

MECHANISMS OF SOCIAL CONNECTION

From Brain to Group



Edited by Mario Mikulincer and Phillip R. Shaver

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BEYOND WORDS: PARENTAL EMBODIED MENTALIZING AND THE PARENT–INFANT DANCE

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How does the sense of a subjective self develop in humans? Cutting through philosophy and passing through psychoanalytic psychology to reach contemporary developmental psychology and neuroscience, one finds everywhere the premise that the self can emerge fully only in the presence of and in relation to another self. That is, an infant's subjectivity and mind can emerge, at least in their normal forms, only through the infant's interactions with a responsive, reciprocal, and mentalizing caregiver. In this chapter, we explore the possibility that a human infant's full development as a subjective being depends, more specifically, on the quality of embodied experiences with a caregiver. We introduce the concept of parental embodied mentalizing and show how it can be operationalized to detect individual differences. We present preliminary findings showing that these individual differences among parents predict a variety of children's developmental achievements, including attachment security.

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THE IMPORTANCE OF PARENTAL MENTALIZING TO CHILD DEVELOPMENT

What parental relational capacities affect an infant's development? Attachment theorists have traditionally focused on maternal sensitivity as a key factor in the formation and establishment of attachment security and related developmental outcomes (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; see Cassidy & Shaver, 2008, for a review of the attachment literature). More recently, scholars have discovered that a crucial parental capacity that influences child development is *mentalizing*—the capacity to consider and treat a child as a psychological agent motivated by mental states (Fonagy, Gergely, Jurist, & Target, 2002; Slade, 2005). For example, higher parental capacity for mentalizing has been shown to be associated with greater likelihood of infant secure attachment (e.g., Arnott & Meins, 2007; see also Chapter 11, this volume), even in the presence of trauma and deprivation (Fonagy et al., 1995). Moreover, parental mentalizing has been shown to predict attachment security above and beyond maternal sensitivity, suggesting that parental mentalizing underlies the capacity of a parent to respond sensitively to his or her infant (Kelly, Slade, & Grienenberger, 2005; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002; Laranjo, Bernier, & Meins, 2008). Higher parental mentalizing also predicts a child's more optimal socioemotional development, including more adaptive social behavior and lower psychopathology symptomatology (Fonagy et al., 1995, 2002; Katz & Windecker-Nelson, 2004; Meins et al., 2003; Sharp, Fonagy, & Goodyer, 2006).

There are currently three approaches to assessing parental mentalizing: the Parental Reflective Functioning measure (Slade, 2002), the Maternal Mind-Mindedness measure (Meins, 1999), and the Insightfulness Assessment (Oppenheim, Koren-Karie, & Sagi, 2001; see also Chapter 11, this volume). The term *parental reflective functioning* refers to parents' capacity to make sense of their own and their child's mental states, and this capacity is assessed by analyzing the 45-item semistructured clinical Parental Development Interview (Slade, Aber, Bresgi, Berger, & Kaplan, 2004). The interview was designed to assess a parent's representations of his or her relationship with a child, and it specifically emphasizes representations of internal experiences of both the parent and the child at times of heightened affective arousal. *Mind-mindedness* refers to the parent's proclivity to treat the child as an individual with a mind, rather than merely as an entity with physical needs that must be met. Parents are video-recorded while interacting with their infants for 20 minutes during a free-play session, and the recordings are coded for parents' appropriate mind-minded comments about their infants (Meins et al., 2003). *Insightfulness* refers to parents' "capacity to consider the motives underlying their children's behaviors and emotional experiences in a complete, positive,

and child-focused manner while taking into consideration their children's perspectives" (Koren-Karie et al., 2002, p. 534). Insightfulness assessment involves parents being interviewed about their perceptions of their own thoughts and feelings and those of their child during a video-recorded parent-child interaction (see Chapter 11, this volume).

Despite their differences, these three approaches conceptualize and measure parental representations of children's intentionality (i.e., parental mentalizing) in terms of verbal expressions, and they portray parental mentalizing as a reflective, semantic, and declarative capacity. However, because these measures either necessitate reflection and measure abstract mental representations (in the Parental Reflective Functioning or the Insightfulness Assessment) or examine a parent's mentalizing capacity via language (in the Maternal Mind-Mindedness), they remain limited in their ability to illuminate how this verbal content can shape a preverbal infant's mind. That is, these measures fail to explain how parental mentalizing actually comes to influence an infant's mind and psychosocial development.

Recognizing this limitation, the first author created a measure of parental embodied mentalizing (Shai, 2011). In its creation, a theoretical and operational approach was adopted to assessing the meeting of parental and infant minds through an explicit focus on the whole-body movements that unfold during dyadic interactions rather than on verbal content. Our discussion of parental embodied mentalizing in this chapter is divided into two parts. The first part outlines support for the premise that parental mentalizing is partly an embodied phenomenon. The second part of the chapter discusses preliminary findings linking parental embodied mentalizing capacities to individual differences in children's developmental trajectories, including the emergence of attachment security.

PARENTAL MENTALIZING IS AN EMBODIED PHENOMENON

There are abundant data showing that preverbal infants have rather sophisticated capacities for social communication and have at their disposal a rich and subtle nonverbal language that they use to express internal states (e.g., pleasure, excitement, curiosity, frustration) and to engage their parents' interest and support. Infants use their faces, voices, hands, and entire bodies to display their varying internal states, their seeking of interpersonal contact, and their monitoring of changes in their environment (Trevarthen, 2004; Tronick, 2007). Parents have been shown to be highly sensitive to these nonverbal communicative signals (e.g., Beebe et al., 2010; Tronick, 1989) and to use nonverbal communication to engage with and relate to their infants. These nonverbal modalities include head movements, paralinguistic speech,

touch, posture, and facial expressions, all of which can convey the degree to which they are emotionally available to their infant's varying internal states (Stern, 1985; Trevarthen, 2004).

Indeed, young infants are highly sensitive to parents' emotional and intentional signals expressed in the form and intensity of communicative gestures in different modalities (e.g., Emde, 1988; Malloch, 1999). And infants are capable of modifying their affective and attentional bodily displays in a reciprocally coordinated manner (e.g., Beebe, 2000; Tronick, Als, & Brazelton, 1977). They appear to have remarkable capacities for detecting regularities in events, temporal relations between environmental events, and contingencies between their own behavior and environmental consequences and for anticipating when certain events will occur (e.g., Beebe et al., 2010; Watson, Futo, Fonagy, & Gergely, 2011).

Pipp (1990), among others, stated early on that the bodily self and the bodily other are the sources of action that come together in coordinated sequences of infant–parent interaction. A considerable body of evidence indicates that nonverbal parent–infant interactions are characterized by bidirectional mutual influence, with parent and infant responding to each other's nonverbal behavior (Beebe, 2000; Tronick, 2007). And the quality of this multimodal dialogue—nonverbal, reciprocal, rhythmic, and temporal exchanges between parent and infant—is associated with crucial developmental achievements, including forming attachment relationships, developing a sense of agency, and improving in self-regulation (e.g., Beebe et al., 2000).

During nonverbal dialogues, in which both parent and infant reveal what is in their mind and respond to the other's mind mainly without awareness, parents' ability to make sense of the infant's nonverbally expressed internal world (i.e., the parents' capacity to mentalize) is of critical importance. The nature of each partner's contingent coordination with the other affects the infant's ability to attend, process information, and modulate behavior and emotions. These processes are essential to the creation of infants' and parents' social expectancies and collaborative interactions and to infants' cognitive development (Stern, 1985).

Considering the sophistication and implications of this nonverbal reciprocal encounter between parents and infants, and keeping in mind the importance of parental mentalizing for the child's socioemotional development, it is surprising that parental mentalizing is currently conceptualized and measured solely through linguistic means. In line with Stolorow and Atwood's (1992) assertion that "the caregiver's affect attunement is communicated primarily through sensorimotor contact with the infant's body" (p. 46), Shai and Belsky (2011a, 2011b) have suggested investigating the observable aspects of parent–infant interactions to further elucidate the mechanisms through

which parental mentalizing is transmitted to the infant and thus can affect the infant's development. They proposed considering parental mentalizing as an embodied phenomenon and investigating the embodied "dance" the parent and infant implicitly choreograph together via their dynamic, interactive kinesthetics.

This dance is probably based on an innate capacity of the human infant to experience some of a caregiver's experiences, communicated largely unconsciously and nonverbally. Initially, experience is primarily somatic (bodily). It begins with somatic experiences in the womb, where the infant's movements and emotions are closely coordinated with the mother's movements and emotions. In other words, infants begin their psychological development with a form of embodied intersubjectivity even before they have emerged into what is usually thought of as the social world. This connection of bodily experience with what might be called "lived experience" (i.e., the experience of movements and sounds external to us) provides an embodied foundation for interpersonal relatedness. What an infant sees or hears is given meaning through its relationship to bodily experience within interpersonal interactions with a caregiver.

PARENTAL EMBODIED MENTALIZING

In our view, the richness of early nonverbal parent--infant interactions calls for revisiting parental mentalizing and expanding its domain beyond linguistic communication guided by explicit reflection. The broader domain includes implicit, body-based interactive processes between parent and infant. Indeed, recent studies make the restriction of mentalizing to the declarative (explicit) domain inconsistent with neurological evidence. Recent studies reveal a differentiation between implicit (automatic, unconscious, and nonverbal) mentalizing, on the one hand, and controlled (explicit, verbal, and reflective) mentalizing, on the other (e.g., Keysers & Gazzola, 2006, 2007; see also Chapter 4, this volume). According to these studies, implicit mentalizing relies chiefly on the external, observable features of nonverbal bodily actions that do not necessitate reflection. Gallese (2006) argued as follows:

Social cognition is not only "social metacognition," that is, explicitly thinking about the contents of someone else's mind by means of abstract representations. There is also an *experiential* dimension of interpersonal relationships, which enables a direct grasping of the sense of the actions performed by others, and of the emotions, and sensations they experience. This dimension of social cognition is *embodied* in that it mediates between the multimodal experiential knowledge we hold of our lived body and the experience we make of others. (p. 16, emphasis added)

In fact, consideration of the original definition of mentalizing reveals no requirement that it be restricted to such metacognitive manifestations (e.g., Fonagy et al., 2002; Meins, 1999; Slade, 2002). *Reflective functioning*, for instance, is defined as the “overt manifestation, in narrative, of an individual’s mentalizing capacity” (Slade, 2005, p. 269). This definition implies that mentalizing capacity could manifest itself in myriad ways, including implicit and nonreflective ones. Indeed, Fonagy and Target (1997) stated that “the caregiver’s recognition of the child’s intentional stance . . . is communicated nonverbally, beginning at birth” (p. 682).

Shai and Belsky (2011a, 2011b) have suggested that parental mentalizing capacities are reflected in and can be assessed by considering a parent’s use of the communicative means that infants employ—the nonverbal, kinesthetic mode. Thus, *parental embodied mentalizing* refers to parents’ capacity (a) to implicitly, not necessarily consciously, conceive, comprehend, and extrapolate their infant’s mental states (e.g., wishes, interests, desires, or preferences) from the infant’s whole-body kinesthetic expressions (e.g., changes in body movement and posture) and (b) to adjust their own kinesthetic patterns accordingly. Parental kinesthetic behavior is not considered in isolation but, reflecting a relational perspective, always in reference to that of the infant.

Tronick’s (2003) detailed and specific model of the way meaning and coherence emerge out of interactive processes focused on mutual regulation provides a comprehensive and rigorous way to approach the process whereby parental mentalizing influences an infant and shapes his or her mind. Tronick’s (1989, 2007) mutual regulation model of infant–adult interaction focuses on the subtle, nonverbal, microregulatory, and social-emotional processes that unfold in infant–mother interactions. Tronick conceptualized the infant as taking part in an open thermodynamic system that must constantly take in energy and work toward coherence in order to stave off dissipation. According to this model, infants have “self-organizing neurobehavioral capacities” and “biopsychological processes” that allow them to organize behavioral states and make sense of themselves and their place in the world (Tronick, 2007).

At the same time, Tronick (2007) pointed out that infants’ self-organizing capacities must be supplemented by a “larger dyadic regulatory system” (p. 17) in which the infant participates with the caregiver. In this way, Tronick suggested, regulation is accomplished through the operation of a communication system in which the infant communicates his or her regulatory status to the caregiver, who responds appropriately to the meaning of the communication. This communication is expressed through the totality of the infant’s and caregiver’s biopsychological processes—including the “shape” (intonation contours) of words, other sounds that each uses, momentary changes in facial expression, the quality of their touch, body movements, and even changes in their bodily odors.

Mentalizing could be assumed to emerge out of successful mutual regulation between the partners, which in turn is probably achieved when an infant and caregiver together generate, communicate, and integrate meaningful elements of their respective experiences. This creates an experience of implicit relational knowing, meaning that each can anticipate and “know” the moves of the other. This “knowing” is initially of a pattern of physiological responses rather than of intentional states, although quite clearly it can be the platform on which understanding intentions builds in a subsequent developmental stage. The parent–infant collaboration results in an organized dyadic state that is believed to be more than the sum of its parts. A 6-month-old infant is likely to be capable of apprehending another’s state of consciousness, allowing a mutual mapping of each other’s states of mind, as Tronick (2007) suggested. Each individual’s sense of self is augmented by the bodily derived meanings, representations of the other, and representations of the relationship as a whole. This leads to what Tronick (2003) called a state of *co-creativity*, a state in which infant and caregiver shape their relationship through a process of mutual physical regulation. Focusing on the parental contribution to the creation of these moments of meeting of minds, we suggest that parental embodied mentalizing facilitates the formation and maintenance of such significant relational moments. Because an infant’s mind is very much based on bodily processes, actions, and kinesthetic feedback, a parent’s embodied mentalizing is the chief means of achieving a meeting of minds with the infant. The process of assessing parental embodied mentalizing involves focusing precisely on such moments and examining the degree to which a parent’s ability to appreciate his or her infant’s kinesthetically manifested mental state is translated into the parent’s modifying her or his own kinesthetics in an attempt to fulfill the infant’s intentions, even beyond the infant’s own abilities.

Tronick also suggested that miscommunication and “messiness” lie at the heart of the development of self and self-regulation. Miscommunication creates negative affect, but when interactive errors are repaired, the negative affect is replaced by positive affect in both infant and parent. These intense experiences generate “coherence” of mother and infant, deepening their dyadic state of consciousness. We believe, in line with Tronick’s ideas, that a parent’s capacity for embodied mentalizing does not require the parent’s initial behavior to magically suit the infant’s mental state. Indeed, high parental embodied mentalizing capacities involve parents’ ability to repair interactive errors. Recall that mentalizing does not imply being able to magically read the minds of others but rather to appreciate the opaque nature of minds, with the understanding that the mental states of another cannot be known with certainty (Fonagy et al., 2002). From this standpoint, misunderstandings and miscoordinations should be frequent. And indeed, during the

first year, fewer than 30% of parent–infant face-to-face interactions are coordinated (Tronick, 1989). Intriguingly, interactive repairs in the first months of life, far more than interactive miscoordination, play a key role in establishing secure attachment. Therefore, a parent’s ability to repair dyadic miscoordination is central to the concept of parental embodied mentalizing and to its assessment.

Relational disruptions and repair of ongoing regulations, where expectations are violated and ensuing efforts to resolve these breaches are made, are hypothesized to underpin the promotion of self-organization (Blatt & Luyten, 2009). Early on, Winnicott (1949), for instance, emphasized the importance of a mother’s ordinary, everyday failures for the development of the infant’s mind. It is her deficiencies that allow for the infant’s mental activity. In fact, one of the mother’s functions is to provide graduated failures of adaptation. In this way, “the mental activity of the infant turns a good-enough environment into a perfect environment, that is to say, turns a relative failure of adaptation into adaptive success” (Winnicott, 1949, p. 245). The parental mismatching of the infant’s abilities, needs, or desires is inherent in the infant’s environment and provides the infant with an expanded environment within which he or she can develop.

According to Trevarthen (2008), “human feelings about intentions, and about contents and relationships that arise between us, are signalled as changing tensions and contours of muscular energy in vocalisations and gestures” (p. 12). Furthermore, the nonverbal information exchanged through various qualities of movement is informative about the mover’s feelings and intentions (Trevarthen, 2008). Central to the measurement of parental embodied mentalizing, then, is the explicit consideration of and the exclusive focus on how interactive bodily actions are performed and coordinated rather than on which actions are performed. What makes this argument most compelling is the synesthesia that appears to run through all aspects of the perceptual experience of the infant. In careful psychophysical studies of newborns, Lewkowicz and Turkewitz (1980) demonstrated that neonates readily transfer learning from the auditory to the visual modality. So, habituation to either a bright or a dimmed light reduces neonates’ responsivity to correspondingly intense or soft sounds. Mondloch and Maurer (2004) showed that most young toddlers systematically perceive that a higher pitched sound goes with a brighter color or that the letter *A* goes with the color red, a conjunction also manifested by the 5% of adults who are synesthetic. As we describe below, researchers who study parent–infant communication implicitly note this phenomenological correspondence across modalities for infants. It appears that embodied intentionality may be rooted in the ability we possess at birth to orient toward the shared qualities of phenomena across differences in modality and setting. We argue that this capacity of human infants enables them to discern the

attitude or intention behind a specific action. Thus, the ability to sense sameness in things that are ontologically different (Rochat, 2010) contributes directly to the development of future social competencies.

Focusing on an act's style or manner calls attention to the shading of behavior rather than to its color. This is evident in Stern's (1985) key notion of *vitality affects*—qualities of processes in several different modalities that reflect forms of affect, rather than content. These qualities can be described in dynamic, kinetic terms, such as *exploding* or *fleeting*. According to Stern (2002), vitality affects are present in all subjective experiences, including those related to any goal-directed mental activity such as thinking, feeling, interacting, or dialoguing. Vitality affects are constantly present in experiences, whether or not one is conscious of them, and infants are especially sensitive to them. According to Stern (1985), "the social world experienced by the infant is primarily one of vitality affects before it is a world of formal acts" (p. 57). Stern (1985) proposed that vitality affects—the temporal progression, the dynamics, and movement of any mental process (be they memories, thoughts, or feelings)—imbue experiences with meaning.

The kinesthetic communication of both infants and adults follows the principle of equipotentiality; that is, the same type of touch or movement is capable of expressing very different meanings or intentions, especially in combination with other kinesthetic qualities (Cicchetti & Rogosch, 1996). Conversely, different patterns of movement and touch by either the parent or the infant can convey the same emotional communicative outcome, thus following the principle of equifinality (Hertenstein, 2002).

Weinberg and Tronick (1994) stipulated that this expressive flexibility serves important functions. An infant capable of expressing the same message in multiple ways may maximize the chance that the caregiver will eventually interpret the message correctly and respond to it in an appropriate manner. As Weinberg and Tronick (1994) noted, "the infant makes an initial communicative attempt using a particular affective configuration or sequence of configurations and then, based on the caregiver's response, makes another and somewhat different type of communicative effort" (p. 1513). Hence, it is the assembly of kinesthetic qualities in the moment-to-moment interaction that reveals their mentalistic meaningfulness (Stern, 1985; Tronick, 2005).

Clearly, then, any simplistic taxonomy of the mental meanings of particular body movements would be misleading. Nonetheless, various movement analysis paradigms offer valuable means of characterizing human movement, although of individuals rather than dyads (e.g., Kestenberg, 1965; Laban & Lawrence, 1947). Drawing on but not being restricted to these paradigms, we can identify several kinesthetic patterns as of prime importance when considering parent–infant interactions (Shai, 2010, 2011; Shai & Belsky, 2011b), and these kinesthetic patterns often reflect a mental state that can be reliably

interpreted by an observer. Indeed, evaluating parent–infant interaction through such a kinesthetic prism affords the careful account of the interactive mentalistic exchanges taking place between parent and infant on the embodied level.

THE PARENTAL EMBODIED MENTALIZING CODING SYSTEM

The parental embodied mentalizing coding system is an observational coding system in which video-recorded parent–infant interactions are used as a basis for assessing a parent’s embodied mentalizing capacities. When this system is used, the focus is on the dyad, with the aim of capturing the quality of parental mentalizing as it unfolds on the somatic and kinesthetic level during the interactions with one’s infant. The parental embodied mentalizing coding system focuses on the degree to which the parent is kinesthetically responsive to the infant’s kinesthetically manifested mental states during an interaction. When this system is used, it should be assumed that the patterns visible in the parent–infant dance reflect the meeting of their mental states.

When focusing on whole-body kinesthetic expressions, we do not consider gaze patterns, facial expressions, or any verbal behavior. To code a parent’s embodied mentalizing capacity, we play back the video-recorded interactions at normal speed, although frequent pausing is permitted for viewing the interaction in frame-by-frame mode. The first stage of coding involves identifying episodes of parental embodied mentalizing, termed *embodied circles of communication*, including their onset and termination times. The second stage involves describing the kinesthetic sequence of each embodied circle of communication in terms of movement qualities, such as tempo, direction of movement, where the interaction occurs in space, its pacing and pathway in space, and how much muscle tension is used to execute it. The third and final stage involves rating the overall quality of parental embodied mentalizing capacity in each embodied circle of communication and then creating a summary, global parental embodied mentalizing score. We now describe the movement qualities used to depict each embodied circle of communication, continue to outline how a parental embodied mentalizing rating is ascribed, and conclude with an illustrative example of an embodied circle of communication event.

Movement Qualities

Describing each step of an embodied circle of communication in kinesthetic terms affords an account of the subtle kinesthetic components that constitute the embodied interaction between the parent and the infant. Any

given movement is likely to be characterized by a number of co-occurring movement qualities, and the following qualities are used to describe kinesthetic actions in the parental embodied mentalizing coding system (for further details, see Shai, 2011).

Tempo

Tempo refers to how fast or slow the movement is or the frequency of the pulse of the movement within a time unit (e.g., velocity), with a range from low to high tempo.

Space

Space refers to where in space the movement is taking place, with the individual's body serving as a point of reference. For the purposes of parental embodied mentalizing coding, a distinction is made between personal and interpersonal space. *Personal space*, referred to as kinesphere or orbit, is the personal three-dimensional sphere surrounding the body, the periphery of which is reachable by extending one's limbs while staying in a still position (Tortora, 2006). *Interpersonal space* refers to the interactive, changing spatial distances between two individuals in a given environment (Schefflen & Ashcraft, 1976), which involves how overlapping or separate the kinespheres of two individuals are. Also considered are the relative distance of the movement from the mover's body (near, intermediate, or far) and the movement's orientation in relation to the ground (horizontal, vertical, or sagittal).

Pathways

This term refers to goal-directed movements that cut through space and make clear and intentional connections between the individual and his or her surroundings (Tortora, 2006). It concerns the imaginary line that a movement creates in space. This can be a straight, direct, linear path, as in a gesture describing a triangle; it can also be a curvy, indirect, circular, or rounded path, as in a gesture describing a balloon moving in the air.

Pacing

This term refers specifically to the velocity of changes or alterations in movement. Pacing ranges from abrupt and rushed to gradual and sustained. In abrupt pacing there is no clear sequence of fluent connections between movements (Davis, 1975), which is likely to provoke a staccato-like sense of fragmentation and unpredictability. Gradual pacing, on the other hand, is characterized by a clear sequence of fluent connections between movements. The change in movement appears to be planned, controlled, composed, and continuous.

Directionality

Directionality concerns the growing or shrinking movement of bodily dimensions in relation to the body center and is associated with different degrees of pleasure (Kestenberg-Amighi, Loman, Lewis, & Sossin, 1999). A *growing movement*—widening (horizontal), lengthening (vertical), bulging (sagittal)—creates open bodily shapes as a result of moving away from the body's center, and it exposes the body to the environment. A *shrinking movement*—narrowing (horizontal), shortening (vertical), hollowing (sagittal)—creates closed bodily shapes as a result of moving toward the body's center, and it reduces exposure of the body to contact or interaction with the external world. When observing the kinesthetic quality of directionality, the coder distinguishes whether the movement is performed with the torso alone, extremities (or head) alone, or some combination of the two. The varying degrees of participation of the body in the directional movement reflect the degree or intensity of the desire to move away or toward a stimulus.

Tension Flow

This term refers to the muscular tone involved in the movement and more specifically to sequences of fluency and restraint in the state of the muscles in various parts of the body. Tension flow concerns alterations between free and bound movements (Kestenberg, 1965). A contraction of an agonistic muscle initiates movement. When the agonistic muscle moves the body with little opposition or resistance of its antagonistic muscle, the movement flows freely and is fairly unrestrained. The greater the contraction and resistance of the antagonistic muscle, the more the movement is restrained and controlled, thus exhibiting the quality of bound tension flow (Kestenberg, 1965). Bound tension-flow movements appear stiff or tensed, with rigid holding of body parts, torso, or the full body attitude.

Rating Parental Embodied Mentalizing

Once an embodied circle of communication has been temporally identified and depicted in kinesthetic terms, the quality of parental mentalizing, as this is manifested in the interactive movement, can be assessed. The parental embodied mentalizing rating reflects the degree to which the parent was able to demonstrate, in his or her movement, an appreciation of the infant's mind and to respond to it via means of modifying his or her own movement to better suit the infant's mental state. Assessing the parent's embodied mentalizing capacity in a given embodied circle of communication involves many considerations. We outline here only some of the chief considerations: (a) How clear is the infant's kinesthetically manifested mental state? That is,

when the infant's movement qualities are examined, how easy or difficult is it to understand the infant's need, desire, or interest? (b) To what extent can observers confidently assume that the parent detected the infant's movement? (c) How fast or slowly is the parent able to adjust his or her own movement to better suit the infant's kinesthetically manifest mental state? (d) Does the infant need to resort to self-affective regulation (e.g., thumb sucking) during the interaction with the parent, and how does the parent respond to these signals of distress and overarousal? (e) Was the parent able to follow the infant's kinesthetically manifested mental state and lead it to completion without interruption?

The parental embodied mentalizing rating for each circle of communication requires coders to pay careful attention to each circle, and the global rating is based on the set of circle ratings. The global rating is not based on some formal, algebraic compositing of component ratings given to each individual circle of communication event; rather, it reflects the degree to which the parent typically manifests a kinesthetic appreciation of the infant as a mental agent and implicitly uses this appreciation to continuously modify his or her own kinesthetic patterns and qualities to better suit those of the infant.

An Example of Coding Parental Embodied Mentalizing

Let us use a typical interaction between a parent and an infant to illustrate how parental embodied mentalizing is assessed. A mother offers her baby a toy by extending her arm forward, away from her body center (directionality) in a fast movement (pacing), in a linear direction toward (pathway) and close to the baby's face (space). In response, the infant pulls his torso back (directionality) in a sudden movement (pacing) while his fists tense up (tension flow). To rate the mother's embodied mentalizing capacities in this embodied circle of communication, observers have to examine how she responds to this behavioral sequence enacted by her baby. If the mother responds by withdrawing her arm that is holding the toy (directionality) and perhaps also by moving her torso back (directionality) to create more space between her and the baby (space), she would be rated high on the parental embodied mentalizing measure. Another interactive possibility is that the mother persists in holding the toy close to the infant's face (space). The infant moves further back and twists his body away from the mother (directionality) and tenses up not only his fists but also his arms (tension flow). The mother, in response, starts shaking the toy at high speed (tempo) and moves it even closer into the infant's face (space). This persistent behavior on the part of the mother continues even when the infant inserts a thumb into his mouth (affect regulation) and loses his upright body posture (tension flow). A mother interacting this way would be rated very low on the parental embodied mentalizing measure.

Preliminary Evidence Regarding Parental Embodied Mentalizing

Although the concept of parental embodied mentalizing is in its infancy, there are a number of promising findings pertaining to the importance of the parent's embodied mentalizing capacity for the quality of parent–infant interaction, as well as its effects on a child's development. First, in two independent studies, one with an American sample and the other with a high-risk South African sample, higher parental embodied mentalizing capacities were found to correlate with higher maternal sensitivity ratings. This was found whether the latter was measured with the Home Observation for Measurement of the Environment (Caldwell & Bradley, 1984; $r = .39$), Play Sensitivity (National Institute of Child Health and Human Development Early Child Care Research Network, 1997; $r = .33$), or Emotional Availability (Biringen, Robinson, & Emde, 2000; $r = .49$). Moreover, higher ratings of parental embodied mentalizing were significantly correlated with higher verbal parental mentalizing, as measured with the Parental Development Interview. The parental embodied mentalizing rating was not related to infant birth order (which should be an indication of more or less experience on the part of mothers) or temperament.

We recently found that parents' embodied mentalizing, measured 6 months after the child's birth during a free-play interaction at home, predicted infant attachment security at 15 months (Shai & Belsky, 2013). Mothers who scored higher on parental embodied mentalizing were significantly more likely to have secure infants than avoidant or resistant infants. This correlation remained when we controlled for traditional, robust measures of parental care, such as maternal sensitivity. Moreover, parental embodied mentalizing capacities measured at 6 months significantly predicted individual differences in children's social skills, social competence, and internalizing and externalizing problems at 54 months: Children of mothers with higher parental embodied mentalizing ratings were significantly more likely to have improved social skills, and they were less likely to have internalizing or externalizing problems than were children of mothers with lower ratings on the parental embodied mentalizing measure.

CONCLUDING REMARKS

The concept of parental embodied mentalizing represents an attempt to conceptualize nonverbal parental capacities that are meaningful and influential in parent–infant interactions and that involve the entire body (rather than just the head or face). This kind of mentalizing is an active part of the rich communication of mental states between parents and infants. The concept and measurement of parental embodied mentalizing capacities are

in their infancy, and the findings sketched in this chapter are preliminary and in need of replication and elaboration. Future research would benefit from (a) investigating the unique movement patterns that fathers, in comparison with mothers, exhibit when interacting with their infants and how these contribute to a child's development; (b) examining cultural similarities and differences in nonverbal interactions between parents and their infants; and (c) comparing behavioral manifestations of embodied mentalizing with physiological and brain activity. The concept of embodied mentalizing is, of course, closely tied to other bodily processes, and these processes, mental and physical, are the foundation of the developing minds of young children. Measuring and understanding these processes will provide a better and fuller understanding of the social foundations of the human mind.

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