

## Chapter 1

# The Disorganized Attachment–Caregiving System

## *Dysregulation of Adaptive Processes at Multiple Levels*

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For all objects and experiences, there is a quantity that has an optimum value. Above that quantity the variable becomes toxic. To fall below that value is to be deprived.

—GREGORY BATESON, *Mind and Nature*

The last two decades have witnessed an extraordinary integration of developmental and clinical theory with knowledge about the psychological and physiological effects of stress and trauma. This integration amounts to a paradigm shift in our understanding of the development of several types of psychopathology (Buchheim & George, Chapter 13, this volume; Lieberman & Van Horn, 2009; Perry, 2008; Siegal, 2001; Tronick, 1989; Van der Kolk & Fisler, 1994). Bowlby's ethological theory of attachment and Ainsworth's concept of attachment security have a central place in this grand synthesis. Secure attachments are now understood to buffer the infant and child from toxic levels of stress and serve a critical role in the organization of the neurophysiological substrates responsible for self-regulation (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1980; Hertsgaard, Gunnar, Erickson, & Nachmias, 1995; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996; Shore, 2003). Earlier we proposed that the construct of disorganized attachment provides a bridge between traditional and contemporary

areas of interest in attachment theory and research (Solomon & George, 1999b). Our goal in this chapter is to provide a conceptual framework for understanding the disorganized attachment–caregiving system and its pivotal role in developmental maladaptation and psychopathology. To do so, we draw both on John Bowlby’s seminal ideas and current models of biobehavioral organization that point to the child–caregiver relationship as a critical component of the homeostatic response to stress. We show why the behavior of both children and mothers in these relationships is described as disorganized, discuss the variety of contexts in which disorganized behavior is observed, and propose that the disorganized infant– or child–parent relationship represents dysregulation of coadaptive processes at the level of behavior, physiology, and representation. We conclude with a brief consideration of the implications of this framework for clinical practices and future research.

### **ATTACHMENT DISORGANIZATION IN NORMATIVE AND HIGH-RISK CHILD-REARING CONTEXTS**

The term “disorganized” as applied to infant attachment originated with Main and Solomon’s descriptions of the behavior of infants who were “unclassifiable” with respect to Ainsworth’s well-accepted classification system of patterns of infant behavior with the parent in the Strange Situation (Main & Solomon, 1986, 1990). Unclassifiable and/or disorganized infant attachments are most common in maltreatment and other high-risk samples, but also comprise about 15% of cases in normative samples (Lyons-Ruth & Jacobvitz, 2008). In contrast to the organized secure and organized insecure patterns identified by Ainsworth, disorganized attachment behaviors often seem bizarre or inexplicable under the circumstances. They include approach, avoidance, or angry behaviors that are succeeded or interrupted by opposing displays or which are subsequently constricted. Indications of disorientation, confusion, or fear of the parent sometimes accompany these events and are also defined as indices of disorganization. These moments of behavioral disorganization impede the achievement of the functional goal of the attachment system.

In Bowlby’s view, the attachment system evolved primarily to promote protection by regulating the child’s proximity to the mother. Activation of the child’s attachment system results in behavior that ordinarily helps the child establish or maintain proximity to the attachment figure and elicits caregiving and comfort behavior that will soothe distress and reduce fear in response to danger or threats, including the threat of separation (Bowlby, 1982). Main and Solomon (1986, 1990) concluded that despite wide variation in the surface appearance of anomalous behaviors, all of the unclassifi-

able cases were characterized by a breakdown in the smooth coordination of attachment behavior and were indicative of the absence of a coherent attachment strategy with respect to the parent. Note that the words *organized* and *disorganized* refer both to the immediate organization or control of attachment behavior and to the development of stable patterns of attachment (“strategies”) in response to stable variations in maternal sensitivity. That is, the organized insecure patterns may be conceptualized, in sociobiological terms, as *conditional strategies*, the capacity for which is presumed to have evolved through natural selection (Main, 1990).

### DISORGANIZED CAREGIVING BEHAVIOR

For some time, we have referred to the maternal behavior that is associated with disorganized infant and child attachment as evidence of a disorganized *caregiving* system (George & Solomon, 1996, 2008; Solomon & George, 1996, 2000). Our usage reflects the context in which we have studied the mother–child relationship, which has been mainly through the study of mothers’ representations of the relationship with their kindergarten-age child. At this age, children who were disorganized in toddlerhood may be classified as disorganized or controlling. The controlling subgroup is superficially more organized (Solomon, George, & De Jong, 1995); controlling behavior usually takes the form of a punitive or caregiving (role-reversed) stance with respect to the parent (Main & Cassidy, 1988). The subjective experience of the mothers of disorganized or controlling children is one of helplessness with respect to the child, their own emotions, and the relationship. In some cases, mothers’ interactions with the child would objectively be described as hostile or confrontational, in others, constricted and submissive. We concluded that these mothers were experiencing a breakdown in their sense of themselves as the “stronger and wiser” member of the dyad and, at the functional level we described them as “abdicating” the protective function of the caregiving system (see also George & Solomon, Chapter 6, this volume).

Mothers’ descriptions of themselves in interaction with their children have been confirmed repeatedly in observational studies. Mothers of controlling children are judged to be more disruptive, conflict-laden, disengaged, and hostile than mothers of children with organized attachments, as well as passive and role-reversed (Britner, Marvin, & Pianta, 2005; Easterbrooks, Biesecker, & Lyons-Ruth, 2000; Humber & Moss, 2005; Macfie, Fitzpatrick, Rivas, & Cox, 2008; Moss, Bureau, Cyr, Mongeau, & St-Laurent, 2004; Moss, Rousseau, Parent, St-Laurent, & Saintonge, 1998; O’Conner, Marvin, Rutter, Olrick, & Britner, 2003). Mothers in punitive dyads also have been found to struggle with cooperation and joint engagement in a

variety of structured laboratory contexts (Moss et al., 2004; Moss & St-Laurent, 2001).

Although the interview and observational findings establish that mothers of disorganized and controlling infants are ineffective, it might also be said that their own behavior is disorganized in ways that parallel their children's behavior in laboratory reunions. A profusion of terms has been invoked to capture observations of the mothers of disorganized infants and children. These include "frightening" or "frightened," "atypical," "anomalous," "disruptive" (Goldberg, Benoit, Blokland, & Madigan, 2003; Lyons-Ruth, Yellin, Melnick, & Atwood, 2005; Madigan, Bakermans-Kranenburg, et al., 2006; Madigan, Hawkins, Goldberg, & Benoit, 2006; Main & Hesse, 1990; Moss et al., 2004; Vondra, Hommerding, & Shaw, 1999), and "disconnected" (Out, Bakermans-Kranenburg, & Van IJzendoorn, 2009; but see George & Solomon, 1996, 2008, for a prior and different use of the term "disconnected"). Researchers have not necessarily identified this behavior specifically as disorganized, perhaps because of the focus on identifying what it is about maternal behavior that is *disorganizing* to the infant. For example, when studying videotapes of disorganized infants, Main and Solomon (1990) noted as important a variety of "odd" behaviors on the part of parents, including breathy and exaggerated greetings; sudden attempts to frighten the baby, usually in the guise of play, and evidence of confusion about or deference toward the infant. Main and Hesse (1998) encapsulated these events in a coding system organized around the concept of "frightening or frightened" maternal behavior, which also included unambiguous indices of dissociation (e.g., behavioral freezing and stalling).

These moments reflect a breakdown in the smooth coordination of caregiving behavior that is certainly analogous, and in some cases may be homologous, to the infant or child behaviors that comprise the indices of attachment disorganization. The same may be said for many of the maternal behaviors that constitute evidence for "disrupted communication" in Bronfman and Lyons-Ruth's AMBIANCE system (Lyons-Ruth & Bronfman, 1999). This system encompasses Main and Hesse's (1998) codes, but in addition covers a broader array of apparently dysfunctional maternal behaviors. This reflects the investigators' observation that Main and Hesse's system fails to capture the behavior of mothers of disorganized infants who otherwise appear secure. In the home and in the Strange Situation, these mothers appear to be passive and withdrawn, rather than actively frightening, frightened, or dissociated. Notably, the AMBIANCE system is sensitive to a variety of contradictory cues from the mother (such as inviting approach, then retreating) and withdrawal behaviors (such as holding the infant away from the body with stiff arms) that have direct analogues in disorganized infant behavior (e.g., holding on to the parent while sharply averting gaze).

Recently, Out et al. (2009) demonstrated that it is specifically *disorganized* rather than just “extremely insensitive” maternal behavior that differentiates between mothers of disorganized infants and the mothers of organized infants, at least in structured laboratory situations. Consistent with what is captured in the disorganized infant classifications, these behaviors were characterized by “lack of meta-signals indicating play or affection (e.g., smiling), the absence of any explanation or justification for these behaviors, and their sudden occurrence” (p. 427).

### **OTHER CONTEXTS IN WHICH DISORGANIZED ATTACHMENT BEHAVIOR MAY BE OBSERVED**

In the introduction to our first volume, *Attachment Disorganization* (Solomon & George, 1999a), we argued that disorganized attachment behavior is the empirical “missing link” unifying Bowlby’s theory about the effects of major separations and loss on attachment and Ainsworth’s identification of normative variations in infant attachment patterns. That is, disorganized attachment, rather than being a recent phenomenon, had been observed, though not necessarily labeled as such, by early investigators of young children’s reactions to major separations. A concern with effects of separation was, of course, one of Bowlby’s central preoccupations (Bowlby, 1977) and a cornerstone of his argument for the importance of attachment in the emotional development of the infant and young child. His theory of attachment was framed, however, in terms of an ethological approach to the study of motivational systems that had evolved under the pressure of natural selection. Ainsworth’s studies of normative mother–child interaction in Uganda, in middle-class homes in the United States, and in the Strange Situation procedure were designed to test Bowlby’s theory that infant attachment behavior would increase in response to small increments in stress and would subside when the infant had achieved proximity to the attachment figure (Ainsworth et al., 1978; Ainsworth & Marvin, 1995). Ainsworth concluded that this pattern was indeed normative and reflected the infant’s confidence in the psychological availability of the attachment figure (i.e., his or her security). The attachment patterns of a minority of infants were characterized by high levels of behavior that were already familiar to Ainsworth from observations of young children following major separation, that is, avoidance and ambivalent clinging and resistance, which allowed her to readily identify these patterns as insecure.

Main and Solomon’s (1986, 1990) identification of indices of disorganization in the Strange Situation provided a new lens with which to view the earlier, “classic” observations of children who had experienced major separation under adverse conditions, especially the absence of a sensitive,

alternative mothering figure (Heinicke & Westheimer, 1965; Robertson & Robertson, 1971). The reunion behavior of several of these children was described by observers in terms suggestive of a profound state of disorientation and inhibition of activity, especially with respect to the attachment figure, and lasting hours or days. Family members typically interpreted this behavior as a failure to “recognize” the mother. This clearly was not the case, as these children readily recognized other family members and familiar objects; neither did they treat the mother with the casual, friendly behavior that is typically shown to unfamiliar individuals. This disorientation with respect to the immediate environment is the prime differentiating feature of this behavior both from the avoidance shown by many infants in the Strange Situation and that shown by children who had experienced major separation under more favorable circumstances. It is a “pathomic” indicator of disorganized attachment in the Main and Solomon system, observable as stilling, freezing, or “disorganized” wandering in response to reunion with the parent. In contrast, simple avoidance, as defined in the Strange Situation, is marked by the child’s increased focus on the environment, for example, picking up and manipulating toys, and rarely lasts more than a minute or two. Separated children were frequently observed to combine, in mutually contradictory ways, behavior suggestive of a disorientation with respect to the mother and proximity seeking and contact maintaining. For example, Gillian, age 19 months, refused to take her mother’s hand or look at her, then broke into intense sobbing. Afterward, “she lay across her mother’s shoulder, still and motionless, with eyes brimming with tears and face averted from her mother” (Heinicke & Westheimer, 1965, p. 217).

Two other salient features of the behavior of children following major separations are more analogous to disorganized behavior than to the “organized” variants of avoidance and resistance. Some children combined anger, resistance, and avoidance in ways that are consistent with the Main and Solomon guidelines for disorganization but differ from that of children with “organized” attachments. For example, John, age 17 months, alternated between attempts to flee from his mother (into the arms of other figures) and close contact with mother, during which he appeared to be asleep. It is noteworthy that apparent “falling asleep” has now also been described by Ostler and Haight (Chapter 10, this volume) during visitations with mother of young children who have been removed by social services from the mother’s home. Other separated children displayed delayed anger or out-of-context aggression toward mother. For example, Heinicke and Westheimer (1965, p. 104) described 18-month-old Dawn as apparently calm and accepting of contact and distraction from mother following a brief tussle over a sticky spoon only to “smack” her mother on the face some minutes later. Solomon and George (1999b) frequently observed similar patterns of “out-of-context” anger and provocation among toddlers who

were regularly separated overnight from the mother due to visitation with the father.

Disorganized attachment classifications have been found to predominate among infants and young children in foster care or who have been adopted (Chisolm, 1998; Marcovitch et al., 1997; O'Connor et al., 2003; Stovall & Dozier, 2000). To the degree that the children in these samples may have previously experienced maltreatment and/or separation from primary caregivers, fostering and adoption ought not to be considered a unique determinant of disorganized attachment. In a recent meta-analysis of adopted children, however, previously institutionalized children and children adopted later rather than earlier (over 12 months of age) were most likely to be classified as disorganized, suggesting that maternal deprivation (possibly along with other kinds of environmental deprivation) makes a unique contribution to disorganization (van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009). It is not clear whether disorganization in these contexts directly reflects the consequences of maternal deprivation during a “sensitive period” for the development of the attachment system or problematic responses of foster and adoptive mothers to the challenging behaviors shown by young children whose earlier attachments have been disrupted. Both factors may be relevant. Children adopted after the first 12 months of life are described as requiring more time to organize their attachment behavior around the new mother. Yet this process is facilitated when the mother has an autonomous (secure) state of mind with respect to attachment and is more likely to result in disorganization when the mother has an insecure state of mind (Dozier, Stoval, Albus, & Bates, 2001). We note, as well, that there continues to be debate as to whether institutionalized children can really be labeled as disorganized in attachment because their disordered behaviors are so extreme (Zeanah, Smyke, Koga, & Carlson, 2005; cf. Marvin & Whelan, 2003). Regardless of how currently or formerly institutionalized children ought to be classified in the Strange Situation, what is key for our present discussion is that they undoubtedly show behavior that is disorganized in the sense that Main and Solomon (1986, 1990) outlined in their studies of home-reared infants.

### **DYSREGULATION OF BIOBEHAVIORAL ADAPTATIONAL PROCESSES**

We have now described at least two and possibly three conditions in which disorganized attachment is likely: (1) in home-reared children who may be presumed to be attached to a caregiver whose caregiving behavior is also disorganized—maltreatment may be a feature of these relationships, but not necessarily; (2) following major separation from an adequate caregiver; and

(3) as a consequence of maternal deprivation during the first year of life or beyond. The differences among these caregiving contexts are as salient as their commonalities.

As originally proposed and elaborated by Main (Main & Hesse, 1990; Main & Morgan, 1996), disorganized attachment among home-reared infants is commonly understood to be a product of the infant's experience of "fright without solution." That is, in the laboratory and at home, disorganized attachment behavior results from immediate and/or repeated experiences of fear with the mother, which simultaneously compel the infant toward the parent, due to the action of the attachment system, and drive the infant away. Main has speculated that these incompatible motives result in a "collapse in attention" and the failure of behavioral and representational mechanisms that would ordinarily organize attachment behavior. There is no indication, however, that the mothers in the early, classic studies of separation were alarming before separation, despite the fact that the behavior of the children on reunion might suggest elements of fear (e.g., running away from the mother, dissociation). Furthermore, although it is true that some institutionally reared infants and children appear to become globally frightened or inhibited, the reverse pattern is at least as common, that is, the children become bold and "indiscriminately" sociable (Zeanah et al., 2005).

Following Bowlby (1980), we propose as a unifying explanation that disorganized attachment behavior in all three contexts reflects a failure in the regulating or organizing properties of the attachment-caregiving relationship. Bowlby (1973) emphasized the role that the attachment system plays as part of the infant's overall homeostatic response to stress, that is, he considered the attachment system to be a component in the overall homeostatic system that regulates the organism's response to stress. This construct implies, clearly, that the ongoing regulation of the infant's internal state depends upon maternal coregulation just as the infant's attachment behavior must be supported by the complementary caregiving behavior of the mother. This in turn requires that the mother's caregiving system itself ought to be organized to respond in an effective, coherent way to infant cues and other environmental demands.

Animal studies of the development and organization of attachment behavior and its neurological substrates essentially validate Bowlby's more global concept of the attachment and caregiver systems as coregulating and linked to homeostatic response to stress and threat. At the same time, contemporary studies highlight the fact that the attachment-caregiving system itself reflects an interplay and coordination of several component subsystems (e.g., infant rat responses to contact and separation are each linked to distinct characteristics and behaviors on the part of the mother) (Polan & Hofer, 2008). The notion that the attachment-caregiver system consists of component modules adds an additional potential source of disorganization.

Typically acting in concert, the adequacy or failure of coregulating processes results in developmental variations, at multiple levels, in the infant's immediate responses as well as resilience in the face of future stresses. These levels include epigenetic and molecular functioning; organization of brain structures underlying affect, memory, and information processing, such as the amygdala, hippocampus, and prefrontal cortex; and activation and function of the autonomic and limbic–hypothalamic–pituitary–adrenal systems (L-HPA), which modulate the body's response to both immediate and chronic stress (Buchheim, George, Kächele, Erk, & Walter, 2006; Fox, 1994; Gunnar & Barr, 1998; Porges, 2003). To these levels we would add, for humans, at any rate, representational processes that determine perception and coordinate behavior in response to projections (predictions) about the behavior of both the self and caregiving figures (Bretherton & Munholland, 2008).

For a system to function homeostatically, it must have available at least one, preferably several, adaptive processes that maintain or return the system to an optimal or steady state. In terms of attachment, the normal functioning or regulation of the system depends not only on the well-known attachment behaviors (e.g., calling, crying, searching, following the attachment figure) and their physiological substrates, but also on processes of adaptation to less-than-optimal conditions (e.g., in maternal sensitivity), such as avoidance or displays of anger. When adaptive or defensive processes are unable to maintain a system within minimally adequate limits, the system will tend to function in a dysregulated or unstable state. Dysregulated responses, by definition, are characterized by a lack of coordination with respect to the “set-goal” of the system and will tend to veer between polarized extremes of functioning, that is, the system remains “all on” or “all off” or alternates unpredictably between these extremes. Note that dysregulation is equivalent neither to stress nor, strictly speaking, to the intensity or quality of expressions of distress. Thus, for example, even very intense crying in the mother's absence ought not to be considered evidence of dysregulation. We might infer that crying is dysregulated, however, when the child is oriented away from the source of soothing, crying begins or ends abruptly or “out of context,” or is mixed with contradictory communication, such as intense, spasmodic laughter. Note that all of these examples are previously defined indices of disorganized attachment (Main & Solomon, 1990).

In order to avoid circularity, it is important to search for evidence of dysregulated systems in addition to or outside the context of attachment behavior itself. For example, we would expect disorganized attachment or caregiving to be associated both with explosive anger and with its opposite, extreme constriction of anger. This is indeed how mothers of disorganized and controlling children describe both themselves and their children (George & Solomon, 1996, 2008; Solomon & George, 1996, 2008). These

dysregulated affective patterns may, at least in part, explain the often replicated finding that children whose attachment to their mother is disorganized (or was assessed as such in infancy) show high levels of externalizing as well as internalizing behavior outside the home (Lyons-Ruth & Jacobvitz, 2008). The dysregulated quality of the disorganized child's anger or constriction has not been demonstrated definitively as yet, however, since the commonly used parent or teacher self-report measures of child social behavior do not differentiate as to context.

Another potentially relevant example of dysregulated anger was reported by George and Main (1979) who found "out-of-context," peer-directed aggression mixed with comforting behavior to be characteristic of abused toddlers. Note also that the extreme, polarized social behaviors shown by institutionalized children (i.e., inhibited or socially indiscriminant behavior) fit well to the construct of dysregulation. A recent study of high-risk, home-reared children is interesting in this light. Lyons-Ruth and colleagues (Lyons-Ruth, Bureau, Ruley, & Atlas-Corbett, 2009) found that even when variation related to disorganized and avoidant attachment was removed, socially indiscriminate behavior was associated with aggression and hyperactivity (i.e., dysregulated affect and activity).

Highly relevant, though still fragmentary, evidence of dysregulation related to disorganized attachment is found in studies of neuroendocrine responses to stress. In the case of disorganized infants living in normative, stable homes and observed in the Strange Situation, the D classification appears to be associated with elevation of cortisol levels, which, unlike the cortisol responses of children with organized attachments, remain high for some time after the end of the Strange Situation (Hertsgaard et al., 1995; Spangler & Schieche, 1998). In a set of elegant studies among recently adopted children, Gunnar and Dozier demonstrated the existence of dysregulation of diurnal cortisol rhythms, which appear to be associated with the well-known "out of control" emotional displays frequently shown by children in these circumstances. Once cortisol levels became regulated through the establishment of daily routines by caregivers, the behavior of these children improved (Dozier et al., 2006; Fisher, Stoolmiller, Gunnar, & Burraston, 2007; Gunnar, Morison, Chisholm, & Schuder, 2001). It is worth noting that the systems underlying dysregulation of cortisol rhythms may be to some degree independent of the organization of the attachment system itself. Thus, dysregulated cortisol rhythms appear to be sensitive to disruptions in care before 6 months of age, whereas maternal deprivation or disrupted attachments do not appear to interfere with the establishment of secure attachment behavior prior to 12 months (Dozier, Albus, Fisher, & Sepulveda, 2002). Finally, in a recent test of polyvagal theory (Porges, 2003), Oosterman, De Schipper, Fisher, Dozier, and Schuengel (2010) demonstrated a stronger effect of disorganized attachment classifications on dys-

regulated autonomic processes in foster children than earlier experiences of neglect.

## DYSREGULATION AT THE LEVEL OF REPRESENTATION

Bowlby proposed the construct of “segregated systems” (Bowlby, 1980; Solomon & George, 1999, 2008; Chapter 2, this volume; Solomon et al., 1995) to characterize and explain dysregulated representational processes. Segregated systems were said to arise when “exclusionary” or defensive representational processes of deactivation and cognitive disconnection were unable to contain intensely painful thoughts and feelings associated with attachment figures. When this occurred, “the specific patterns of behavior that go to make up attachment behavior together with the desires, thoughts, working models and personal memories integral to them” (Bowlby, 1980, p. 348) become a part of this unintegrated system, leading to a separate representational self that under most conditions is unavailable to consciousness. In this way, segregated systems may be said to equate to processes of repression or dissociation. In Bowlby’s view, the process of segregation did not entirely preclude memories, thoughts, and feelings associated with the attachment figure from influencing behavior. Rather, these might be elicited by attachment cues or other reminders, sometimes quite idiosyncratic ones. Because they could not be processed in awareness (i.e., by higher integrative functions), previously segregated material was likely to emerge in ways that were out of context and out of control.

We have adapted Bowlby’s model to explain variations in the symbolic representation of attachment of kindergarten-age children through doll play (Solomon et al., 1995) and the caregiving representations of their mothers in the course of semistructured interviews (George & Solomon, 1999, 2008). Bowlby defined two types of defensive exclusion of information, which, when not extreme, can be considered to be adaptive: deactivation and cognitive disconnection. Briefly, we find that deactivating defenses (i.e., ways of thinking and symbolically representing parent–child interaction that *preclude* the need for engagement or assistance) to be characteristic of insecure–avoidant children and their mothers. For example, a child might depict in doll play that when the parents return from a trip, the children are asleep in their beds; a mother of an avoidant child in the course of the Caregiving Interview might describe, as a source of pleasure, watching from afar her child in play. We find defenses related to cognitive disconnection to be characteristic of insecure–ambivalent children and their mothers. Disconnecting processes help the individual *circumvent* the expression of attachment by separating feelings from the awareness of what is eliciting them. Often this occurs by distracting one’s attention to irrelevant details. For example, an ambiva-

lently attached 5-year-old might in doll play enact a thorough cleaning of the house when the doll parents are away; in the context of an interview, the mother of an ambivalent child might describe doing the same thing as a distraction from worry about her child's first day at school. Consistent with the notion that dysregulated representations (segregated systems) are associated with polarized representations of attachment and caregiving behavior, the symbolic representations of controlling and disorganized children and their mothers are manifested as either affective flooding or constriction. That is, both controlling children and their mothers represent parent-child interaction as wildly frightening, out of control, and dangerous *or* manifest or describe efforts to constrict behavior. Examples of constriction include the child refusing to enact a family scene, or the mother barricading herself in her room rather than display anger toward the child. Other investigators, using our measure or different ones, have reported qualitatively similar indices of disorganization among high-risk, maltreated, and foster children and their parents (Fury, Carlson, & Sroufe, 1997; Jacobsen & Miller, 1999; Katsurada, 2007; Shields, Ryan, & Cicchetti, 2001; Venet, Bureau, Gosselin, & Capuano, 2007; Webster & Hackett, Chapter 11, this volume).

## CAUSALITY

As Gregory Bateson so lucidly pronounced, conditions that fall outside the optimum range of a system become either toxic or depriving: they flood the adaptive defenses of the system or they starve the system of essential constituents. Somewhat less eloquently, Bowlby proposed that the attachment system becomes dysregulated when it is chronically or intensely activated (mobilized) but not assuaged. This occurred, he believed, under adverse conditions of separation or loss, as well as when the infant or child was punished for the display of attachment behavior.

Bowlby's formulation applies most easily to disorganization among children who have been separated from parents under adverse conditions, are observed in foster care or following adoption, and, possibly, also to institutionalized children who have never had an opportunity to establish a stable attachment. In all of these cases, an attachment figure is now or always was chronically unavailable to assuage distress or to otherwise coregulate the infant or child. Maternal separation and deprivation are, however, usually not the most common causes of disorganized attachment. A recent meta-analysis of the conditions under which disorganized attachments are most likely points strongly to families in which there has been maltreatment or where there is high cumulative stress (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010). Curiously, as a reflection of the times, there is no direct mention of maltreatment in the original editions of Bowlby's *Attach-*

*ment* trilogy (Bowlby, 1969, 1973, 1980). Main adapted Bowlby's formulation (based on shock administration research with baby animals; Bowlby, 1979), however, by pointing out that when the caregiver is frightening, the infant is placed in a position of "irresolvable conflict" and the attachment system is activated but cannot be terminated (Hesse & Main, 2006; Main & Hesse, 1990; Main & Morgan, 1996). That is, the attachment figure is present but unable to function as a source of security or coregulation, especially when the infant or child is most frightened or distressed. Clearly, frank physical abuse would function in this way and would be a dysregulating event or condition. Our interviews with mothers of infants and kindergartners in our normative samples convince us that although it may fall short of abuse, mother–child interaction in the homes of these controlling and disorganized children is characterized by unpredictable and intense rage or other negative affect, which is either directly or more covertly expressed. Many mothers also report significant failures to buffer the child or respond protectively to psychological and physical dangers, requiring the child to remain more or less continually vigilant and fearful (George & Solomon, 1996, 2008; Solomon & George, 1996, 2000). Correlatively, we have found that mothers of disorganized or controlling children report qualitatively similar experiences during their own childhoods (Solomon & George, 2006; Chapter 2, this volume). That is, they describe caregiving figures as out of control, frightening, and/or failing to buffer or protect them and they describe themselves as frightened and helpless. We hypothesize that these child-rearing circumstances have enduring effects on mothers' ability to self-regulate and coregulate the child.

Do the disorganized caregiving behaviors described earlier actually disorganize infant or child attachment? On this matter there continues to be debate. Main and Hesse (1990) have proposed that the subtle frightened, frightening, or dissociated behaviors shown by some mothers of disorganized infants and children are sufficient to disorganize attachment behavior; presumably, the disrupted communication coded by Lyons-Ruth (Lyons-Ruth & Bronfman, 1999) might also be disorganizing in the moment. Observational studies more-or-less consistently demonstrate support for both Main and Hesse's and Lyons-Ruth's approaches to describing maternal behavior in the laboratory and the home. Significant "transmission gaps" remain with respect to both disrupted and frightened–frightening–dissociative maternal behavior and infant disorganization, however (Madigan, Bakermans-Kranenburg, et al., 2006; Out et al., 2009). An alternative hypothesis to that proposed by Main and Hesse (1990) is that all of these indices of disorganized caregiving behavior, detectable, often, only through microanalysis of interaction, are the behavioral products of dysregulation in parent and child and the relationship, as a consequence of a history of unambiguously (macro) frightening interactions, but are not themselves the

source of this dysregulation. Experimental studies comparable to manipulating interaction through the use of the still-face paradigm (Tronick, 1989) would be useful to resolve this question.

Can the infant or child challenge the mother's caregiving system sufficiently to dysregulate the attachment-caregiving system? The preponderance of studies has shown the attachment-caregiving system to be remarkably resilient. Typically, studies reveal that variables such as infant temperament and affect regulatory capacities have an impact on attachment security only when combined with other stressors (Vaughn, Kelly, Bost, & van IJzendoorn, 2008). An intriguing development in recent years are data that appear to show a relation between genetic variations related to neurotransmitter efficiency and disorganized attachment, first reported by Gervai and colleagues in a Hungarian sample (Gervai et al., 2007). Results of replication studies have been inconsistent, however, with some studies showing main effects of allelic variants, others finding no effects, and still others showing that these variations result in disorganized attachment only in combination with high levels of maternal sensitivity (for a review, see Spangler, Chapter 5, this volume). If genetically based differences among infants indeed contribute to disorganization, they may do so by affecting the infants' own regulatory abilities or their "set-points" for optimal levels and patterns of maternal behavior and responsiveness.

## CLINICAL AND RESEARCH IMPLICATIONS

Twenty years of research involving the disorganized and controlling attachment categories in home-reared children have demonstrated that these infants and children express the most distress and display the most insecure behavior in the home (Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006; Solomon & George, 2008). They are more likely than children who are assigned to the organized classifications to show maladaptive behavior in the classroom and to require clinical services (Lyons-Ruth & Jacobvitz, 2008). Their mothers report the highest levels of parenting stress and helplessness (see George & Solomon, Chapter 6, this volume) and are most likely to receive major mental health diagnoses such as depression and borderline personality disorder (Dozier, Stovall-McClough, & Albus, 2008; Lyons-Ruth & Jacobvitz, 2008). Clearly, these dyads are operating toward the farther reaches of the "expectable" environments within which coregulating mechanisms have evolved. From this perspective, dysregulation of adaptive mechanisms at the levels of behavior, affect, neurophysiological substrates, and representation are hardly surprising.

The construct of disorganization is now well integrated into the lexicon of clinicians, especially those involved in providing infant mental health

intervention (Dozier et al., 2002; Hoffman, Marvin, Cooper, & Powell, 2006; Lieberman & Van Horn, 2009; Slade, 2005; Toth, Rogosch, Manly, & Cicchetti, 2006). Evidence-based treatment recommendations incorporate relationship-based approaches to intervention to improve the parent's ability to respond empathically, refrain from frightening the child, repair ruptures quickly, and behave in a protective manner. To our knowledge, only child–parent psychotherapy (Lieberman & Van Horn, 2009) adds to this mix specific techniques to ameliorate the self-regulation difficulties faced by the caregiver. The accumulating research summarized here indicates, however, that the majority of “disorganized” caregivers may benefit from such strategies, whether or not they have directly experienced trauma as it is typically defined (see Solomon & George, Chapter 2, this volume).

Increasingly, research in the field of attachment reflects an awareness of the links between attachment disorganization, affect regulation, and the physiological substrates of regulation. The precise neurophysiological mechanisms through which the dysregulated caregiver influences the child's internal state are largely unknown, however. Furthermore, because the caregiver is so often seen in terms of his or her stimulus value for the child, rather than as an integral part of a coregulating relationship, even less is known about the ways in which the child's behavior regulates or dysregulates the caregiver's adaptive control systems at multiple levels. Investigations into this phenomenon from the perspective of the attachment–caregiving system would parallel the elegant animal research models (Polan & Hofer, 2008). One would like to know, for example, whether the L-HPA and autonomic systems of the mothers of disorganized infants are also dysregulated, in general, and during various kinds of interaction with the child (see Buchheim & George, Chapter 13, this volume).

Attachment researchers have only recently turned their attention to the role of disorganized infant–caregiver relationships in the relational diathesis of psychopathology. Recent work by Lyons-Ruth and colleagues on the development of borderline disorders, examining the interrelations of caregiver behavior and representation with infant genetic vulnerabilities is an inspiring example (Hobson et al., 2009; Lyons-Ruth et al., 2006; Nemoda et al., 2007). Given the failures of the disorganized attachment–caregiving relationship to buffer the infant and child from stress of many kinds, including those generated through the relationship itself, we would expect them to be associated with and potentiating of a wide range of psychological and physical disorders, including those believed to have a genetic or immunological basis. For example, an issue of particular interest to us is the role of disorganized attachment–caregiving relationships in the development of “childhood bipolar disorder,” apparently soon to be labeled “temper dysregulation disorder with dysphoria” (American Psychiatric Association, 2010). Our clinical experience indicates a link between this diagnosis, disorganized

attachment and caregiving, and recent trauma. Disorganized relationships might also be considered a risk factor for stress-related effects on health, including, for example, newly “rediscovered” virus-initiated affective disorders (Bortolato & Godar, 2010).

Though we propose that disorganized attachment–caregiving relationships will provide a powerful model for examining the interplay between dysregulated systems at multiple levels, we also emphasize that a multiplicity of relationships and histories are subsumed under this rubric. We have argued here that all of the contexts in which disorganized attachments are common—home rearing with a disorganized and affectively dysregulated caregiver, following major separation from attachment figures in adverse conditions, and as a consequence of maternal deprivation in institutionalized children—are associated with dysregulated adaptive systems within the child. These conditions represent a continuum of assaults to the attachment and caregiving systems. We can expect to find important qualitative differences among these relationships as a function of etiology, including the presence or absence of regulatory impairments originating with the child. These, in turn, are likely to be associated with differences, as well as commonalities, in the developmental onset, type, and degree of impairment of biobehavioral and representational adaptations.

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