideas of systems theory. Developments in many areas have moved from an individual-centered approach and linear views of causality toward systems and field approaches (Badalamenti and Langs, 1990, 1992; von Bertalanffy, 1968; Iberall and McCulloch, 1969, Kohlberg, 1969, Lewin, 1937; Sameroff, 1983; Thelen and Smith, 1994).

Systems theory (field theory) was conceptualized in physiology, physics, and biology. Von Bertalanffy (1968) was a leading figure who conceptualized theoretical biology as a theory of open and closed systems. His fundamental interest was the self-organization of the organism as it developed in the direction of increased integrity and self-direction. Although the organism was engaged in continuous transaction with the environment, von Bertalanffy’s emphasis was on the use of transactions to maintain the self-regulation process.

Psychology was influenced by both physics and theoretical biology in its development of systems views. Lewin (1937) and Morris (1934), notable in the Chicago school of social psychologists, had an impact on Sullivan (1953), who drew on systems views in developing his interpersonal field theory. In his 1964 paper, The Illusion of Personal Individuality, Sullivan argued that a person has as many identities as human relationships. Thus, the individual organization is continually shaped by the dyadic context.

Sullivan was active in the Washington School of Psychiatry and Chestnut Lodge, where he was influential in the work of Fromm-Reichmann and David and Margaret Reichman, as well as of Loewald, Riolo, and Weinstein (1964) edited a book that discussed a central statement of systems theory by James Miller. Miller argued that there were essential similarities in information processing across cells, neurons, organs, organisms, humans, groups, and social organi-
A Dyadic Systems View

Each level has its own unique characteristics, but all are living systems open to energy and information. They maintain themselves in a changing environment by regulating inputs and outputs of matter, energy, or information and by preserving internal steady states of critical variables through the governance of subsystems. These living systems also share similarities in the way they respond to overload or "underload" of information, both of which can lead to pathology of the system.

In England, working with very different influences, Winnicott (1957, 1965) also developed a systems approach, illustrated by his famous concept that there is no such thing as a baby, but rather a mother–baby unit. In different ways, both Sullivan and Winnicott carefully conceptualized the contributions of both partners in the dyad. However, even as systems views filtered into clinical practice, the focus generally remained on the individual rather than on the dyad.

In developmental research, despite the increasing emphasis on systems views, more attention was given to the influence of the parent than to the influence of the child. Not until the early 1970s did infant research begin actively to endorse a fully bidirectional view of each partner's contribution to the organization of the dyad (Bell, 1968, 1970, 1971; Lewis and Rosenblum, 1974). In developmental psychology, three interacting units constitute the system: the parent as a self-organizing, self-regulating unit; the child as a self-organizing, self-regulating unit; and the parent–child dyad as an interactive field with a unique organization of its own. None of these three units can be fully described without reference to the other two.

Systems approaches shifted our thinking from a one-way to a two-way concept of interpersonal regulation in the dyad. In a bidirectional system, each person's behavior is predictable from (not "caused" by) that of the other. We are both influencing, and being influenced by, our partner's words and actions. Particularly at the nonverbal level, mother and infant, as well as analyst and patient, participate in a moment-by-moment coordination of the rhythms of behavior. This is the fundamental nature of social behavior. Each partner has continuous rhythms of behavior, for example, sound and silence,
movement and hold. Even the moments of verbal or gestural "silence" are communicative. The rhythms of behavior of two partners are always coordinated in some way, usually outside awareness.

The capacity to enter into split-second facial or vocal exchanges is robust in infancy as well as adulthood and is probably highly adaptive in evolution. These split-second exchanges have also been documented in the facial-visual exchanges of monkeys (Chevalnier-Skolnikoff, 1976). Eibl-Eibesfeldt (1970) filmed lovers flirting on park benches while unaware of his camera. Microanalysis of the film revealed split-second responsivity of face, gaze, and head orientation between the lovers. Thus, much of the organization of nonverbal communication remains similar across the life span.

Although bidirectional influence is a central meaning of our term co-construction, we use this concept in a second way as well: the interactive- and self-regulation processes influence each other. Fogel (1993a, b) integrates both of these processes noting that all behavior unfolds in the individual while, at the same time, it is continuously modifying and being modified by the changing behavior of the partner.

In the empirical infant literature, studies of interactive regulation and self-regulation have tended to exclude each other (see, as important exceptions, Sander, 1977, Tronick, 1989). But we are always monitoring and regulating our inner state at the same time as we are tracking our partner's words and actions. Feeling anxious, agitated, or low will bear upon the way we affect, and are affected by, our partner. And vice versa: if the interaction is unpleasant, we will have difficulty staying calm.

Thus, a theory of interaction must specify how each person is affected by his own behavior—that is, self-regulation—and by the partner's behavior—that is, interactive regulation (Thomas and Martin, 1976, Thomas and Malone, 1979). Each person must both monitor the partner (influence and be influenced) and at the same time regulate his own state. Self- and interactive regulation are concurrent and reciprocal processes (Gianino and Tronick, 1988). Each affects the success of the other. They are optimally in dynamic balance with flexibility to move back and forth. Although this the-

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tionally. The contingencies for behavior of each partner are dictated by, to a significant extent, experiences both during the developmental period and later. The solid lines indicate self and interpersonal regulation. The dotted lines represent the flow of regulation. Figure 1 shows the system's interaction.
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ory is now well articulated, neither infant research nor psycho-
analysis (but see Aron, 1996), however, has taken full advantage
of its implications.

Definitions of Self- and Interactive Regulation

When we discuss interactive regulation we use the terms mutual regu-
lation, bidirectional regulation, and co-constructed regulation inter-
changeably. These terms do not imply mutuality. They mean that
contingencies flow in both directions between partners. That is, the
behavior of each partner is contingent on, "influenced" by, or pre-
dicted by, that of the other. One or the other direction of bidirec-
tional influence is usually emphasized. However, the person
experiences both influencing and being influenced by the partner.
The solid lines in Figure 1 illustrate the continuous reciprocal effects
of self- and interactive regulation processes in a systems model. The
dotted lines parallel to the solid lines indicate the history of these
regulations. Figure 2 illustrates that all modalities contribute to the
bidirectional exchange between mother and infant.

Figure 1. Systems Model of Interaction. Arrows indicate predictability ("coordi-
nation" or "influence") between partners. Dotted arrows represent the history of
the pattern of predictability.
These terms do not imply symmetry: each partner may influence the other in different ways and to unequal degrees. Nor is a causal model implied. Regulation is defined by probabilities that one partner’s behavior is predictable from that of the other. Nor is a positive interaction implied; aversive exchanges (such as the chase-and-dodge interaction described later) as well as positive ones (such as facial mirroring) are bidirectionally regulated.

We use the term self-regulation to denote the capacity of the partners to regulate their respective states. From birth onward, self-regulation refers to the management of arousal, the maintenance of alertness, the ability to dampen arousal in the face of overstimulation, and the capacity to inhibit behavioral expression. It includes variations in the readiness to respond and in the clarity of cues, such as how clearly a baby conveys hunger, sleepiness, or approach—avoidance (see Körner and Grobstein, 1976; Sander, 1977, 1995; Als and Brazelton, 1981; Gianino and Tronick, 1988). Self-touching, looking away, and restricting the range of facial expressiveness are examples of self-regulation strategies that dampen arousal. Across the life span, self-regulation is a critical component of the capacity to pay attention and engage with the environment. Sander (1977, 1995) suggested that articulation of, and so on.

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Adult Self-Regulati
- (unconscious) fantasies
- defenses

Figure 3. Self-Regulati
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\[ \text{Denote the capacity of the states. From birth onward, self-arousal, the maintenance of al in the face of overstimulatio- vioral expression. It includes and in the clarity of cues, such er, sleepiness, or approach- , 1976; Sander, 1977, 1995; l Tronick, 1988). Self-touch- range of facial expressiveness es that dampen arousal. Across al component of the capacity e environment. Sander (1977, 1995) suggested that, in adulthood, self-regulation includes access to, articulation of, regard for, and capacity to use inner states. Figure 3 illustrates self-regulation in the systems model.

By giving equal emphasis to self- and interactive regulation, we retain the traditional interest of psychoanalysis in the organization of the individual. At the same time, we emphasize that the organization of the individual is always in a “dialogue” with the dyad, influencing and being influenced by the nature of the interactive regulation. Behavior is simultaneously communicative and self-regulatory. Shifts in influencing and being influenced by the partner are accompanied by simultaneous shifts in self-regulation, behavior, and arousal. Self-regulation in the adult includes (unconscious) fantasy, day dreaming, symbolic elaboration, and defenses.

**Figure 3.** Self-Regulation in the Dyadic Systems Model.
Sander's Description of the Systems Model

The most general description of a systems model for infant research has been provided over the last two decades by Louis Sander (1977, 1985, 1995). He emphasizes the primacy of process over more static notions of structure. In systems thinking, a person is always embedded in an ongoing engagement with a context. The organization of the system refers to a principle of ordering that stabilizes the pattern of a large number of elements of both person and environment. This pattern recurs, but it also changes slightly with each engagement between the individual and the environment. Thus, an interactive system is always in process, with a dialectic between predictability and transformation.

A central theme of Sander's work is the description of self-regulation, interactive regulation, and their integration. Infants, like any other living system, must be capable of self-regulation and self-organization. This self-regulation process, however, is continually modifying and being modified by the nature of the interactive regulation (see also Fogel, 1992a, b). An infant's experience of "agency" is organized through the self-regulation process, but only insofar as the interactive regulation "grants" or facilitates this agency. In Sander's terms, agency is a "systems competence." Self-regulation accrues to awareness of inner experience (state, emotion, expectation) from the beginning of life. Thus we are simultaneously aware of inner experience and of interactive context.

To illustrate, the study of disordered interactions in infancy previously tended to locate the source of difficulty in one partner or the other, for example, in infant temperament difficulties or in maternal intrusion or withdrawal. Instead, it is essential to disentangle the relative contributions of self and interactive regulation of both partners. By not privileging inner or relational processes, and by highlighting their co-construction, a systems view examines how dyadic process may organize and reorganize both self- and interactive regulation. Simultaneously, changes in self-regulation in either partner alter the interactive process. This point of view informs our discussions of therapeutic action throughout the chapters to follow.

Recent findings that infant agency is speech to her four-tens, were coded maternal speech co commenting on the you're wiggling" or now." Kaminer also designed by Blatt, nerability to depre DEQ dependency that is, who were like them. Mothers who more vulnerable action/agency con hypothesize that, that their own age. In the latter by the mother on rate." These mor action/agency con "You are not look agency occurs or "against" the moth Sander's prem tem emerge from individual agency ciple of "matched wholeness in the between two syste facilities" (p. 162).

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Recent findings by Kaminer (1999) illustrate Sander's concept that infant agency is a systems competence. The nature of a mother's speech to her four-month-old infant, as well as the infant's gaze patterns, were coded from videotape, second by second. One of the maternal speech codes was "action/agency" defined as the mother's commenting on the infant's autonomous action, for instance, "Oh, you're wiggling" or "What are you looking at?" or "You're smiling now." Kaminer also asked the mothers to fill out a questionnaire designed by Blatt, D’Afflitti, and Quinlan (1976, 1979) to tap vulnerability to depressive experiences around interpersonal loss (the DEQ dependency scale). Mothers who scored low on Blatt's scale, that is, who were less vulnerable to depressive experiences, tended to make action/agency comments while the infants were looking at them. Mothers who were high on Blatt's scale, that is, who were more vulnerable to depressive experiences, tended to make action/agency comments when the infants were not looking. We hypothesize that, in the former case, infants will eventually learn that their own agency is included within the mutual gaze engagement. In the latter case, infants may learn that their agency is noted by the mother only when they are visually "away" or more "separate." These more vulnerable mothers tended to frame their action/agency comments in terms of "Where are you looking?" and "You are not looking at me." These babies may learn that their agency occurs only when they are more separate, or somehow "against" the mother.

Sander's premier questions are: how does coherence of the system emerge from complexity? and how does the system grant the individual agency and identity? His answer uses Weiss's (1970) principle of "matched specificities," which maintains organization and wholeness in the system. This principle is "a sort of resonance between two systems attuned to each other by corresponding properties" (p. 162).

An example of matched specificities is the selective recognition of sound waves in tonal identification, or the selectivity of nerves in connecting with only certain types of peripheral tissue. An example from mother–infant research is the documentation that mother
and infant, as well as stranger and infant, track each other’s vocal rhythms. Furthermore, the tightness of the tracking (degree of predictability of one person’s behavior from that of the other) differs according to the security of the infant’s attachment (Jaffe et al., 2001). The principle of matched specificities is illustrated in the vocal rhythm study by the finding that only certain ranges of tightness of rhythmic coordination are optimal, in particular partner and site contexts, for particular developmental outcomes.

Sander (1977, 1985, 1995) has argued that matched specificities, shaped by the recurrence of patterns in the flow of engagement, generate expectancies in the infant. Coherence of organization is achieved in any living system through a process of adaptation or fitting together. The capacity for mutual adjustment must be present in each partner in order for them to fit together. It is just this concept that the infant research on vocal rhythm coordination illuminates.

The principle of matched specificities underlies Sander’s concept of the “moment of meeting,” further developed as a theory of therapeutic action by The Process of Change Study Group (see Lyons-Ruth, 1998; Sander, 1998; Stern et al., 1998; Tronick, 1998). Matched specificities between two systems attuned to each other yield awareness in each partner of the state of the other. In a moment of meeting, two states of consciousness are matched such that the way that one is known by oneself is matched by the way one is known by the other (Beebe, 1998). This match in the moment of meeting facilitates the development of agency and identity. In the moment of meeting, a mutual recognition occurs that changes the patient’s ability to act as an agent in his own self-regulation.

Sander’s work impels us to find new ways of thinking about “organization” in infancy and adulthood. He recommends that we shift our conventional view of psychological organization as the property of the individual to a view of psychological organization as the property of the mutually organized infant–caretaker system (Sander 1985, 1995).

We are extending Sander’s thinking to the adult patient–analyst system. We view the adult patient’s experience as the property of the mutually organized patient–analyst system. Nevertheless, as repeatedly emphasized, a unique history to each patient can be fully understood in the context of his or her relationship with the therapist and that person’s experience as an adult.
repeatedly emphasized by Sander and others, each individual brings a unique history to the interactive encounter. But this uniqueness can be fully understood only in the context of how that particular partner and that particular individual “co-create” their relatedness.

Infant Research Illustrates a Theory of Interaction for Psychoanalysis

The value of infant research for psychoanalysis is often derived from the ways in which this research can help an analyst and a patient imagine the patient’s infancy (see, e.g., Kiersky and Beebe, 1994). Despite the importance of this use, however, we are primarily interested in using infant research in a different way, that is, to illustrate organizing principles of interactions relevant for psychoanalysis.

Psychoanalysis is currently seeking an expanded theory of interaction. Organizing principles of interaction can be discerned when mother and infant are viewed as a system. Despite the many differences between mother–infant and patient–analyst interaction, we propose that these principles can illuminate how interactions are organized at the nonverbal level in adult treatment. These organizing principles of interactions describe self- and interactive process, not dynamic content.

A theory of interaction for psychoanalysis must ultimately address the nonverbal or “implicit” (procedural/emotional), as well as the verbal or “explicit,” dimension of the interaction. The nonverbal dimension is usually outside awareness, but it provides a continuous background of moment-by-moment mutual influence. The verbal system is usually in the foreground and more intermittent (speaking and listening). Simultaneously with the exchanges on the verbal level, patient and analyst are continually altering each other’s timing, spatial organization, affect, and arousal, on a moment-to-moment basis. This is the fundamental nature of social behavior. Figure 4 illustrates the systems model in adult treatment. It shows that self- and interactive regulation occur in both the explicit and the implicit realms, roughly equivalent to the verbal narrative and nonverbal action sequences, respectively. The arrow between the explicit and implicit realms indicates that, ideally, each realm can
be translated into the other. The broken arrow indicates that, in some communication difficulties, the two realms cannot be translated back and forth.

The nonverbal interactive process between two conversing adults using language is obviously more complex than that between mother and infant. Nevertheless, the organizing principles we offer can illuminate the nonverbal dimension of psychoanalysis. Furthermore, the ways in which the nonverbal dimension is organized affect such familiar dynamic issues as safety, efficacy, self-esteem, mutual recognition, intimacy, separation and reunion, boundaries, self-definition, and aloneness in the presence of the partner.

These organizing principles can be viewed in several ways. In our previous work (Lachmann and Beebe, 1992, 1996a, 1997) we suggested that the principles can be used to generate analogies (but not one-to-one correspondences) between mother–infant and adult communication. This remains a useful approach. More fundamentally, however, the organizing principles describe lifelong modes of regulating interactive processes at the procedural/emotional level of action sequences, as long as we continue to recognize that the addition of language makes the conceptualization of the process more complex. That is, the only "language" mother and infant have is the nonverbal process. Adults have two "languages," one verbal and the other nonverbal, each of which continuously bears upon the other.

Linking the Organization of Inner and Relational Processes

Internal processes and interactive processes are organized concurrently and affect each other. For infants and adults alike, face-to-face communication involves experiences of influencing and being influenced by the partner, as well as continual shifts in arousal and self-regulation behaviors. How is it possible to translate between inner experience and interactive behavior before language? Remarkably, infants are capable of coordinating their own inner state with the nature of the interaction. By examining how infants do this, perhaps we can learn something about how adults may do it.
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Figure 4. The Systems Model in Adult Treatment. Arrows indicate predictability ("coordination" or "influence") between partners. Dotted arrows represent the history of the pattern of predictability. The arrow between the explicit and implicit realms indicates that, when necessary, the implicit and explicit systems can be translated back and forth; the broken arrow between the two realms indicates that, in some difficulties of communication, this translation is disrupted.
Internal processes and relational processes are inextricably coordinated and are organized concurrently. Experiences of influencing and being influenced by the partner, as well as concomitant shifts in self-regulation behaviors and arousal, are inherent in the infant's, as well as the adult's, face-to-face communication and social-information processing. Across development, interactive regulation reorganizes inner as well as relational processes, reciprocally, changes in self-regulation in either partner alter the interactive process. This integration of self- and interactive regulation is one way of conceptualizing the organization of experience. Infant as well as adult research studies are reviewed to illustrate this position.

Cross-Modal Perception of Correspondences

Meltzoff (1985, 1990) has shown that infants as young as 42 minutes can imitate the facial expression of an adult model. Infants perceive the correspondence between what they see in the face of the model and what they feel proprioceptively in their faces. How can they do this? Through cross-modal matching. Detecting matches from the beginning of life, infants can translate between environmental information and inner proprioceptive information. They can bring their internal states and behaviors into a correspondence with the environment. Meltzoff argues that cross-modal matching provides a fundamental relatedness between self and other, between inner state and environment. He suggests that it provides the earliest experience of "like me." Cross-modal perception of correspondences is one mechanism for coordinating inner and relational states. Although Meltzoff's demonstration is in the modality of facial expression, this principle can be extended to other modalities, such as correspondences of timing.

Perception of Emotion in the Partner Creates a Resonant State in the Perceiver

There is considerable evidence that in adults certain regions of the two cerebral hemispheres are differentially lateralized for process-
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in adults certain regions of the
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ing positive and negative emotional stimuli (Davidson and Fox,
1982). And, in studying infants, Davidson and Fox showed that, by
10 months, the brain is likewise lateralized for positive and negative
affect. As an infant watched a video of a laughing actress, his brain
showed the pattern of positive affect (EEG activation of the left
frontal lobe). As an infant watched a video of a crying actress, his
brain showed a pattern of negative affect (EEG activation of the right
frontal lobe). Thus, the mere perception of emotion in the partner creates a res-
onant emotional state in the perceiver. Unlike the design of Meltzoff’s (1990)
study, these infants did not actually have to match the partners’
behavior to be affected by the partners’ facial expression. What an
infant perceived on the face of the partner altered his internal state,
and the infant could not escape the face of the partner. In this sense,
internal state and interactive state are organized simultaneously.
Schore (1996; see also Perry, 1996) has amassed extensive evidence
showing that variations in the nature of maternal stimulation influ-
ce the developing organization of the infant’s brain.

The link between the perception of facial expression and brain
activation patterns in the perceiver provides a second mechanism
through which the emotional state of the partner and the emotional
state of the individual are coordinated. The Davidson and Fox (1982)
research goes further than the Meltzoff (1990) study by docu-
menting the concomitant reorganization of activation in the frontal
lobes, thus further specifying the regulation of inner state. Both
mechanisms (documented by Meltzoff and by Davidson and Fox)
operate at the nonsymbolic, implicit level.

Elaborating on Davidson and Fox’s work, Dawson (1992a, b)
applied this method to the study of depressed mothers and their
infants. She showed that by 10 months the emotional responsivity
of infants of depressed mothers is already organized differently from
that of normal infants. The same event that activates a positive affect
behavior and EEG pattern in normal infants (mother playing peek-
a-boo or mother returning after separation) elicits negative behavior
and EEG pattern of activation in infants of depressed mothers. Again,
interactive events and infant inner state are coordinated, but the infants
of depressed mothers show a reversal of the usual organization.
Matching of Facial Expressions

Ekman, Levenson, and Friesen's (1983) study of adults found that a particular facial expression is associated with a particular pattern of physiological arousal. Matching the expression of the partner therefore produces a similar physiological state in the onlooker. Thus, a relational state and an internal state are simultaneously constructed. The Ekman work provides a third mechanism through which the emotional state of an individual can be transmitted to the partner, that is, specific matching of facial expressions. Like the Davidson and Fox (1982) work, it specifies the nature of the internal regulation of state at the physiological level. We have previously argued that, as two partners match each other's affective (as well as temporal) patterns, each recreates in himself a psychophysiological state similar to that of the partner, thus participating in the subjective state of the other (Beebe and Lachmann, 1988a, b).

Specific matching of facial expressions in adults has recently been empirically documented by Dimberg, Thunberg, and Elmehed (2000). Adult subjects were exposed to 30 milliseconds of happy, angry, and neutral target faces through a masking technique. The 30 milliseconds of the target face was "masked" by a five-second exposure to a neutral face before and after the target face, with the result that the subjects could not consciously perceive the target face. Simultaneously subjects were monitored for facial electromyographic activity by miniature electrodes. Despite the fact that exposure to happy and angry faces was not conscious, the subjects displayed distinct facial muscle reactions that corresponded to the happy and angry target faces. These results show that positive and negative emotional reactions alike can be evoked outside awareness, so that important aspects of face-to-face communication occur on a nonconscious level.

Inner Experience Is Organized in the Interactive Context

An important corollary of the mechanisms just described is that inner experience is organized in an interactive context. Sander (1977, 1983, 1985) has an extensive body of data demonstrating that, from the very beginning of active context, infant transitions (between of life, particularly tion and an expecta 24-hour cycle. A com self-regulation and ho gestion of infant se propose that the cap consolidates around infant comes to recog sequence of arousal, so on. This inner exp atively more disorgan regulation of state oc mismatches of his ex state transitions will g of his own states. The infant can be aw.

Sander (1983, 19 quality and success of taker system construc the infant's access to to organize his own to use his states in org itations and constrain of differences in (1) t aware of, (3) how he potential pathology c on the part of the inf that awareness, and essence, an increasing regard to his own state anism for the recipi processes: the interacti activity, and feeding i
study of adults found that a
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he Interactive Context
hanisms just described is that
active context. Sander (1977,
of data demonstrating that, from
the very beginning of life, inner experience is organized in the inter-
active context. Infant management of state maintenance and state
transitions (between sleep and wake) was studied in the first weeks
of life, particularly the infant's achievement of day-night organiz-
ation and an expectable pattern of the temporal organization of the
24-hour cycle. A complex interplay was documented between infant
self-regulation and how mother and infant jointly negotiate the man-
agement of infant state transitions. Sander used this framework to
propose that the capacity for inner experience exists from birth and
consolidates around the experience of recurring states, which the
infant comes to recognize. Inner experience begins in an expectable
sequence of arousal, waking up, being fed, open spaces for play, and
so on. This inner experience is getting organized, or remaining rela-
tively more disorganized, in the interactive context, in which the
regulation of state occurs. As an infant encounters both matches and
mismatches of his expectancies of how the interactive regulation of
state transitions will go, he becomes "aware" (at a presymbolic level)
of his own states. The more regular the state periodicities, the more
the infant can be aware of his states.

Sander (1983, 1985) argued that, as a function of the particular
quality and success of the mutual regulation of states, the infant–care-
taker system constructs a unique facilitation of, and constraint on,
the infant's access to and awareness of his own states, his initiative
to organize his own states, his regard for his states, and his ability
to use his states in organizing his own behavior. These unique facili-
tations and constraints eventually contribute to the development
of differences in (1) the person's ability to be aware, (2) what he is
aware of, (3) how he uses it, and (4) how he feels about it. The
potential pathology of the system is seen in an increasing inability
on the part of the infant to be aware of his state, to be guided by
that awareness, and to use his initiative to change his state—in
essence, an increasing interference in the experience of agency with
regard to his own states. Thus Sander's work provides another mecha-
nism for the reciprocal coordination of inner and relational pro-
cesses: the interactive regulation of the biorhythms of sleep–wake,
activity, and feeding cycles.
Adult Data on the Co-Construction of Inner and Relational Processes

The argument for the co-construction of inner and relational processes can be made with adult data as well. Adult facial behavior is simultaneously communicative and self-regulatory. Behavior, physiological arousal, and subjective state are all organized concurrently and as aspects of the same phenomenon (Tomkins, 1962, 1963; Izard, 1979; Ekman et al., 1983; Adelmann and Zajonc, 1989). All three are simultaneously organized in the interactive process. For example, there is now a substantial body of experimental adult data demonstrating that facial action is simultaneously communicative and self-regulatory, modulating physiological arousal and subjective experience. This research links facial action with internal state. It provides another body of data documenting that internal experience is organized hand-in-hand with interactive experience (see Adelmann and Zajonc, 1989; Laird, 1984; Winton, 1986; Winton, Putnam, and Krauss, 1984).

Tomkins (1962, 1963) considered the face to be central in expressing emotion both to others and to the self by way of feedback from the tongue and facial muscles, the sound of one’s own voice, and changes in blood flow and temperature of the face (see Adelmann and Zajonc, 1989). Changes in facial action are associated with subjective changes, either intensifying or inhibiting the experience of the emotion (Adelmann and Zajonc, 1989; Izard, 1979; Ekman, Friesen, and Ancoli, 1980; Tomkins, 1962).

Ekman and his colleagues (1980) videotaped adult subjects while they watched films. The subjects’ facial actions were coded. During a happy film, those subjects who showed greater positive facial action rated themselves as happier, during a negative film, subjects who showed more negative facial action reported more distress. Facial action can also influence subjective experience of emotion, even without awareness. In studies where spontaneous facial action was intensified without the subject’s awareness, for example, by using reinforcement, canned laughter, or the presence of an observer, self-reported emotion increased correspondingly (Adelmann and Zajonc, 1989).

A dramatic example of spontaneous facial action intensified with-
of inner and relational as well. Adult facial behavior is self-regulatory. Behavior, state are all organized cogenomenon (Tomkins, 1962, delman and Zajonc, 1989). In the interactive process, a body of experimental adult is simultaneously commingling physiological arousal and inks facial action with inter-data documenting that interaction experience 1984; Winton, 1986; Winton, 1988. the face to be central in the self by way of feed-cules, the sound of one’s ownal temperature of the face (sequences in facial action are associ-intensifying or inhibiting the and Zajonc, 1989; Izard, 1979; Smikins, 1962).

Video-taped adult subjects while al actions were coded. During a negative film, subjects who reported more distress. Facial perience of emotion, even with-taneous facial action was intensified, for example, by using reinforcement, an observer, self-reported emo-lmann and Zajonc, 1989).

As facial action intensified without the subject’s awareness comes from a study by Heller and Haynal (1997). Fifty-nine patients who had attempted suicide in the previous three days were given an initial interview by the same psychiatrist. Two split-screen videotape cameras recorded the faces of both doctor and patient. One year later, 10 of these 59 patients, the “reattempter” group, had made another suicide attempt. Two forms of analysis (blind to one-year outcomes) were used to try to predict which patients would reattempt suicide. The first was the psychiatrist’s own predictions written immediately after the interview, and the second was an analysis of the nonverbal communication of doctor and patient. The written predictions correctly identified the reattempt risk in 29% of the patients. For the analysis of nonverbal communication, another 11 of the original 59 patients who did not make another suicide attempt were chosen as the “nonrecidivist” group for purposes of comparison. These two subgroups were compared using Ekman and Friesen’s Facial Action Coding System to code any facial action every .2 second. The nonverbal analysis correctly classified 81% of the patients analyzed. Thus the nonverbal analysis was more powerful than the written predictions. Furthermore, the psychiatrist’s facial behavior was more powerful in discriminating the two groups of patients than was the patient’s facial behavior. With his patients who would later try another suicide attempt, the psychiatrist frowned more, showed more head-and-eye orientation, and showed more overall facial activation and increased speech.

The greater activation and negative expressiveness of the psychiatrist can be seen as both regulating his own inner state and communicating with his patient, both probably outside his awareness. Using Davidson and Fox’s (1982) work, we can imagine that the psychiatrist’s perception of suicidal despair in a future reattempter patient created a resonant emotional state in the psychiatrist, which contributed to his nonverbal behavior. Using Melzoff’s ideas, it is not far fetched to imagine that the psychiatrist brought his internal state and behavior into a correspondence with his future reattempter patients, providing a fundamental relatedness between himself and his patient. Using Ekman’s work, we can imagine that the psychiatrist specifically matched some of the future reattempter patients’
frowning expressions, therefore producing in himself a physiological state similar to that of the patient. However, since the nonverbal behavior of the patients themselves did not discriminate the two groups of patients, the differential emotional pattern evoked in the psychiatrist by the future reattempter patients was not based primarily on a simple matching of expressions, but rather on something more evoked in the psychiatrist.

**Dyadic Expansion of Consciousness**

The mutual regulation model and a “dyadic expansion of consciousness” view of therapeutic action has been proposed by Tronick (1989, 1996, 1998; Gianino and Tronick, 1988), who has made a major contribution in conceptualizing the integration of self- and interactive regulation processes. For example, he considers that the maintenance of adequate internal regulation (homeostasis), such as the regulation of an infant’s core body temperature, is a dyadic achievement. It is a joint product of exogenous and interactive processes. And each must come to know the state of the other if the regulation is to succeed (Tronick, 1996).

Tronick (1996) has suggested that, in the process of mutual regulation, each partner (mother and infant, or therapist and patient) affects the other’s “state of consciousness” (state of brain organization). As each affects the other’s self-regulation, each partner’s inner organization is expanded into a more coherent, as well as a more complex, state: “each individual is a self-organizing system that creates its own states of consciousness—states of brain organization—which can be expanded into more coherent and complex states in collaboration with another self-organizing system” (p. 9). In this process, each partner’s state of consciousness expands to incorporate elements of consciousness of the other in a new and more coherent form. Since both partners are affected by this process, there is a dyadic expansion of consciousness into a more coherently organized and complex state of dyadic consciousness (p. 13). Tronick suggests that this process describes a view of therapeutic action: both analyst and patient create and transform unique dyadic states of consciousness through mutual and self-regulation.
Summary

The various ways in which inner state and interactive process are linked are offered as organizing principles of the integration of self- and interactive regulation. Although much of the research we reviewed is based on interactions with infants, we contend that these principles are equally relevant to adults. This research documents a number of general principles for a theory of interaction at the nonverbal level:

1. In a systems view, self- and interactive regulation are simultaneous, complementary, and optimally in dynamic balance (see Figure 1). Thus the individual can be fully described only in relation to the dyad.

2. Across the life span, each partner participates in a moment-by-moment reciprocal influence process at the nonverbal level, usually out of awareness (Jaffe and Feldstein, 1970; Langs, Badalamenti, and Thompson, 1996; Capella, 1991; Cohn and Tronick, 1988; Crown, 1991; Warner, 1988a, b; Jaffe et al., 2001).

3. Each dyadic system constructs a unique facilitation of, and constraint on, the individual’s access to, awareness of, regard for, and ability to use, his own states (see Figure 3) (Sander, 1977, 1985).

4. Through cross-modal matching, we can link the behavior we see in the partner to our own inner proprioception, constituting a fundamental relatedness between self and other from the beginning of life (Meltzoff, 1990; Meltzoff and Gopnick, 1993).

5. The mere perception of positive or negative emotion in the partner creates a resonant emotional state in the perceiver, reorganizing the frontal lobe of the brain (Davidson and Fox, 1982; Schore, 1994).

6. Since a person’s facial expression is associated with a particular physiological pattern, matching the expression of the partner creates in the onlooker a similar physiological state (Ekman et al., 1983).

7. In the reciprocal influence process, each affects the other’s “state of consciousness” (state of brain organization)
(Tronick, 1996), especially in states of prolonged matching (Schore, 1994).

(8) Behavior, arousal, and subjective awareness are all simultaneously organized in the interactive process (Ekman et al., 1983; Izard, 1979; Adelmann and Zajonc, 1989).

These principles illustrate an integration of behavior, physiological arousal, proprioception, brain activation, and subjective awareness. Many others could be defined (see Schore, 1994; Perry, 1996). They suggest the multiple levels at which self- and interactive regulation interface. These organizing principles of regulation describe self- and interactive process, not dynamic content. They can apply to the verbal as well as nonverbal levels, and they affect such familiar psychoanalytic dynamic issues as, for example, safety, efficacy, self-esteem, separation and reunion, boundaries, self-definition, intimacy, aloneness in the presence of the partner, and mutual recognition. Observing and owning this process enriches our range and flexibility as analysts. Attention to this self and interactive interface is critical to restoring, expanding, and, in some cases, creating access to inner experience as well as interpersonal engagement.