This chapter reviews the dimensions of a dyadic systems model and its implications for psychoanalysis. Several organizing principles of interaction can be derived from these dimensions:

(1) The distinction between explicit and implicit processing provides a new framework within which to integrate verbal and nonverbal communication in psychoanalysis.
(2) Patterns of expectation provide one definition of implicit procedural knowledge, which is a potent mode of therapeutic action.
(3) Therapeutic action can occur in an implicit form of processing without necessarily translating the communication into an explicit verbal mode.

In this chapter, we first provide a summary of the dimensions of a dyadic systems model. We then summarize our view on interaction in psychoanalysis, reviewing a number of organizing principles of interaction derived from infant research. In the next section, we suggest that the distinction between explicit and implicit processing provides a new framework within which to integrate verbal and nonverbal communication in psychoanalysis. Distinguishing
self-regulatory tilts and interactive tilts, we spell out some implications of our system model for adult treatment. We then use the systems model to reformulate several key concepts in psychoanalysis: self and other, internalization, and mutuality versus autonomy. Finally, we review recent experiments from dynamic systems theory on how the brain perceives and constructs its “maps.” This research further articulates two key themes of our book: the co-construction of experience and a transformational model of representations. The section on “The Mind That Updates Its Maps” further explicates an interactive model of mind for psychoanalysis.

Dimensions of a Dyadic Systems Model

Communication Viewed as a Continuous, Moment-to-Moment Interactive Process

Variations in face, voice, and orientation provide an essential means of sensing the partner. Moment-to-moment shifts can be considered to be the smallest unit, nested within larger units that are more prolonged, such as discrete verbalizations. In the history of psychoanalysis, the concept of process has been most evident in the careful tracking of patients’ associations. Whereas tracking a patient’s associations uses an explicit, verbal mode of processing, the tracking of nonverbal shifts uses an implicit mode.

Interaction Organized Through Bidirectional “Influence” or Coordination

Since this term is so easily misunderstood, we reiterate that neither causality nor mutuality is implied; rather, bidirectional coordination or “influence”) refers to the probability that one person’s behavioral stream can be predicted from that of the other, and vice versa. Positive as well as aversive interactions can be bidirectionally coordinated. The statistical concept of the probability that one person’s behavioral stream can be predicted from that of the other can be translated into the idea that each person can sense whether or not the partner’s behavior is related in time to his or her own, that is, “coordinated.” Sensing that the partner’s behavior is coordinated with one’s own provides the most fundamental layer of implicit relatedness. This sensing generally goes out of awareness; it is most easily noticed when absent. But this sensing can be brought into awareness under certain conditions. This concept of bidirectional coordination defines one use of the term co-construction, that is, that all interactions are co-constructed by both people.

In translating the bidirectional model for psychoanalysis, it is important to articulate both the patient’s experience of being influenced by the analyst as well as influencing the analyst, and the analyst’s experience of being influenced by the patient as well as influencing the patient. Of these four vectors of experience (two for each partner), often one or two are privileged by patient and analyst.

Interactive Exchanges as a Product of the Integration of Self- and Interactive Regulation

Sander (1977) has argued that infants begin life with primary endogenous activity that must be coordinated with the partner. Included in this primary activity is an intrinsic motivation to order information, detect regularity, and generate and act on expectancies (Haith et al., 1988). In Sander’s model, the way self-regulation is organized, in relation to the dyad, sets the stage for the sense of self as agent. A subjectivity of “one’s own” is continually being organized, including access to, articulation of, and regard for one’s inner states. But the inner process is enhanced or limited by the ongoing interaction.

This emphasis on self-regulation answers a current critique of relational and systems models as tilting too far toward environmental influences and neglecting endogenous influences (see Wilson, 1995). We thus return to one of Sander’s most essential postulates: inner process is organized by both self- and interactive regulation. The individual can be fully described only in relation to the dyad. That self- and interactive regulation always affect each other defines our second use of “co-construction,” the co-construction of inner and relational processes.
The co-construction view advanced here potentially alters our usual understanding of the analyst's subjectivity. Concerns about obfuscation or facilitation have dominated our understanding of the contribution of the analyst's subjectivity to the analytic process. The analyst's subjectivity is seen as potentially constraining, biasing, distorting, or facilitating the process. In contrast, using the co-construction model, each partner's subjective experience is an emergent process, continually affected by the interaction as well as by the person's own self-regulation.

*Patterns of Expectations as Generated by Both Partners, Organized Through the Dimensions of Time, Space, Affect, and Arousal*

The sequence of one's own actions in relation to those of the partner, and an associated self-regulatory range and style, come to be expected. Four-month-old infants detect regularity in spatiotemporal events, in both the self and the environment. Further, they develop expectancies based on these events, which implies some future-oriented mental process. This, in fact, is one definition of procedural knowledge of the social environment. In this book, we have used patterns of expectation to define presymbolic representations, which is one way of conceptualizing the initial organization of implicit procedural processing.

*A Systems Model Uses a Constructivist View of Perception and Representation*

Wilson (1995) has argued that a theory of representation is not adequate to map the mind. He suggests that the use of representations alone will lead to a model of the mind as "enslaved," as a mirror of nature. This view uses a copy theory of representation deriving from positivist/mechanist assumptions about the nature of perception (Reese and Overton, 1970). But a systems model uses constructivist assumptions about the nature of perception and representation. A positivist view assumes a one-to-one correspondence between the world and what we perceive in it. In contrast, a constructivist view assumes that there is no pure sensory event independent of the categories we bring, such as perceptual preferences, expectancies, and self-regulatory styles (see Kuhn, 1962; Reese and Overton, 1970; Lewis and Brooks, 1975). We actively construct and reconstruct all information, since what we perceive and represent is the result of an ongoing interaction between the environment and the categories we bring. Representations are thus "in process," open to being updated. The concept of representation shifts toward a continuously reorganizing process. Nevertheless, there are quasi-stable states of the system, patterns of expectancies. Much work remains to explicate the conditions under which systems do or do not transform, particularly when trauma enters the picture.

*Interaction in Psychoanalysis*

The foregoing dimensions of a systems model yield organizing principles of interactions for psychoanalysis, defining dimensions of an interactive model of mind. The most general of these principles entails the integration of self- and interactive regulation. An individual is continually affected by his or her own behavior as well as by that of the partner. Behavior is simultaneously communicative and self-regulatory (see Tronick, 1989). Self- and interactive regulation are simultaneous, complementary, and optimally in dynamic balance.

We have further differentiated three principles of salience: ongoing regulation, disruption and repair, and heightened affective moments, each of which further refines our understanding of the nature of self- and interactive regulation (see the case of Clara, chapter 8). The case of Karen (see chapter 3) was used to illustrate an experience of chronic mismatched interactive regulation which led to premature, drastic self-regulation.

Perceptual mechanisms linking the organization of inner and relational processes can be used to further explicate the nature of self- and interactive regulation. For example, through cross-modal matching we can link the behavior we see in the partner (for example, facial expression) and our own inner proprioception. The mere
perception of a positive or negative expression in the partner creates a resonant emotional state in the perceiver. And, 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. These perceptual mechanisms illustrate our argument that internal processes and relational processes are inextricably coordinated and are organized concurrently (see chapter 2).

The general principle of interactive regulation can be further refined by the midrange model. We have reviewed research documenting a continuum of interactive regulation of vocal rhythm coordination, ranging from high to low, which predicted one-year attachment outcomes in a large study of mother-infant and stranger-infant interactions (Jaffe et al., 2001). Midrange coordination predicted secure attachment whereas scores outside the midrange predicted insecure attachment. High coordination was conceptualized as interactive vigilance, low coordination as an aspect of withdrawal or inhibition. Interactive vigilance and interactive inhibition further articulate forms of interactive regulation that can be used in adult treatment (see the case of Jennifer, chapter 6).

An elaboration of interactive vigilance can be seen in the chase-and-dodge pattern, in which not only are the two partners very highly coordinated, but there is an approach-withdrawal pattern as well. Sorter (1996) treated a young woman for whom a chase-and-dodge pattern had become a central organizing feature of her life. In the first session, that patient sat in a spot furthest away from Sorter. As Sorter rolled her chair slightly forward to a distance that was optimal for herself and usually acceptable for her patients, the patient's eyes became "as big as saucers" (p. 70) and she reared back. Sorter understood that she had violated the patient's space. As Sorter rolled her chair back, the patient visibly uncoiled. The movements seemed to happen in a flash and remained entirely nonverbal. As this pattern then gradually continued to unfold in the analytic dyad, Sorter was able to label it chase and dodge. Using it as a metaphor to understand their mutual engagement and disengagement processes became a powerful mode of therapeutic action.

The midrange balance model provides a more refined description of how self- and interactive regulation affect each other. Building on the midrange model, which described only interactive regulation, the midrange balance model posits a midrange optimum in both self- and interactive regulation. In the midrange, interactive coordination is present but not obligatory, and self-regulation is preserved but not excessive. Optimal social communication and development is hypothesized to occur with flexibility to move between self- and interactive regulation, yielding relatively optimal levels of attention, affect, and arousal. For each partner, operating outside the midrange may index an attempt to cope with a disturbance in the interaction. An excessive monitoring of the partner, at the expense of self-regulation, defines one pole of imbalance, interactive vigilance. Prooccupation with self-regulation, at the expense of interactive sensitivity, defines the other pole of imbalance, withdrawal or inhibition.

Implicit and Explicit Processing

The implicit mode of processing is beginning to be recognized as critical to psychoanalysis (see, e.g., Stern et al., 1998; Tronick et al., 1978). Lyon-Ruth (1998b) has defined implicit relational knowing as

rule-based representations of how to proceed, of how to do things ... with others ... such as knowing how to joke around, express affection, or get attention ... as much affective and interactive ... as cognitive. ... [It] begins to be represented long before the availability of language and continues to operate implicitly throughout life [p. 284].

It operates out of awareness and outside of verbal consciousness.

Whereas explicit memory refers to symbolically organized intentional recall for information and events, implicit memory includes procedural and emotional memory that is outside of awareness. Procedural memory refers to action sequences that are encoded nonsymbolically and influence the organizational processes that guide behavior (Squire and Cohen, 1985; Grigsby and Hartlaub, 1994). These action sequences are initially "intentional," both for the infant
and the adult (Müller and Overton, 1998). Only after they become automatic with repeated practice are they “nonconscious” or out of awareness. They can again become the focus of awareness, particularly if these action sequences do not proceed as expected. Emotional memory includes aspects of the limbic system, such as the amygdala. For example, a facial change of the partner can be processed within four milliseconds and registered in a change in the amygdala, out of awareness. The explicit and implicit memory systems are potentially dissociable.

The patterns of mother–infant interaction described in this book are examples of repetitive action sequences organized procedurally. An implicit “knowing how to proceed” can be illustrated by attention regulation patterns, such as who initiates looking, whether or not the partners mutually gaze at each other, how long it is comfortable to hold a mutual gaze, who looks away first, and how reactive either partner is to the other’s looking away. The research on vocal rhythm provides another example of how to proceed moment by moment, that is, how each partner knows when it is his or her turn to speak, how easily the turn is exchanged, how tightly each partner “tracks” or coordinates with the other’s vocal rhythm, and rules for interruption and joining. It is at the implicit procedural level, on a moment-to-moment basis, that powerful interactive “emotion schemes” (Bucci, 1997) of face, gaze, vocalization, and orientation are organized, shifts in degrees of coordination are played out, and disruption and repair are negotiated. In chapter 4 we argued that these patterns are encoded in infancy in a presymbolic representational format. In chapter 5 we described some of the research predicting attachment and cognition outcomes at one year from these repetitive action sequences at four months, illustrating how implicit processes can influence the ongoing developmental trajectory.

In psychoanalytic treatment the expectancies that regulate intimate relating can be reorganized in the implicit domain without necessarily reaching conscious awareness. Lyons-Ruth (1998b) notes that only a small area of a patient’s implicit relational knowing will ever become the subject of verbal narrative or transference interpretation. By implication, the implicit mode is far more pervasive

and potentially more powerfully organizing than is the explicit mode. The idea that therapeutic action can occur at the implicit level without verbalization is an important change for a theory of therapeutic action. This position is forcefully argued by Grigsby and Hartlaub (1994), Clyman (1991), Emde et al. (1991), Bucci (1997), Schore (1994, 1996), Morgan (1998), Pally (1998), Lyons-Ruth (1998b), and Stern et al. (1998) among others. Clyman (1991) has proposed that implicit procedural processing provides a measure of continuity from childhood to adulthood and organizes transference expectations.

Despite the importance of implicit relational knowing in potential continuities across the life span, we do not hold that early patterns necessarily become long-term, entrenched procedural memories that govern interaction in adult dyadic life (cf. Harris, 1997). Instead, we espouse a transformational view, along the lines of Sander (1977, 1995) and Sameroff (1983), that early patterns set a trajectory that can nevertheless transform. Only in pathology is there a relative loss of this transformational process.

The distinction between implicit and explicit processing provides a new framework for conceptualizing the integration of verbal and nonverbal communication in psychoanalysis (see also Lyons-Ruth, 1999; Pally, 2001; Stern et al., 1998; Tronick et al., 1978). Our approach takes into account both the symbolic representational level (explicit) and the action-perception level (implicit). The working assumption of psychoanalysis is that explicit symbolizable representations of self and other (conscious/unconscious) guide social behavior. In contrast, an implicit procedural view argues that social behavior is coordinated on a split-second basis, out of awareness, with such rapidity and density of information that central cognitive control or representation is not possible (Newton, 1990). At the implicit action-perception level, the information sufficient to structure action is inherent in the person-partner relation (Gibson, 1979, Newton, 1990; Fogel, 1992a, 1993; Thelen and Smith, 1994). In the latter view, actions contain information as an objective property, in contrast to the former view that information has no psychological reality until it is symbolically represented.
We note as a caveat that we are limiting the concept of nonverbal communication in psychoanalysis to the repetitive, rapid-action sequences that are largely out of awareness. Symbolic nonverbal gestures, such as a raised hand held flat and open, which is an explicit communication of "stop," are excluded from our discussion.

Stern (1995) has noted that there is a strong intellectual current against placing action at the center of an understanding of human behavior. He cites Gendlin's view that anything human depends on language. Stern suggests that "many modern strains of psychoanalysis privilege the narration or interpretation that stands behind . . . an act, . . . rather than the act itself" (p. 77) and that "what one experiences is not determined by the actions and interactions that make up the lived event, but rather by the later mental reconstruction of what happened" (p. 78).

These two levels, the implicit action sequence and the explicit symbolized narration, must be integrated for a fuller understanding of therapeutic action in psychoanalysis (see also Stern et al., 1998). These two levels potentially affect each other. The struggle to symbolize the implicit action level can be seen as one of the major goals of psychoanalysis (Bucci, 1985, 1997). The nature of the symbolization can then potentially affect the implicit action level. However, therapeutic action proceeds in both these modes, whether or not they are integrated.

Implications for Adult Treatment

With "difficult-to-reach" patients in particular, the interaction between analyst and patient requires close, continuous attention. These are the treatments where the critical cues that call for analytic attention go far beyond the usual verbal exchanges. These are the treatments for which terms like "parameters" (Eissler, 1953) and "noninterpretive interventions" (Lachmann and Beebe, 1996a, b; see also Stern et al., 1998) were coined. These are the treatments in which countertransference is seen either as an interference or as an analytic panacea, each introducing its own problems. These are the treatments in which attention to the system, the unfissional unit (Kohut, 1984), and the moment-to-moment process carry the therapeutic leverage.

For infant and mother, as well as for patient and analyst, either person's self-regulation may disrupt or facilitate the interaction. For example, in the case of Paulina, who cried for the first three years of her treatment, as the analyst, I (Beatrice Beebe) might speak too quickly using a fast-paced style, in my eagerness to capture my thought. In this process, I came to understand that I could lose my patient, who went slowly, trying to make sure that she knew what she was feeling at every moment. If she followed my train of thought, she would warn me, she would lose her own. Thus, my racy style altered and potentially derailed the interactive process. These descriptions of what the analyst brings to the treatment, in self-regulatory style or interactive expectations, are usually understood in terms of countertransference. From a systems point of view, however, they are part-and-parcel of the interactive process. They are neither positive nor negative, they are unavoidable, and they influence the psychoanalytic encounter at every moment.

Specific nonverbal patterns can be observed in the therapeutic relationship. For example, an analyst may take note of particular patterns, such as Sorter's (1996) chase-and-dodge case, in which, as the analyst rolled her chair slightly toward the patient, the patient recoiled. These experiences are often very difficult to put into words. Neither the patient nor the analyst may be quite aware of them. For the patient, the history of these behaviors is also likely to be out of awareness. If the analyst can notice recurrent patterns or subtle shifts in nonverbal behaviors in either herself or the patient, these patterns may signal subtle difficulties in the engagement. These nonverbal patterns are particularly powerful because they occur in the here-and-now, possessing that special alive quality of something immediate for both.

Once such a pattern is noticed, much investigation is usually necessary to understand its history and meaning. It is important to note that a particular nonverbal pattern has no set meaning; its meaning can emerge only through the analytic process. Furthermore, months may go by before there is an appropriate moment to notice a particular pattern. And sometimes the analyst may choose never to bring it into the verbalized exchange.
Self-Regulatory Tilts

Specific patterns of self- and interactive regulation are highly visible in nonverbal behaviors. For example, we can observe the self-regulatory ranges that both patient and analyst bring. Is one rapid and one slow? What capability does this particular dyad generate to gain access to the patient’s self-regulatory range and expand it? In chapter 3 we described the treatment of Karen where the analyst had to construct his own “exuberant” tilt in order to make contact with Karen, who hid behind her coat. She remained immobile, visually avoidant, and barely audible. A particular patient may have a very different access to self-regulatory capacities with a different therapist. Similarly, with different patients, a therapist may experience different access to inner process and self-regulation. For example, some patients let the therapist pause and muse in the middle of a sentence and are not thrown by this behavior. Other patients cannot stand it and snap their fingers, asking “what’s wrong?” In chapter 6 we described these patients as “hypervigilant,” illustrated by Shumsky’s (1996) treatment of Sandra, and as analogous to the disorganized attachment infants and mothers in the Jaffe et al. (2001) vocal rhythm study. Shumsky’s patient monitored the analyst intently for microcues about her state and used communication primarily to protect the equilibrium of the analyst.

The details of these nonverbal regulations can refine an analyst’s capacity to notice moment-by-moment self-regulatory shifts of both partners. These shifts are rooted in adaptive efforts to compromise between needs for engagement with the partner and needs to maintain organismic integrity, that is, arousal in a comfortable range. The shifts can inform both patient and analyst of the compromises that have been and continue to be necessary. We are not interested in pathologizing self-regulatory patterns nor necessarily drawing them into one theory of interpretation or another. Instead, we use these patterns to further explicate the nature of the interactive system.

Interactive Tilts

Stern (1983) has described maternal styles of joining (state sharing with similar timing, intensity, and contouring), in which affective empathy is the aim, altering (state transforming), in which attempting to transform the infant’s state is the aim; and complementing (reciprocal completion of the behavior of the other), in which experiencing the other directly is the aim. His examples of complementing include vocal turn-taking, rolling a ball back and forth, and the infant’s playing while mother is observing.

By analogy, does a therapist envision the analytic task as, for example, tracking and matching the patient’s affect state (joining); stimulating or dampening the patient’s affect and arousal (altering); engaging in give-and-take exchanges such as humor or maintaining an ongoing dialogue (complementing); or remaining “neutral”? How do patients respond to these different styles?

From the patient’s side, if, for example, the unconscious goal is to make sure that the therapist does not intrude, or to obtain love and approval, or to attempt to find the therapist’s own need for the patient, how do these different “goals” affect the patient’s self-regulatory range and interactive patterns? And how does the therapist respond to these “tilts”? All therapists use a wide range of styles at different moments, and patients have a range of unconscious goals. Nonetheless, for illustrative purposes let us imagine the consequences of the predominance of any one of these styles or goals. Although any of the scenarios we describe may have “negative” consequences, we depict the potential benefit of each.

The midrange balance model described in chapter 5 provides a way of conceptualizing these tilts. Optimal social communication and development are hypothesized to occur in the midrange of self- and interactive regulation, with flexibility to move back and forth. Excessive monitoring by the partner, at the expense of self-regulation, tilts the system toward “interactive vigilance.” Preoccupation with self-regulation at the expense of interactive sensitivity tilts the system toward the other pole of imbalance: withdrawal or “inhibition,” on one hand, and escalating overarousal on the other.

Since this model was developed for infants, our examples illustrating these tilts for adult treatment consider more complex integrations of self- and interactive regulation. In adult treatment, simultaneous difficulties can occur at both poles of imbalance, such that preoccupation with both self- and interactive regulation can occur at the same time. For example, in Shumsky’s (1996) treatment
of Sandra, the patient's hypervigilance for cues to the analyst's discomfort functioned both to regulate the analyst's vulnerability and to maintain the bond (preoccupation with interactive tracking). In addition, Sandra's hypervigilance functioned to regulate her own vulnerability in case the analyst failed and the patient had to take over (preoccupation with self-regulation). The analyst was initially preoccupied with maintaining her own self-regulation in the face of the patient's hypervigilance.

Joining patterns also illustrate the simultaneous organization of self- and interactive regulation. The therapist who envisions the analytic task as joining remains very interactive, carefully tracking and matching the patient's affect and arousal. Stern (1983, 1985) emphasizes that similarity of timing, intensity, and contouring brings two partners into a similar state, facilitating intimacy and attachment. This style affects the patient's self-regulation as well. Through nonverbal joining, the analyst communicates to the patient, "I am with you in this affective state." The therapist's joining behavior provides a nonverbal interactive background, heightening the attachment bond, while the patient remains in a particular state. Since the patient is no longer attempting to regulate this state completely alone, the attachment process may be facilitated. In addition, through joining experiences, the patient can undergo an interactive modulation of this state and, over time, experience more self-regulatory control. Thus, joining experiences tilt the system both toward intimacy and attachment, as Stern emphasized, and toward the interactive modulation of self-regulation and self-reflection. If, however, the analyst requires joining experiences for aspects of his or her own regulation, the patient may not be free to explore a sufficient range of experiences.

The therapist who envisions the analytic task as altering also remains very interactive, but the system is tilted toward the regulation of the patient's state. An obvious example of state transformation in infancy is the physical soothing of a distressed infant, with a dramatic transformation of arousal accruing to experiences of physical intimacy and trust (Stern, 1983). An analogous example in the adult psychoanalytic literature is the case of Bob, who was continually fired from his jobs owing to chronic, unmodulated rage states (Knoblauch, 1997). None of the "words" seem to help Bob. Knoblauch used the research example of Elliot (see chapter 5), in which Beebe joined Elliot's cry rhythm, and then gradually both slowed down. Knoblauch joined the agitated rhythm of Bob's rage state in the tempo and cadence, but not the volume, of his words. In this way, Bob gradually came to feel that his therapist "understood" him. This intervention facilitated Bob's ability to associate more freely about his history with his abusive father, his bosses, and his analyst. He gradually became less agitated.

Reformulating Three Key Concepts in Psychoanalysis

Self and Other

Within our systems perspective of the continual co-construction of experience, we prefer to use the terms self- and interactive regulation rather than the terms self and other. In a systems view, each component is defined in relation to the other. A systems view is critical of the position that self and other are initially separate, isolated individuals and that the task of development is their integration. In contrast, a systems view sees self and other as initially coordinated and interrelated, and the task of development is further elaboration, differentiation, and integration.

Since self-regulation and interactive regulation are continuously affecting each other, these terms also keep the focus on process. But it is not easy to maintain the dynamic tension between these two processes without tilting toward one or the other as the more dominant organizing principle. For example, when describing our position, Harris (1997) tilted toward the dyadic when she said that we were theorizing that "identity is given and elaborated through the interactive reaction of the other" (p. 202). This position does not preserve the equally important role of infant capacities, temperament, and, more generally, self-regulation style. In contrast, when discussing our work, Kulka (1997) tilted toward the self in holding that "the raison d'être of the human being is not interrelations but the creation of an experience of significant selfhood, even if this goal can be realized only within the contextual cradle of relations with an other" (p. 186).
Using the more traditional concepts of self and other, Tabin (1997) discussed our work in terms of a balancing process between individuality and mutuality. In our view, what is in balance is not “self” and “other,” but, rather, the processes of self- and interactive regulation. Each person is always sensing and modulating her own state, while simultaneously sensing how she affects and is affected by her partner. What is in balance is the degree to which one can flexibly go back and forth, in foreground-background fashion, between both processes. If these two processes are in balance, attention, affect, and arousal can be regulated within an optimal range. The research by Jaffe et al. (2001) cited in chapter 5 showed that secure attachment at one year was predicted by midrange degrees of interactive regulation of vocal rhythms, which were interpreted as more flexible than either pole of high or low regulation. The midrange balance model recognizes that both self- and interactive regulation are always present, each affecting the other, and neither process is privileged over the other.

The balance model of self- and interactive regulation shifts the observing stance of the clinician. From this view, the clinician observes two processes in herself (self- and interactive regulation) and infers two in the patient. The analyst is actively involved in comparing her inferences about these two processes in the patient with the patient's own experience of them. Much work may be needed before the patient can articulate her experience of these two processes. Discrepancies between the therapist's inferences and the patient's experience are of particular interest. At the same time, the therapist attempts to maintain an ongoing observation of these two processes within herself.

The research on the regulation of interaction described in this book provides a basis for formulating “interactiveness” as a core psychoanalytic concept. Interactiveness can be defined as “a system whose processes are its essence” (Kulka, 1997, p. 184). Rather than conceiving of self as interacting with other, we conceptualize an ongoing co-construction of processes of self- and interactive regulation. Interactiveness is emergent, in a constant process of potential reorganization.

**Internalization**

Our systems view changes the concept of internalization. In proposing in chapter 7 that representation and internalization are not distinct processes in the first year, we argued that the research articulating the presymbolic origins of representations speaks equally to the origins of internalizations. Considering that infant research on face-to-face interaction had barely begun in 1968, it is remarkable that Schafer, in that year, defined internalization as regulatory interaction, with its striking parallel to the core metaphor of current infant research on social interaction.

However, Schafer did not systematically play out the implications of this idea. Rather than viewing interactive regulations as transformed into self regulations, which is the central concept in the analytic literature, in our view regulatory interactions and self regulations proceed hand in hand and shape each other. Both the person and the environment continuously construct, elaborate, and represent the regulations, which are simultaneously interactive and self-regulatory. The expectation and representation of the dyadic modes of regulation constitute the internal organization.

We concur with Schafer that what is at stake in the internalization process is the increasing relative autonomy from actual interactions with the environment. With the advance of symbol formation, modes of regulation are increasingly abstracted, depersonified, and relatively autonomous. This model puts the bidirectional nature of the regulation center stage. It further articulates the role of the subject in the regulation process, and it emphasizes the dyadic nature of the construction of internalization.

**Mutuality versus Autonomy:**

A Misunderstanding of the Systems Model

Mutuality and autonomy are frequently conceptualized as opposite poles on a continuum. It is a misunderstanding of our model to equate mutuality with interactive regulation and autonomy with self-regulation. Both autonomy and mutuality require processes of
self- and interactive regulation. We reconceptualize autonomy as emerging from "good-enough" interactive regulation. Likewise, we see interactive regulation in the optimal range as emerging from "good-enough" self-regulation of both partners. Rather than seeing autonomy and relatedness as two separate poles, we see both as simultaneously co-constructed. They operate in a foreground–background format.

Even Tabin's (1997) elegant discussion of our work on the origins of self- and object representations nevertheless contained this frequent misunderstanding of our systems model. In discussing the chase-and-dodge interaction (see chapter 5) in terms of the infant's psychological autonomy, Tabin described this infant as "maintain(ing) his own affect" (p. 191) and "flout[ing] the mother's urgent effort" (p. 192). She described the chase-and-dodge sequence as "initiated and maintained by the infant" (p. 194).

On the contrary, what was so fascinating about the chase-and-dodge baby was his complex compromise between engagement and disengagement. The infant moved in a withdrawal direction but continued split-second responsiveness to his mother (as mother did to him). Before the mother had completed her loom movement into the infant's face, the infant had already begun to move away. And before the infant completed the head movement away, mother had already begun to move her head to the side, following the direction of the infant's head movement.

Thus, this infant was not on his own affective track or, in Tabin's language, maintaining his own affect. His attention, affect, and arousal were continuously linked to what the mother was doing and vice versa. To be so embedded in the split-second responsiveness of the dyad, while at the same time moving in the withdrawal direction, simply does not fit our traditional concepts of autonomy and separateness. Thus, the infant's withdrawal was an emergent dyadic property, reciprocally constructed by both partners. The infant's withdrawal had both interactive and self-regulatory functions.

Nevertheless, we retain the concept that an active infant has agency and potentially a different, conflicting agenda from that of the mother (see Slavin, 2000). However, in the chase-and-dodge infant, this agency did not result in efficacy. His own efforts at regulation (increasingly severe head and body orientations away from facing the mother and ultimately going limp) did not result in an optimal range of attention, affect, and arousal.

There is a second difficulty in equating mutuality with interactive regulation. Whereas mutuality carries a positive value, interactive regulation is neutral with respect to the success of the interaction. Positive and aversive patterns alike are interactively regulated, with both partners making reciprocal adjustments. For example, the chase-and-dodge pattern, although clearly aversive, is co-constructed by both partners, each affecting the other on a split-second basis.

The Mind That Updates Its Maps

In our first chapter, we showed how a systems view altered our thinking about the treatment of Burton. In chapter 2 we introduced our dyadic systems view, which integrates the contribution of the individual and that of the dyad to the organization of behavior and experience. In the course of this book, we have used this point of view to go back and forth between organizing principles of interactions in infant research, and in psychoanalysis.

In this final chapter, we have summarized the dimensions of a systems model that yields organizing principles of interaction for psychoanalysis. We have framed these organizing principles within the distinction between implicit and explicit processing, which allows for the integration of verbal and nonverbal communication in psychoanalysis. We have argued that the implicit and explicit levels must be integrated for a fuller understanding of therapeutic action and illustrated these ideas with examples from adult treatment describing self-regulatory tilts and interactive tilts. Now we look ahead to the connection of our work to burgeoning developments in broader systems views. The same general systems model informing our work has been generating research in other areas, particularly neuroscience, which further explicates an interactive model of mind.
Dynamic systems theory, drawing on the work of Edelman (1987, 1992, Tononi, Sporns, and Edelman, 1994), Freeman (1987, 1991), Thelen and Smith (1994), and others, has a critical contribution to make to an interactive model of mind for psychoanalysis through its emphasis on the question of how the brain perceives. Equal emphasis is placed on both sides of an interactive model: the brain influences behavior, but experience alters the brain. Tremendous neural diversity, with variability in size, shape, type and connections of cells, insures that every brain is different. Therefore, the connections between cells, the “wiring,” is dependent on experience (Thelen and Smith, 1994; Schore, 1994). These connections among cells are continuously rewritten, remapped, as a function of ongoing experience. One implication of this model is that there is no fixed schema or representation of a stimulus. The representation of a stimulus is always being updated, “reassembled” as a function of organismic arousal, context, and experience. The mind updates its maps. Thus, brain and experience are co-constructed.

The Updating Process

An example of this updating process can be found in research on how the brain of a rabbit creates a “map” of the smell of sawdust (Freeman, 1987, 1991; Thelen and Smith, 1994). EEG patterns were recorded from 60 sites all over the olfactory bulb. The sawdust odor showed a particular pattern of amplitudes of EEGs in the brain of the rabbit, across the 60 sites. To study the updating process, the rabbit was then exposed to the smell of a banana. Then the same sawdust was returned and EEG patterns were again recorded. It was found that the sawdust map had been modified as a function of the interposed banana smell. Thus, extending the rabbit model to humans, what we perceive is continually updated in the light of the immediate context and the sum of our experiences up to that point.

This kind of research suggests that the mind is inherently relational. The research provides an interactive model of how the brain creates perceptions, representations, or maps, and how these maps are continually updated by experience. This work has tremendous implications for the nature of representation in psychoanalysis. Although many theorists have emphasized the “process” rather than the “static” nature of representation, in this work, representations take on a more purely process character: they are continually updated as a function of experience. Thus, representation must be reconceptualized as a continually shifting process of emergent organization. However, quasi-stable states are posited by dynamic systems theorists. These states can be translated into the familiar concept of expectancies based on repetitive sequences. This work provides a model for the transformation of representations and thus a model of therapeutic action for psychoanalysis. Nevertheless, much work is needed to explicate the conditions that interfere with the updating process, one of the central concerns of psychoanalysis. Trauma substantially alters the flexibility of the brain to update perception and representation. Healthy development may be characterized by an optimal degree of stability, which balances both predictability and transformation.

The Role of Context

The role of context is critical to understanding how representations form and transform, how the brain creates and updates its maps, how co-constructions reassemble. The way two people co-construct their dyadic process is very sensitive to context. The data on vocal rhythm coordination (Jaffe et al., 2001) show fascinating context sensitivities as a function of the particular partner, mother–infant or stranger–infant, and whether the dyad was filmed at home or in the lab. For example, vocal rhythms were more activated with novelty: from home to lab, and from mother–infant to stranger–infant interactions. The most novel context of stranger–infant in the lab showed more bidirectional vocal rhythm coordination than did the most familiar context of mother–infant at home.

Thelen and Smith (1994) have argued that it is context sensitivity which allows behavior its enormous flexibility and which allows for the possibility of change. They propose that a representation is not something we “have” but something we assemble and
resemble in the moment according to context and task. We hold that psychoanalysis must translate the notion of context into its own terms, identifying its own critical contexts, for example, separations and reunions, disruptions and their repair, moments of shifting affect, spatial orientation, or timing.

A Perturbation Theory of Change

A perturbation theory of change is proposed by nonlinear dynamic systems theorists. A key question for psychoanalysis is, how do systems change, create patterns, and transform patterns? The beginning assumption is that all action and knowledge is process. Patterns of activity in time arise in a certain context. They are inherently dynamic and changeable (Thelen, 1994, 1998; Thelen and Smith, 1994). Development is conceptualized as patterns of changing stability and instability. Some patterns are fairly stable in certain contexts; others are unstable, easily disrupted as a function of history and current context. In an optimally open system, there is a continual flow of information in and out, with the creation of temporarily stable patterns (expectancies). Because an open system is flexible and variable, it is open to exploration and responsive to perturbations, with new solutions.

Variability Is a Source of New Forms

For a pattern to change, some part of the system must disrupt the current stable pattern. New patterns then form as emergent properties of the system. These patterns are nonlinear; they cannot necessarily be predicted from what transpired before. When components are not too tightly coordinated, the system can explore and change. However, when coordination is too tight, it is harder for the system to shift and explore new solutions. In this case, if the system is perturbed, variability can emerge, and overly stable patterns can be pulled apart. In the example of vocal rhythm coordination (Jaffe et al., 2001), the tightest coordination was seen in the most insecure attachments (anxious-resistant and disorganized). Presumably the very tightly coupled dyads lost variability and flexibility. Shumsky's (1996) hypervigilant patient (see chapter 6) illustrated such a tightly organized pattern at the cost of any flexibility; every ripple portended disaster.

Redefinition of Psychopathology

The quality of interpersonal communication is related to the degree of coordination between the partners. Various theorists have suggested that high coordination is either optimal (Chapple, 1970) or not optimal (Gottman, 1979) for communication. Currently, nonlinear models of degree of coordination provide a more general view of its varying meaning (Cohn and Elmore, 1988, Lewis and Feiring, 1989, Thelen, 1998; Warner, 1988a; Watson, 1994). This nonlinear view argues that the person and the environment (partner or inanimate environment) are always coordinated in time, and that the tightness of coordination is flexible, changing according to context (Thelen, 1998). In situations of danger, such as speeding down the Los Angeles Freeway, we better be tightly coupled to the road. Similarly, situations of intense attention and concentration require high coordination. In relaxed contexts, such as meditation or with a very familiar partner, we may be loosely coordinated.

Thelen (1998) suggests that flexibility in the ability to change the strength of coordination provides one definition of adaptation. What is adaptive one second may not be adaptive the next. In an open system, degree of coordination is flexible, whereas loss of such flexibility is one hallmark of pathology.

We illustrated this concept with the work on mother–infant vocal rhythm and the prediction of attachment (Jaffe et al., 2001). Midrange coupling was optimal for secure attachment. At either end of the range, too tightly coupled or too loosely coupled, insecure attachments were predicted. We interpreted the tight range of coupling as vigilant, too predictable, too contingently responsive, presumably as a way of coping with stress or threat. We interpreted the low end of coupling as an inhibition, where the two partners were acting relatively independently of each other and the dyadic
system had lost its coherence. Thus, preverbal vocal rhythms and their degree of coordination carry emotional "qualities" of interactions relevant to developing attachment. An extensive adult literature also shows that rhythmic coordination conveys emotional information regarding perceived warmth, similarity, and empathy of the speakers (see, e.g., Jaffe and Feldstein, 1970; Feldstein and Welkowitz, 1978; Warner, 1988a, b).

In conclusion, our purpose in this book has been to explicate the value of infant research and a systems view for psychoanalysis. The value of the research, however, goes beyond its application to adult treatment and an interactive model of mind. It provides a systematic view of the origins of the processes of relatedness itself.

REFERENCES


