

The Caregiving System:
A Behavioral Systems Approach to Parenting

Carol George
Mills College
Oakland, CA

Judith Solomon
Children's Hospital
Oakland, CA

In press. J. Cassidy & P. R. Shaver, *Handbook of Attachment: Theory, Research, and Clinical Application* (2nd Edition). New York: Guilford Press.

“An 8-month-old infant clammers on... a fallen tree while its mother sits about 7 feet below. The infant slips and hangs by two hands. [His mother] looks up, stands on two legs, and barely reaches the foot of her infant. She pulls it to her chest but it wriggles free, repeats the climb only to slip at the same place again, to be rescued once more by its mother.” Schaller (1963, p. 263, describing gorillas)

“Gremlin’s concern for Gimble went way beyond merely responding to his appeals for help: like a good mother she would anticipate trouble... Once, as she was carrying him along a trail, she saw a small snake ahead. Carefully she pushed Gimble off her back and kept him behind her as she shook branches at the snake until it glided away.” Goodall (1990, p. 169, describing chimpanzees)

“One day Effie was observed contentedly feeding about twenty feet behind the group, while Poppy, some six feet behind her mother, was solo playing and swinging in a Seneco tree... [S]uddenly Effie twirled around and stared at Poppy... Poppy had fallen and was hanging by her neck in a narrow fork of the tree. The infant could only feebly kick her legs and flail her arms as the stranglehold began cutting off her oxygen. Instantly Effie ran to her baby. With considerable effort she tugged at Poppy, trying to release her from a potentially fatal position. Effie was wearing a horrified expression of fear similar to that of a human parent whose child is in mortal danger... At last Effie succeeded in releasing her infant from the tree’s stranglehold. Immediately upon regaining her breath, Poppy began to whimper, then attached herself to Effie’s nipple for four minutes before her mother carried her off, in a protective ventral position, toward the group, which were unaware of the drama that had unfolded behind them.” Fossey (1983, p. 88, describing gorillas)

Bowlby's attachment theory inspired a dramatic shift in the way we understand the development of the early infant-caregiver relationship and other relationships across the life span. By reframing attachment in terms of the ethological concept of behavioral systems, attachment theory added a new perspective to developmental inquiries about relationships. The attachment system is one of many behavioral systems that have evolved to promote survival and reproductive success (Hinde, 1982). The goal of attachment behavior is to seek protection by maintaining proximity to an attachment figure in response to real or perceived stress or danger (Bowlby, 1969/1982). The goal of that behavior remains the same across the life span, although the actual behavior varies according to context and age. The empirical evidence supporting the role attachment in the child's development is impressive. Almost four decades of research have shown that attachment contributes importantly to an individual's ability to accomplish age-appropriate socio-emotional and cognitive tasks in childhood and adulthood. Marked aberrations in attachment organization are associated with developmental and mental health risks in children and adults (see DeKlyen & Greenberg, Chapter 27, this volume; Lyons-Ruth & Jacobvitz, Chapter 28, this volume; Solomon & George, 1999a, in press-b).

According to attachment theory, the most important factor guiding the formation of the attachment relationship is the child's experience with caregivers. All infants who receive some form of regular care select attachment figures, suggesting that simple propinquity and social interactions with a caregiver are sufficient for an attachment to develop (Bowlby, 1969/1982). The quality of care determines the organization of the relationship through its effect on a child's confidence in the availability of a caregiver (i.e., security; see Ainsworth, Blehar, Waters, & Wall, 1978; De Wolff & van IJzendoorn, 1997). But what are the origins of the attachment

figure's sensitivity? What causes parents to provide care for their infants – care that sometimes requires costly personal sacrifices on the part of parents?

Bowlby proposed that an attachment figure's behavior is organized by a caregiving behavioral system reciprocal to the care recipient's attachment behavior (Bowlby, 1969/1982, 1988). Historically, it was unusual to view caregiving as the result of an organized behavioral system. There is a large literature on parenting that covers a wide range of topics (e.g., Bornstein, 2003; Hoghughi & Lond, 2004). What this literature lacks, however, is a theory that integrates the internal organization of the parent's caregiving behavior with child outcomes.

We were part of a small group of attachment researchers in the late 1980's through mid-1990's who were interested in describing the caregiving system. During that era, attachment research moved "to the level of representation" (Main, Kaplan, & Cassidy, 1985); that is, it moved from observations of infant behavior with a caregiver to an examination of how relationships are mentally represented, remembered, and described (see Hesse, Chapter 25, this volume). The purpose of the present chapter is to provide a comprehensive framework for understanding caregiving as a behavioral system in its own right, that is, as an organized set of behaviors guided by a representation of the current parent-child relationship (George & Solomon, 1989, 1996; Solomon & George, 1996, 2000).

A unique contribution of this chapter is to emphasize the importance for the parent of making a shift away from *seeking protection and proximate care from attachment figures* (the function and goal of attachment for the child) to *providing protection, comfort and care for a child* (the function and proximate goal for the parent). This shift is fundamental to understanding the meaning of and motivation underlying critical aspects of parental behavior, cultural

differences in providing care, the development of the child's quality of attachment, and the mechanisms of intergenerational transmission.

The first section of this chapter outlines the components of a behavioral systems approach to caregiving. We next describe the caregiving system in relation to interactions and competition among behavioral systems. This discussion leads us to define the construct of "flexible care." We next discuss what little is known about the ontogeny of a mother's caregiving system, including potential influences in childhood, adolescence, and the transition to parenthood (pregnancy and childbirth). The final major section discusses representational models of caregiving. The predominant focus of caregiving researchers to date has been on describing the representational mechanisms that underlie maternal sensitivity. We complete our caregiving model by contrasting these approaches with our own, which defines caregiving representation in terms of flexibility and of organizing and disorganizing forms of defensive exclusion.

Defining the Caregiving Behavioral System

A Behavioral Systems Model of Caregiving

This section describes the behavioral system concept, guided by the Hinde's (1982) method of defining elements. A behavioral system is a biologically based motivational control system that governs the rules and behaviors associated with a specific proximate goal (see Marvin & Britner, Chapter 12, this volume). Important to this approach is the distinction among levels of causality (e.g., ultimate, proximate, ontogenic). Behavioral systems (1) comprise behaviors coordinated to achieve specific goals and adaptive functions; (2) are activated and terminated by endogenous and environmental cues; (3) are "goal-corrected" (i.e., regulated by goals that extend over long periods of time and are served by nonrandom behavior that flexibly adjusts to a wide range of environments and an individual's level of development); (4) are

“activated” and “terminated” at the biological level by a feedback system that monitors internal cues (central nervous system activity, hormones) as well as environmental cues; (5) are related to and interact with other behavioral systems; (6) are developmentally integrated behavioral sequences that become functional (i.e., mature) over time as the product of organism-environment interaction; and (7) are organized and integrated by specific cognitive control systems (in the case of humans, mental representations).

We begin our discussion of caregiving by examining the first four principles. The remaining principles are discussed in later sections.

The behavioral systems approach to caregiving begins with Bowlby’s (1969/1982, 1973) belief that the caregiving system is reciprocal to, and evolved in parallel with, the attachment system. The ways in which the infant’s behavioral systems (e.g., attachment, exploration, affiliation) interact with each other were outlined thoroughly in Bowlby’s and Ainsworth’s original work and have become standard features of attachment theory and research (see Cassidy, Chapter 1, this volume). The ways in which the infant’s behavioral systems interact with those of the caregiver, and the ways in which the caregiver’s behavioral systems interact with each other, are as yet largely unexplored.

The first step in defining the caregiving system is to delineate its adaptive function and behavioral goal. We adopt Bowlby’s position that the adaptive function of the caregiving system, as with attachment, is protecting the young and thereby ultimately increasing one’s own reproductive fitness (Solomon & George, 1996; see Simpson & Belsky, Chapter 6, this volume). Following ethological theory and paralleling Bowlby’s (1969/1982) discussion of attachment, we assume that the behavioral goal of the caregiving system is to provide protection for the child.

Central to Bowlby's theory was his identification of factors involved in the activation, termination, and regulation of the child's attachment system. The attachment system is activated by internal or external cues that the child perceives as frightening, dangerous, or stressful. It follows that the caregiving system is activated by internal or external cues associated with situations that the *parent* perceives as frightening, dangerous, or stressful for the child. These situations include (but are not limited to) separation, child endangerment, and the child's signals of discomfort and distress.

Once activated, the parent's caregiving system can call upon a repertoire of behaviors that serve the system's protective function. These behaviors may include retrieval, maintaining proximity, carrying, following, signaling the child to follow, calling, looking, and in humans, smiling, all of which work to establish proximity, care, and comfort.¹ The child's attachment system is terminated by proximity, or physical or psychological contact with the attachment figure, when the caregiver responds to the child's attachment needs in a satisfactory manner. Again following Bowlby's template for attachment, we propose that the parent's caregiving system is terminated by physical or psychological proximity and signs that the child is comforted, contented, or satisfied. Just as Bowlby proposed that attachment is associated with and regulated by strong feelings, including joy and anger in response to whether or not the caregiver is within proximity, caregiving is also associated with and regulated by strong emotions. Mothers express intense feelings of pleasure and satisfaction when they are able to protect and comfort their children; they experience heightened anger, sadness, anxiety, or despair when they are separated from their children or when their ability to protect and comfort their children is threatened or blocked.

Behavioral systems are goal-corrected – a feature that potentially allows for maximum behavioral flexibility, and guided by a biological feedback system. Bowlby (1973) proposed that flexibly integrated attachment behavior is the foundation of physiological homeostasis (see Polan & Hofer, Chapter 7, this volume). Individual differences in the way the goal is achieved, operationally defined as individual differences in security, should therefore be evidenced in neural and hormonal activity. There is now excellent research on mothering in humans and other mammals that demonstrates the role of hormones and neural activation patterns in the regulation of attachment and caregiving (e.g., Bartels & Zeki, 2004; Hrdy, 1999; Lorberbaum et al., 1999; Novakov & Fleming, 2005).

Once the caregiving system is activated, the caregiver must “decide” whether and how to behave. The caregiver’s behavior depends upon his or her conscious and unconscious evaluation of competing sources of information. One source of information is the caregiver’s evaluation of the child’s signals. Another is the caregiver’s appraisal of danger or threat. The parent must always be vigilant, scanning regularly for cues from these sources. He or she must then organize the various perceptions and select a response. This requires a capacity to flexibly integrate these sources of information in order to achieve the goals of the caregiving system.

We turn now to the parent’s perspective on caregiving. The parent has access to more information than the child, including a wealth of information drawn from his or her evaluation of the context and personal past experience both as a child and as a parent. There are many situations in which the parent’s caregiving system is activated, but the child’s attachment system is not. These situations may lead to occasions of parent-child conflict. For example, the desire of parents of adolescents to protect and care for their teenagers often conflicts with the teens’ view that their parents are controlling or intrusive.

The Caregiving System: Interaction and Competition among Behavioral Systems

According to ethological theory, behavior is the product of the *interaction* among behavioral systems (Hinde, 1982; Marvin & Britner, Chapter 12, this volume). Another important step in defining the caregiving system, therefore, is to examine the interaction between the parent's caregiving system and other behavioral systems that may compete with providing care for any particular child (Bowlby, 1969/1982; Solomon & George, 1996; Stevenson-Hinde, 1994). Just as flexible integration of sources of information is important, flexibility and the ability to balance competing behavioral systems are essential to accomplishing caregiving goals. This is true at the ultimate (functional) as well as at the proximate (psychological and physiological) level of analysis. From a functionalist view, a parent and child have overlapping interests and inherent and inevitable conflicts (Cassidy, 2000; Simpson & Belsky, Chapter 6, this volume; Solomon & George, 1996; Trivers, 1974). In addition to being a caregiver to one child, a parent may be a caregiver for other children (competing caregiving), a friend (affiliative system), a sexual partner (sexual system), a worker (exploratory system), or a person who seeks care from his or her own attachment figures (attachment system). A parent must strike a balance among these competing demands, as constrained by developmental, ecological, cultural, and individual factors that have been detailed elsewhere (Cassidy, 2000; Hrdy, 1999; Simpson & Belsky, Chapter 6, this volume; Solomon & George, 1996b, 2000).

Flexible care appears to be characteristic of all humans, despite vast differences in caregiving behavior (e.g., Posada, Gao, Wu, & Posada, 1995). Care is elevated through toddlerhood and followed by less direct supervision as the child matures. Flexibility is thought to contribute to selective advantage under difficult environmental conditions (Kermorian & Liederman, 1986). A parent may need to develop alternative or compromise strategies that are

manipulations of a primary behavioral system strategy (Hinde & Stevenson-Hinde, 1991). Main (1990) proposed that an infant's behavior associated with security is the primary attachment strategy; patterns of behavior associated with avoidant and ambivalent attachment are conditional secondary behavioral strategies that sacrifice feelings of security but permit a child to maintain proximity to the mother for protection. Following this thinking, we propose that mothers of avoidant and ambivalent children develop complementary alternative, conditional caregiving strategies, including heightened or minimized care (i.e., strategies that keep children close or at a distance), which may be culturally promoted in relation to overarching cultural socialization goals (George & Solomon, 1999; Solomon & George, 1996).

If we are correct in assuming that the goal of caregiving is protection of the young, then a very broad range of caregiving strategies may be considered "good enough," to the extent that the mother's behavior *under conditions of risk or threat to the child* is organized around protection. Mothers of infants classified as avoidant and resistant, as well as those of infants classified as secure, may be considered "good enough" under normal rearing conditions (i.e., in the absence of multiple or severe threats). In contrast to these relationships, we discuss later in this chapter how mothers of infants classified as disorganized may properly be labeled "disabled" caregivers, because they intermittently or persistently "abdicate" their protective role. This view is supported indirectly by well-established evidence that disorganized attachment, in contrast to the organized secure, avoidant, and ambivalent patterns, is associated with children's developmental risk (e.g., Lyons-Ruth & Jacobvitz, Chapter 28, this volume; Solomon & George, in press-a).

A Note about Caregiving in Mothers versus Fathers

It is likely that there are differences in interaction and competition among behavioral systems, depending on a parent's gender. Attachment research has focused primarily on mothers, although there is evidence that fathers can also be sensitive and involved caregivers (Bakermans-Kranenburg, van IJzendoorn, Bokhorst, & Schuengel, 2004; Belsky, Jaffee, Sligo, Woodward, & Silva, 2005; Grossmann, Grossmann, Kindler, & Zimmermann, Chapter 36, this volume). A few recent attachment studies describe fathers' views of their parenting activities (e.g., Bretherton, Lambert, & Golby, 2005). No attention has been devoted, however, to defining the caregiving system in relation to a father's other behavioral systems.

Ontogeny of Maternal Caregiving

The behavioral systems framework includes discussion of how caregiving behavior becomes an integrated, organized behavioral system. The most prominent explanations within attachment research assert that maternal caregiving is the transmission of the mother's attachment to the next generation (see Hesse, Chapter 25, for an overview). A view that this pathway is linear has become widely accepted in the field. We call this the assimilation model of caregiving (Solomon & George, 1996). Assimilation is the process by which new experiences and information are integrated into existing schemes; attachment theorists suggest that under normal circumstances, a mother integrates her experiences with the child into her mental representation of attachment.

At first glance, the assimilation model is appealing and appears to be supported empirically by findings that report statistically significant concordance patterns between a mother's AAI classification and a child's attachment classification (e.g., Benoit, Parker, & Zeanah, 1997; van IJzendoorn, 1995). More careful examination of this data shows that concordance is found predominantly for mothers who are judged secure or autonomous with

regard to attachment on the Adult Attachment Interview (AAI, George, Kaplan & Main, 1984, 1985, 1996; Main & Goldwyn, 1984/1998; see discussion by Solomon & George, 1996, in press-b). Concordance is lowest for mothers of disorganized children. The assimilation model predicts that mothers of disorganized children should be unresolved with respect to their own attachment-related loss or trauma; yet this is frequently not the case. Another striking mismatch that challenges the assimilation model has been demonstrated in attachment trauma research. Mothers who have “earned security” (see Hesse, Chapter 25, this volume) with respect to childhood trauma have been described as disorganized parents. As we discuss in detail in the section on disorganized caregiving at the end of this chapter, caring for their own children dysregulates these mothers’ caregiving system and reactivates personal traumatic fears and memories (Fisher, 2000).

Development of Maternal Behavior

Many contributions to the understanding of caregiving from outside the field of attachment bear on the development of the caregiving system and caregiving behavior. Central to our argument is that this development is the product of a complex transaction among biological and experiential factors. The biological foundation of mothering is regulated by neurological mechanisms associated with effective protection and care (Bell, 2001; Gobbin & Haxby, 2006; Kinsley et al., 1999; Leibenluft, Gobbin, Harrison, & Haxby, 2004; Lorberbaum et al., 1999; Nitschke, Heller, Etienne, & Miller, 2004; Swain, Lorberbaum, Kose, & Strathearn, 2007).

Comparative researchers describe the similarities among mammals in maternal behavior as due to common brain regions and mechanisms (e.g., Carter et al., 2005; Kinsley & Lambert, 2006; Poindron, Terrazas, de la Luz Navarro Montes de Oca, Serafán, & Hernández, 2007).

Kerverne (1995) emphasized the similarity across species of hormonal priming associated with pregnancy and birth, especially the role of oxytocin (see also Carter et al., 2005).

Pryce (1995) has developed the only comprehensive model of mothering that describes the developmental pathways that may lead to individual differences in mothering. Pryce stresses the importance of interacting influences, including the caregiving environment (e.g., social support, stress), characteristics of the infant, and “maternal motivation” (defined as the mother’s motivation to provide care, based on the reward value of the baby). Following attachment theory, and similar to the position advanced by Pryce, we propose that the caregiving system has important roots in childhood as well as more contemporary adult influences (see also Simpson & Belsky, Chapter 6, this volume).

In the remainder of this section, we outline ontogenetic factors beyond the mother’s own childhood experience that are likely to be important to the development of the caregiving system. Some of these influences have been considered briefly by other researchers interested in maternal behavior (e.g., Fraiberg, 1980; Sroufe & Fleeson, 1986), but not in terms of their relation to the caregiving system. We consider the following discussion to be a work in progress and do not intend it to be a definitive statement on caregiving. Our primary goal is to stimulate future thinking about the development of the caregiving system.

Factors Important to the Development of the Caregiving System

Childhood influences. All behavioral systems begin with immature forms of behavior that gradually become integrated and “mature.” Behavioral systems contribute to an individual’s fitness, but they do not develop at the same rate or at the same time during the life course. Behavioral systems essential for survival of the young (e.g., attachment, feeding) mature quickly. Behavioral systems important to later stages of development (e.g., caregiving, sex) mature more

slowly. Immature, isolated, and incomplete forms of behavior associated with a behavioral system can be observed before the system has reached maturity (Bowlby, 1969/1982; Marvin & Britner, Chapter 12, this volume). Behavior resulting from immature systems differs qualitatively from behavior resulting from mature systems. The stimuli activating immature behavioral systems are more varied than those that activate mature behavioral systems. Upon maturity, stimulus discrimination and organization improve, which results in a system that is potentially flexibly integrated and goal-corrected (Bowlby, 1969/1982)

The first expressions of the caregiving system appear as isolated, immature, nonfunctional forms of care and affection. These elements are observable at early ages in human and nonhuman primates. For example, “play-mothering” is common among juveniles, especially females (Pryce, 1995). The presence of babies, including dolls and baby animals, elicits interest and caregiving behavior in human children. There are important differences, however, between play-mothering and mature caregiving. The behavioral sequences in play-mothering are fragmented and incomplete, and a child’s attention is easily distracted away from the baby (Pryce, 1995). As a result, the child is not likely to follow through in providing complete or satisfactory care, and the baby may be placed in jeopardy.

Behavioral biologists emphasize that maternal behavior in juveniles is likely to be cued not only by the presence of an infant, but also by the child’s own experiences of maternal care (Pryce, 1995). Play-mothering does not occur, for example, in rhesus macaques that are isolated from their own mothers during the first year of life. Furthermore, these monkeys fail to show normal preferences for their own infants over infants of other females when they become mothers themselves (Pryce, 1995). Attachment theory proposes that children develop a sense of

caregiving through their experiences with their mothers (Bowlby, 1969/1982; Bretherton & Munholland, Chapter 5, this volume).

Although there is no research on caregiving behavior during middle childhood (roughly ages 5-11), we expect that the caregiving system matures gradually under child-rearing conditions in which a child is not placed in the position to assume *principal* responsibility for the care and protection of siblings or the child's own parents. In many cultures, children take on major responsibility for sibling care, tutored by their mothers or guided by older siblings. The degree to which this experience contributes to the early maturity of a child's caregiving system (i.e., causing it to become fully organized and integrated) is an empirical question.

Adolescence. It is likely that the caregiving system begins a transformation toward maturity during adolescence (Solomon & George, 1996). This view fits with the developmental perspective that adolescence is the period during which many of a child's characteristics (e.g., physical, mental) mature into adult forms. Fullard and Reiling (1976) found that children between the ages of 7 and 12 preferred to look at pictures of adults when given a choice between adults and infants. They report a shift to adult-like preferences for pictures of infants in girls ages 12-14 and boys ages 14-16. These shifts in preferences coincide with the average ages at which girls and boys become capable of reproduction. It suggests that the adolescent transformation of the caregiving system may be partly based on the biological changes associated with puberty. In girls, the changes in the hypothalamus, pituitary, and ovaries associated with menarche result in dramatic changes in primary and secondary sexual characteristics, including ovulation, placental development, and the production of adrenocorticotrophic hormones. Given the influence of hormones on mammalian and primate mothering, we speculate that these changes may be a

catalyst toward maturity of the caregiving system during adolescence; this speculation is supported by observations of earlier maturity of caregiving in girls than boys (Kerverne, 1995).

This transition is also influenced by experience. Stressful childhood experiences, for example, may provoke the early onset of menarche and an early interest in infants (Dario, 2005; Ellis & Garber, 2000; Kim & Smith, 2000; Moffitt, Caspi, Belsky, & Silva, 1992; Wierson, Long, & Forehand, 1993). The influence of mores and taboos in cultures that discourage adolescent sexual behavior and pregnancy may override a girl's biological predisposition to become a mother. In our experience, however, despite cultural pressures against adolescents having babies, many older adolescent girls (e.g., ages 17-19) demonstrate remarkable interest and thoughtfulness regarding mothering that extends beyond the intellectual knowledge of reproduction. Girls at this age are often consumed by questions about whether or not they will be good mothers, how it is that a mother comes to love a baby, and what it would be like to be responsible for an infant.

Transition to parenthood. The caregiving system probably undergoes its greatest development during the transition to parenthood (pregnancy, birth, and the months following birth). Developmentalists conceptualize a transition as a "crisis" or "bio-social-behavioral shift" that results from the transaction among unique biological, psychological, and social factors (Emde, Gaensbauer, & Harmon, 1976; Lee, 1995). We view the development of the caregiving system as a similar kind of qualitative shift. At the biological level, this period in a woman's life is accompanied by intense hormonal and neurological changes (Pryce, 1995), especially influences on neural networks considered to be the "maternal circuit" (i.e., hypothalamus and orbitofrontal cortex; Kinsley et al., 1999). Ovarian steroids (e.g., oxytocin, progesterone, oestradiol), adrenal hormones, and endorphins produced during this period are thought to

activate “motherly impulses” (Gintzler, 1980, as cited by Kinsley et al., 1999) and to influence sensory acuity, emotional calm, and closeness (Fleming & Li, 2002). Finally, many psychologists have noted an enormous upsurge in thoughts, doubts, and worries about the self as a parent, the spouse, and the past during this period. Some theorists propose that this upwelling of anxiety is essential for the mother’s reorganization of self (Ammaniti, 1994; Benedict, 1959; Bibring, Dwyer, Huntington, & Valenstein, 1961; Brazelton, 1981; Cohen & Slade, 2000; Coleman, Nelson, & Sundre, 1999; Cowan, 1991; Deutscher, 1971; Ilicali & Fisek, 2004; Lee, 1995; Liefer, 1980).

The caregiving system is influenced by the experience of childbirth itself, including the hormonal milieu and stimuli emanating from the young, and shifts in hormone production that reduce mothers’ fear and facilitate acceptance of their offspring (e.g., Fleming & Li, 2002; Hrdy, 1999; Klaus, Kennell, & Klaus, 1995). Factors surrounding a baby’s birth are thought to be critical to human mothering, although the strong interpretation of these effects has now been tempered (Klaus et al., 1995). Providing human mothers with bonding experiences (i.e., the opportunity for extended closeness and physical contact with the infant immediately following birth) enhances touching, kissing, talking to their babies, and nursing, especially for mothers at risk (e.g., those experiencing economic risk, high stress, unplanned or unwanted pregnancies) (e.g., Tallandini & Scalembra, 2006). Mothers’ bonding experiences, however, have not been found to be related to the children’s attachment security later in infancy (Rode, Chang, Fisch, & Sroufe, 1981).

The degree to which childbirth and other influences associated with the transition to parenthood influence the caregiving system is an issue that needs further investigation. The experiences that a mother brings to her baby’s birth, her representation of herself as a caregiver,

her interpretation of the birth experience, and her experience of the birth itself (e.g., birthing technique – Manning-Orenstein, 1997; miscarriage – Hughes, Turton, McGauley, & Fonagy, 2006; Slade et al., 1995; premature birth – Borghini et al., 2006; foster care – Stovall-McClough & Dozier, 2004) may be synergistic factors that together influence (positively or negatively) the caregiving system.

The baby. Other factors that may influence the development of the caregiving system are associated with the baby him- or herself (e.g., Bell, 1968; Sameroff, 1993). The baby has enormous power to evoke caregiving behavior. Physical features of “babyness,” including a combination of the prominent features of an infant (e.g., rounded, oversized head; large eyes) and distinctive emotional expressiveness, evoke caregiving in adults (Fullard & Reiling, 1976; Lorenz, 1943; Suomi, 1995). Infant cues (e.g., odor, cries) and proximity (including touching the baby) influence both the patterning of behavior and the mother’s motivation to respond in rats and humans (Carter et al., 2005; Corter & Fleming, 2002; Fleming & Li, 2002). A mother’s perception of her baby as physically unattractive or abnormal can elicit rejection, neglect, abandonment, or infanticide (Clutton-Brock, 1991; Langlois, Ritter, Cassey, & Sawin, 1995; Miller, 1987; Scheper-Hughes, 1987; Volk, Lukjanczuk, & Quinsey, 2005). Intervention techniques developed to increase parents’ propensity to paying attention to infant cues, such as “kangaroo care” (i.e., ventral physical contact with the infant through a soft baby carrier), increase sensitivity, mood, and touching for mothers and fathers (Feldman, 2004; Feldman, Weller, Sirota, & Eidelman, 2003; Magill-Evans, Harrison, Rempel, & Slater, 2006), and attachment security with mothers at 1 year (Anisfeld, Casper, Nozyce, & Cunningham, 1990).

The mother’s perception of her infant and of their relationship appear to be more important factors than any single quality of the baby, including temperament (Belsky & Rovine,

1987; Bokhorst et al., 2003; Egeland & Farber, 1984; Pianta, Marvin, Britner, & Borowitz, 1996; Vaughn, Bost, & van IJzendoorn, Chapter 9, this volume). Furthermore, her perceptions are likely to be integrated into a transactional feedback loop that is heavily influenced by other factors associated with the mother herself, including her memories and feelings about her own childhood attachment experiences.

Social-contextual factors related to providing care. Social-contextual variables – including the extent of a mother’s satisfaction with her social support network, her marriage/couple relationship, or economic factors – can support or compete with the mother’s *** ability to focus on providing care for her child (Cowan, Bradburn, & Cowan, 2005; Cox, Paley, Payne, & Burchinal, 1999; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Lundy, 2002; Meyers, 1999; Moss, Cyr, Bureau, Tarabulsky, & Dubois-Combois, 2005; Solomon & George, 1999c). According to Bowlby (1969/1982), it is likely that the mother’s partnership with the baby’s father or another co-parent especially influences her ability to provide care (see also Gable, Belsky, & Crnic, 1992; Lundy, 2002). From a behavioral systems perspective, the parent’s partner can enhance or compete directly with the ability or desire to be caregiver. Marital satisfaction, in and of itself, has not been found to be a strong predictor of child attachment with the mother (Belsky, Rosenberger, & Crnic, 1995). Other aspects of the marriage may, however, influence child attachment and maternal caregiving, especially the parents’ ability to work together in a co-parenting relationship and buffer the child from insensitivity in the other parent (Cowan et al., 2005; Edwards, Eiden, & Leonard, 2006; Solomon & George, 1999c).

Representational Models of Caregiving

The final specification of the caregiving behavioral system requires describing the internal guidance system that regulates the parent’s thinking and behavior regarding providing

care and protection. In humans, this internal system is conceived as an internal working model or mental representation, following Bowlby (1969/1982). The reader is referred to Bretherton and Munholland (Chapter 5, this volume) for a comprehensive discussion of mental representation in attachment theory. Here we provide an overview of the key points related to our thinking about caregiving representations.

Bowlby (1969/1982) proposed that the attachment behavioral system is regulated by internal working models that evaluate, emotionally appraise, and organize the infant's real life experience. He believed that these models were updated and reworked to achieve internal consistency and available for use in novel situations or as the basis of future plans. We have emphasized that, if caregiving is a behavioral system in its own right, then it should be guided by a representational model, separate from other models (e.g., the parent's model of attachment) (George & Solomon, 1989; Solomon & George, 1996). That is, the parent's caregiving representation is specific to the child. Caregiving representations capture the parent's immediate "retranscription" (West & Sheldon-Keller, 1994) or reconstruction of the past and current experiences with the child, in intersection with memories of the parent's attachment past, in terms of the current appraisal or thinking about the parent-child relationship (Solomon & George, 1996, 2006). The importance of relationship-specific models in current relationships has been more recently echoed in models of adult romantic attachment (see e.g., Crowell, Treboux, Pan, Gao, Fyffe, & Waters, 2002; J. Feeney, Chapter 21, this volume).

Representation is conceived by Bowlby (1973) as contributing to biological system homeostasis. Representational flexibility, then, should be the hallmark of a truly goal corrected relationship, one of the defining behavioral systems constructs that we described in the beginning of this chapter. Representational flexibility would be expected to contribute to integration and

balance, thus maintain caregiving homeostasis. Optimally, these processes enable sensitivity, and they fortify the parent's commitment to the child with feelings of competence and joy.

Representational flexibility should facilitate the parent's ability and desire to detect and differentiate among the signals and events associated with competing behavioral systems and goals. Such differentiation should be evidenced by thinking and behavior that demonstrate understanding of the fundamental boundaries between and intersections among systems, including protection and care of the child (caregiving system), seeking protection and care from others (attachment system), peer friendships (affiliative system), sexual activity (sexual system), and exploration (exploratory system) (George & Solomon, 1999; Solomon & George, 1996).

Flexibility and balance are undermined when defensive processes distort and exclude information and feelings to the extent that the parent is not able to detect and integrate the signals associated with caregiving, attachment, and other behavioral system. This results in exclusion, confusion, or breakdown.

This integrative quality is captured by concepts related to the flexibly integrated states of mind. "State of mind" refers to how the individual integrates thoughts and feelings about relationships and the processes that support or exclude relationship-related information from one's thinking. State of mind was first defined in attachment theory using the Adult Attachment Interview (AAI: George, Kaplan, & Main, 1984/1985/1996; Main & Goldwyn, 1984; Main, Goldwyn, & Hesse, 2003). Main proposes that AAI attachment security represents maximal representational integration, reflected best by the interview's coherence ratings (the strongest predictor of security on the AAI – see Hesse, Chapter 25, this volume, and Main et al., 2005). The relation between integrative flexibility and security is integral to two other state-of-mind constructs. The "internalized secure base" is defined as the individual's capacity to draw upon

internalized attachment figures to explore and integrate thoughts and feelings about attachment distress and possible solutions (i.e., as a safe internal haven for secure base explorations of attachment) (George & West, 2001, in press). Self-reflective functioning, a form of psychoanalytic intersubjectivity, is defined as the individual's ability to conceive of and integrate the mind of the self and parent (e.g., Fonagy, Steele, & Steele, 1991; see Slade, Chapter 32, this volume, and Fonagy, Gergely, & Target, Chapter 34, this volume).

Table 1 provides a chronological summary of the different representational approaches to caregiving in the field of attachment. These approaches share an emphasis on describing the parent's *current* relationship-specific state of mind regarding the child, and all use structured clinical interviews to elicit narrative descriptions of affect, experience, and appraisals of the child or the child-parent relationship. The reader will see that there is no single approach and that interviews and analysis dimensions overlap considerably across methods. Some approaches address the phenomenon that van IJzendoorn and colleagues termed "the transmission gap" (de Wolff & van IJzendoorn, 1997; van IJzendoorn, 1995), the fact that a mother's state of mind regarding her childhood attachment experiences is not as powerful a predictor of maternal sensitivity and child security as was expected. Caregiving researchers tested hypotheses that parents' representations of their children would be a strong contributor to explaining the "gap," and found that integrated "mentalizing" features of caregiving representations were important mediators between mothers' representations of their past and sensitive interactions with their children in the present. The mentalizing dimensions defined by this body of research fit what we have described in this chapter as representational flexibility, including *coherence* (derived from the AAI), *mind-mindedness* (Bernier & Dozier, 2003, following Meins, 1999), *insightfulness* (Oppenheim, Koren-Karie, & Sagi, 2001; Oppenheim & Koren-Karie, 2002), and *reflective*

functioning (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005, derived from Fonagy et al.'s (CITEXX) self-reflective function). Other approaches examined representational dimensions of parenting related to the child's attachment and developmental correlates, including parents' resolution of their child's disability diagnosis (Marvin & Pianta, 1996; Pianta, Marvin, Britner, & Borowitz, 1996), quality of care in foster mothers (Bates & Dozier, 2002; Bernier & Dozier, 2003; Ackerman & Dozier, 2005), intrusive infant interaction (Grienenberger, Kelly, & Slade, 2005) and psychosocial adjustment in adolescence (Mayseless & Scharf, 2006).

Classification groups are the primary conceptual and methodological foundation in child and adult *developmental* attachment research (see Crowell & Fraley, Chapter 26, this volume for a discussion of developmental and social-personality approaches to adult attachment and the merits of classification groups versus rating scales as tools for analysis). Four caregiving approaches have produced a caregiving classification system (see Table 1). Three systems report moderate concordances (52-74%) between caregiving representations and 3-group child attachment classifications (B, A, C classification groups – Mayseless & Scharf, 2006; Zeanah, Benoit, Hirschberg, & Barton, 1993; B, C, D classification groups – Oppenheim, Koren-Karie, & Sagi, 2001).

All of these approaches (parent representation dimensions, mentalizing, and classification systems) have contributed new and important insights into parenting. Theory and research in attachment draws heavily from the four group infant classification system. As we noted earlier, models of parenting have either emphasized caregiving dimensions associated with security, or developed three or four group classification systems that are only weakly associated with identifying the insecure attachment groups. We have developed a different approach to classification based on Bowlby's (1980) view of defensive exclusion, which we will describe

more fully in the discussion below and which has demonstrated a high secure-insecure (91%) and 4-group classification (81%) concordance rate (George & Solomon, 1996).

With Table 1 in mind, we now complete our behavioral systems model of caregiving by describing how caregiving is related to the child's secure, avoidant, ambivalent, or disorganized attachment. Studies describing parent and child dimensions not specifically related to attachment are beyond the scope of this discussion. We begin by discussing the representations of caregiving for the mothers of secure children.

We have tied the child's attachment security to behavioral and representational caregiving flexibility and balance, which contribute to a goal corrected partnership. Caregiving representation studies converge in describing mothers of secure children as flexible, balanced, and integrated (Ackerman & Dozier, 2005; Bernier & Dozier, 2003; George & Solomon, 1996; Grienberger, Kelly, & Slade, 2005; Oppenheim & Koren-Karie, 2002; Oppenheim, Koren-Karie, & Sagi, 2001; Slade, Belsky, Aber, & Phelps, 1999; Slade, Grienberger, Bernbach, Levy, & Locker, 2005; Solomon & George, 1999c, 1999d; Steinberg & Pianta, 2006). Mothers' narratives describe other features of a goal corrected parent-child relationship as well, including commitment, trust, cooperation, knowledge of self and child as individuals, the ability and desire to communicate clearly about caregiving and attachment goals (especially when in conflict), and the joy associated with being a parent (Bernier & Dozier, 2003; George & Solomon, 1996, 1999; Grienberger et al., 2005; Slade et al., 1999; Slade et al., 2005; Steinberg & Pianta, 2006). Many of these representational characteristics coincide with recent behavioral descriptions of maternal caregiving behavior with preschoolers in the Strange Situation (Britner, Marvin, & Pianta, 2005).

Research demonstrates as well that the caregiving representations of mothers of insecure children are not flexible, balanced, or integrated. Mothers of insecure children receive lower ratings for insight and sensitivity, maternal reflective function, and mind-mindedness than mothers of secure children (Bernier & Dozier, 2003; Bretherton et al., 1989; Slade et al., 2005). There is little systematic research or theory building regarding individual differences in caregiving representation related to insecure attachment. One of the reasons for this shortage is likely due to the primary research focus on representational dimensions, especially in relation to the quest for the roots of maternal sensitivity. Slade (2004) argued that dimensional processes are more informative about an individual's representation of interpersonal experience than categories. We have always found that understanding processes in the context of classification groups provides a more structured framework of understanding caregiving in relation to attachment than dimensions alone, and a "compass," so to speak, that orients us to the fundamental differences among caregiving-attachment relationships (e.g., Solomon & George, 2006). We now describe mothers of insecure children, predominantly drawing on our own work, integrating other research findings when available. This discussion requires a brief discussion of our approach. Our goal, as with the chapter as a whole, is to stimulate theory building in relation to the caregiving system.

Defensive Processes

Our approach is built on Bowlby's model of defense. Bowlby (1973) defined defense as "contributing to the maintenance of what can ... be termed a steady 'representational' state" (p. 149). He described three forms of defensive exclusion – deactivation, cognitive disconnection, and the segregated system (Bowlby, 1980). We have defined how patterns of Bowlby's defenses are manifest in mothers' descriptions of parenting during the Caregiving Interview and how

these patterns are related to individual differences in child attachment (George & Solomon, 1996; 1988-2007). This approach has also been validated in our doll play assessment procedure for young school-aged children (Solomon et al., 1995) and in a projective assessment for adults (the Adult Attachment Projective; George & West, 2001, in press).

We conceived of deactivation and cognitive disconnection as “organizing” defenses (George & Solomon, 1996; Solomon, George, & De Jong, 1995). Following Bowlby, we have shown that these forms of defensive exclusion serve to protect the individual from breakdown and keep internal working models of caregiving and attachment organized, that is, to protect the individual from representational and behavioral disorganization. Bowlby (1980) defined deactivation as a defensive process that removes distress from conscious awareness. This form of defensive exclusion characterizes the interviews of mothers of avoidant children. We understand deactivation as the exclusion mechanism that permits circumventing activation (arousal) of the caregiving system, resulting in evaluations of self and child that diminish the importance of caregiving and attachment experiences and descriptions of caregiving practices we have called “distanced protection” (Solomon & George, 1996). Mothers in this group express disdain for clingy children and do not enjoy caregiving closeness; they describe caregiving strategies that emphasize overseeing the child from afar or assigning care to someone else. Psychological distance is maintained through emphasizing negative portrayals of self and child, such as the mother is not doing a good job or the child is manipulative and requires authoritarian discipline. A similar emphasis on lack of intimacy and discipline was noted in behavioral observations of mothers of avoidant preschoolers in the Strange Situation (Britner et al., 2005).

Cognitive disconnection is the dominant defensive process that we have found to characterize the mothers of ambivalent-resistant children (CITEXX). Bowlby (1980) defined

cognitive disconnection as a form of splitting (literally disconnecting) attachment information and affect from their sources. Whereas deactivation is likely to block or re-define caregiving experiences in order to keep distress and need out of conscious thinking, it is helpful in understanding Bowlby's conceptualization of disconnection to view this process as "chopping" up events and affects. This form of exclusion leads to a different quality of limited awareness and narrative descriptions from deactivation. Complete events and their associated affects are neither fully remembered nor fully excluded; disconnection prevents seeing "the bigger picture." We view disconnection as the underlying mechanism that heightens activation of the caregiving system, leading to caregiving practices we have described as "close protection" (Solomon & George, 1996). Keeping the child close presumably affords mothers maximum opportunity to detect caregiving and attachment signals. We have found that most mothers of ambivalent-resistant children endorse the advantages of closeness, emphasizing descriptions of the positive aspects of the relationship (e.g., enjoy the child's sweet nature, happy togetherness) and attempts to stop thinking about distressing aspects of caregiving (citexx). The disadvantage of this level of physical and psychological closeness also means, though, that mothers are not able to turn fully away from their children's unhappiness or from their own caregiving failures. They are ultimately unable to integrate or deactivate, and they describe how they are worried, guilty, and anxious about their misunderstandings and confusing ineffectiveness. This mixed or confused quality of thinking is consistent with features of caregiving classification typologies that have been relatively successful in identifying the mothers of ambivalent infants (Oppenheim et al., 2001; Zeanah et al., 1993) and also described in observations of maternal behavior in the Strange Situation (Britner et al., 2005).

Now that we have described the mental representations of caregiving that we propose to be associated with children with organized attachments, we return to examine our proposition that these forms of caregiving representational processes are associated with “good enough” protection and care. The reader will recall that, when viewed from a behavioral systems framework, maternal behavior is the product not only of activation and termination of the mother’s caregiving system, but also of the mother’s integration of her own and the child’s competing behavioral systems. We found that the flexibly integrated mother clearly understands the boundaries and intersections of behavioral systems. The mother attempts and is successful in balancing competing behavioral systems’ goals without threatening caregiving and attachment, investing in or putting other goals aside as context and the child’s development permits (George & Solomon, 1988-2007).

What we found in the interviews of mothers of avoidant and ambivalent children is the degree to which defensive exclusion permits representational approximations of behavioral system integration, despite being out of balance. Mothers of avoidant children were clear in their minds about the boundaries among competing behavior systems, attending to caregiving goals as necessary or through distanced protection and elevating the attention and energy invested in the exploratory (e.g., personal achievement, contributing role in the child’s education) and affiliative systems (e.g., being with her friends). Mothers of ambivalent-resistant children elevated caregiving at the expense of exploration and affiliation. Thus, although out of balance, mothers of organized-insecure children described providing some degree of care and protection for their children, as compared with the mothers we consider in the next section.

The Disabled Caregiving System: Abdication of Care, Helplessness, and Disorganized Attachment

There are several overlapping views of attachment disorganization in children. These views agree that the children's fear, of the mother herself or the context created in her care, are central to the child's disorganized attachment (George & Solomon, 1999; Lyons-Ruth & Jacobvitz, Chapter 28, this volume). In contrast to mothers of children with organized attachments, we have proposed that the caregiving representations of mothers of disorganized and controlling children are characterized by *abdicated caregiving*, *failures of protection*, and *helplessness* (George & Solomon, 1996; Solomon & George, 1996). Following Bowlby (1980), we conceive of abdicated caregiving in terms of the breakdown of regulated normative defenses (i.e., deactivation, cognitive disconnection) that he termed "segregated systems." Linked to attachment trauma (Bowlby, 1980) and caregiving trauma or threats (Solomon & George, 2000), the defensive processes that are developed to maintain a "steady representational state" can be achieved only if painful and threatening memories and their associated affects are blocked from consciousness. Bowlby likened segregated systems to repression, and he proposed that the contents of segregated memories are maintained as a separate representational model. Segregated systems were conceived as the psychological foundation of "pathological mourning," because this mental state blocked memories (failure to mourn) or flooded the individual with memories of traumatic events (chronic mourning). In either manifestation, segregated systems created a situation in which the individual could not face or integrate traumatic attachment events in a way that made them available to consciousness and subject to monitoring by executive processing control mechanisms. Bowlby proposed that segregated systems are the most extreme and brittle forms of defensive exclusion, acting behind the scenes, so to speak, and suddenly subject to defensive breakdown when the attachment system was activated. Segregated systems, therefore, are more likely to interfere with a steady representational state than help maintain it.

Bowlby's description of segregated systems is consistent with contemporary thinking in attachment theory (e.g., Hesse & Main, 2007; Liotti, in press). Attachment studies using neuroimaging techniques have demonstrated a failure in unresolved adults (analogous to disorganized child attachment) in community and psychiatric samples of the prefrontal cortex to modulate limbic system activity when attachment was activated in an fMRI environment (Buchheim, Erk, et al., in press; Buchheim et al., 2006; Buchheim & George, in press). These patterns were interpreted as indicative of the effects of attachment distress on the mental states of "disorganized" individuals, such that autobiographical memories, especially trauma, flooded and overwhelmed executive control processes.

We conceive of disorganization and dysregulation of caregiving as the failure to use adaptive, normative forms of defense (and the executive control mechanisms associated with normative defenses) to regulate segregated caregiving experience (George & Solomon, 1988-2007; Solomon et al., 1995). Disorganization of caregiving marks the potential for *failure* to protect (functional goal) and provide care and comfort (proximate goal) (Solomon & George, 1996). We return to this idea shortly when we discuss "abdication" of caregiving.

We believe that segregated systems are evident in two forms of processing that we have identified in mothers' caregiving interviews: dysregulation and constriction. Dysregulated caregiving is conceived as "unleashed" segregated systems, a mental state characterized by flooding and by mothers becoming overwhelmed by their worst fears about themselves and their children. When dysregulated, mothers describe their helplessness to care for or protect themselves or their child from threats and danger. Their interviews include strong themes of vulnerability, inadequacy, loss of control, and inability to provide assurance or comfort when children are frightened. In some instances, these inadequacies were "not their fault," but rather

the result of individuals or contexts that prevented them from providing care and protection for their children (e.g., court-imposed visitation with a father whom the mother did not trust; Solomon & George, 1999b). Mothers' descriptions of their children emphasized many of the qualities they described of themselves. Their children were viewed as being out of control (e.g., acting like "maniacs," defiant, hysterical, threatening), descriptions conveying the message that their children were "devils" that rendered mothers helpless to combat or organize their children's behavior. As a result, at the behavioral-systems level, these mothers were markedly out of balance, desperately struggling to remain in control.

Constricted caregiving is conceived as a brittle defensive guard or heightening of segregating exclusion processes that prevents dysregulated representational and behavioral states from emerging (Solomon et al., 1995). Constriction appears to prevent the mother from thinking about how she and the child together contribute to their caregiving-attachment relationship. Constricted mothers describe constricted caregiving practices. They describe how they remove themselves from caregiving situations (e.g., take a bath in a locked bathroom), often leaving the child in distress, in order to prevent breaking down and losing self-control. They describe situations in which their children took over caregiving responsibilities, evaluating the child as possessing precocious and amazing (sometimes supernatural) abilities to manage and control people and situations in which the mother would have been incompetent (i.e., adultification, role reversal; see also Ackerman & Dozier, 2005). They also describe the converse: psychologically merging with the child or taking on the child's distress as their own (e.g., "we have a special understanding of each other," "the child and I are one"). We view constriction as a mechanism that blocks integration of self and child. Mothers can think of the child only in relation to themselves – the child is invisible.

It appeared from the interviews that invisibility permits mothers to block from their awareness potential evaluations of their children that might dysregulate caregiving and unleash feelings of helplessness and being out of control. It was evident from the interviews that this form of defensive exclusion released mothers from the difficulties of caregiving. Constriction was associated with descriptions of children as “angels” who never created and problems or conflicts. Like the behavioral systems of dysregulated mothers, those of constricted mothers are also markedly out of balance; the caregiving system, like the child, is essentially invisible.

In contrast to the interviews of mothers of avoidant and ambivalent children, the interviews of mothers of disorganized children failed to reveal any predominant organizing defensive processing strategies. Rather, these mothers described their own extreme behavioral reactions or feelings of impotence or constriction, and their inability to select, evaluate, or modify their own behavior or that of their children. They viewed themselves as helpless, an appraisal that was often associated with strong, uncontrollable emotions and affective dysregulation.²

Two studies support our approach to disorganized caregiving. First, Britner and his colleagues (2005) adapted our concept of “abdication of care” for the Strange Situation. Mothers of disorganized-controlling preschoolers were described as not taking the “executive role” and as incompetent, passive, frightened, and inappropriately accepting of their child’s punitive or caregiving behavior. Drawing from our prior discussion, we would characterize the mothers in this preschool sample as helpless.

Second, George and Solomon (in press) examined disorganized caregiving in a sample of mothers of children ages 3 to 11. Disorganization was measured using a Helplessness Questionnaire that we derived from and validated using the Caregiving Interview. The

questionnaire measures three dimensions of disorganized caregiving: mother helpless (e.g., “When I am with my child, I feel out of control”), mother and child frightened (e.g., “My child does scary and dangerous things”), and child as caregiving (e.g., “My child is good at tending to or caring for others”; “My child is always trying to make others laugh”). The first two dimensions appear to indicate dysregulated caregiving; the third dimension taps constricted caregiving. Disorganized caregiving (each of the three dimensions) was significantly associated with mothers’ self-reported distress, including parenting stress and depressive symptomology. There were important differences, however, between the correlates of the dysregulated and constricted dimensions. Dysregulated caregiving was significantly related to mothers’ reports of their children as troublesome and the source of their distress (e.g., fails to meet mothers’ expectations, moody, hyperactive/distractible; CBCL externalizing behavior). These associations were not found for constricted caregiving. Caregiving constriction was associated with precocious adultification and perceived goodness in the child, but not linked to mothers’ distress.

We now return to the concept of abdicated care. We have defined abdication as a breakdown in the caregiving system, and the result is a *disorganized* and dysfunctional form of care (Solomon & George, 1996b, in press a). Dysfunction as associated with attachment disorganization has been defined in the field only in terms of developmental or mental health risk. Dysfunction from a functionalist view (i.e., an evolutionary perspective) would take into consideration caregiving that undermines a mother’s adaptive fitness. It may sometimes be in a mother’s interest to abdicate care, and even abandon or kill her infant (Clutton-Brock, 1991; Hrdy, 1999; Miller, 1987; Scheper-Hughes, 1987); however, these forms of physical abdication are relatively rare after the immediate neonatal period, and in our own culture they are considered pathological. Of particular interest to psychologists is a subset of mothers who do not

dispose of their infant physically, but nevertheless behave in ways that are antithetical to protection, including frightening, maltreating, neglecting, or leaving the child unprotected from threats by others or the environment. Taken together, these are all examples of abdication of care. For these mothers, in whom the caregiving system is disabled, their attachment and caregiving systems are dysequilibrated and unintegrated. This means that the caregiving and attachment behavioral systems are not working reciprocally and are failing to mutually inform each other. We propose that it is under conditions of failed protection—that is, abdication of the caregiving system—that the mother fails to provide “good enough” care for the child.

This may occur especially when mothers are overwhelmed by their own distress (and their attachment system is activated). Flooded, distressed mothers are blocked from detecting the attachment needs of their child (a function of the caregiving system). As a result, the mother experiences caregiving and her relationship with the child in terms of profound helplessness and fear. Our recent study of mothers of disorganized children showed that, even if the mother’s adult attachment classification was not Unresolved, memories of being frightened and unprotected as a child were associated with disorganized and helpless representations of the self as a mother (Solomon & George, in press a).

In sum, evidence from these studies suggests that these mothers are afraid, although they need not be constantly preoccupied with or consciously aware of their fear. We have proposed, however, that for a full understanding of attachment disorganization, mother–child interaction must also be examined from the perspective of the caregiving system. Based on this perspective, two important questions arise: What is the mother afraid of? And what is it about the mother’s caregiving behavior that frightens the child?

We suggest that the mother is afraid of her own profound helplessness, a helplessness that may be the product of overlapping fears. She may be afraid for the safety and protection of herself and/or her child. She may also fear losing control of her emotions and her behavior, and/or of circumstances or people (self, child, or others) that threaten her fragile resources. Determining the immediate causes of the mother's fear – that is, the situational cues that elicit the mother's fear in the moment – is more difficult; these causes are likely to be rooted in the mother's childhood or her current experiences. Unresolved childhood loss and trauma have been linked with attachment disorganization (Hesse & Main, 2006); however, as we described earlier in this chapter, this link is not fully supported by research and there are many gaps in this model. Further research is needed to examine how lack of resolution is linked explicitly to a mother's fears and helplessness.

In addition to childhood trauma, we propose that the mother's caregiving system may be immobilized by "assaults to the caregiving system" (Solomon & George, 2000). These may include, but are not limited to, parental divorce (Solomon & George, 1999b), child disability (Pianta et al., 1996), prematurity (Borghini et al., 2006), perinatal loss of a child (Bakermans-Kranenburg, Schuegel, & van IJzendoorn, 1999; Cote-Arsenault & Dombek, 2001; Heller & Zeanah, 1999; Hughes, Turton, Hopper, McGauley, & Fonagy, 2004; O'Leary, 2005; Turton, Hughes, Fonagy, & Fainman, 2004), or brutal urban violence, war, and terrorism (Almqvist & Broberg, 2003; Schechter et al., 2005; Stovall-McClough et al., 2006). Fear is known to increase stress and arousal, and hypervigilance (Perry, Pollard, Blakley, Baker, & Vigilante, 1995).

We propose that isolating the particular causes of attachment disorganization requires observing mother and child under stressful circumstances; specifically, in situations that threaten the mother's ability to manage (regulate) either her child's negative affect and behavior or her

own. Our data suggest that mothers of disorganized children can sometimes provide organized protective care (Solomon & George, in press a), and under some circumstances they evaluate themselves as effective. Observations of mother-child interaction under low-stress conditions have failed to differentiate between organized and disorganized groups (Lyons-Ruth & Jacobvitz, Chapter 28, this volume). Links between stress and helplessness have also been found in studies directly measuring parents' perceived stress as related to the child (George & Solomon, in press). According to our model, the mother's fear can be understood only in the context of the stressful *events* or *cues* that *dysregulate* her and leave her feeling vulnerable, unprotected, and helpless.

In order to understand what in the mother's behavior frightens the child, we must examine the chain of events that prevail during mother-child interactions in disorganized dyads. Our thinking is that because she is hypervigilant and lacking robust, organized defenses, perhaps also constricted and shut off from the child, the mother is susceptible to being overwhelmed by helplessness and fear (e.g., affective flooding). The panic or helplessness disables caregiving because the mother becomes closed or shut off from the child's attachment cues. Thus, the mother does not detect the child's need and, therefore, is not able to care for or respond to these needs. We propose that *what frightens the child is the mother's simultaneous abdication of care and impermeability to the child's cues or bids for care*. The mother is unavailable to her child during the moments that her child needs her the most. It is under conditions of failed protection—that is, abdication of the caregiving system—that the mother fails to provide “good enough” care for the child.

Conclusions and Implications

We believe that consideration of the caregiving system offers important insights into the

parent-child relationship that are missed when focusing on attachment system alone. This chapter has been dedicated to describing some of those insights. Attachment researchers, and more broadly developmental psychologists and psychoanalysts, have historically approached the mother as a “variable.” Maternal behavior has been carved into an infinite list of qualities and behaviors. Attachment theorists have described mothers, for example, as sensitive, rejecting, accepting, intrusive, or frightened. In this chapter we have argued that in order to understand caregiving, theorists need to move from the level of considering the mother as a “variable” to seeking to understand her as an individual in her own right. Mothers as individuals represent a complex interplay of developmental factors and challenges, including, as we emphasize in this chapter, an integration of competing behavioral systems.

What is added to our understanding of maternal caregiving and attachment by looking at the mother and her behavior through the lens of the caregiving behavioral system? We propose that this lens has important implications for understanding the development of caregiving behavior throughout the lifespan, and we have made specific suggestions for future research as related to the parent-child relationship throughout this chapter. We still know little about the caregiving system in fathers, and in parents of children beyond early childhood, including adolescents. Other questions concern caregiving in relationships other than the primary parent-child relationship. In what ways is caregiving by a parent’s partner or relatives (e.g., grandmother), caregiving professionals (e.g., day care provider, preschool teacher) similar to and different from the caregiving system for parents?

Some attachment theorists have described caregiving in the context of other relationships, including adult attachments (e.g., Crowell et al., 2002; J. Feeney, Chapter 21, this volume; Mikulincer & Shaver, Chapter 23, this volume) and the relationships between middle aged adults

and their elderly parents (e.g., Steele, Phibbs, & Woods, 2004; Magai, Chapter 24, this volume). With regard to adult attachments, the reciprocal balance is defined in terms of peer relationships. These relationships among equals are qualitatively different from the hierarchical caregiving-child relationship in which relationship members are not equal. The caregivers in parent-child attachment are thought to be “stronger and wiser” (Bowlby, 1969/1982; West & Sheldon-Keller, 1994). In relationships among equals, adult partners are likely to change roles, sometimes acting in the role of the stronger and wiser support provider and sometimes in the role of the one who is troubled and needs support. With regard to adult children and their elderly parents, we might be especially interested in the question of whether or how the child may change roles to become caregiver for the parent (see Magai, Chapter 24, this volume). Is this role reversal or parentification, as it would be conceived for children, or a more normative chain of events that may be precipitated by the parent’s loss of all other attachment figures (e.g., spouse)?

The overlaps in discrete behavior (caring for the other, paying attention to signals of distress) and motivation between the different kinds of relationships generate questions about the etiology of caregiving behavior. The discussion of the many different relationships in which caregiving is a component is beyond the scope of this chapter. We hope that the principles we have described prove helpful in understanding the overlaps and differences between caregiving in these other relationships, including their relation to the biological function and goal of caregiving.

We end with a major clinical implication of our approach to the caregiving system. The caregiving system provides clinicians with a powerful tool—a tool that frames a mother’s behavior and perceptions of her child in terms of *protection*. The mother’s desire and ability to provide protection are the central organizing features of the child’s attachment. Behavioral

interventions usually focus on changing the mother's "bad" behavior. Furthermore, as we have discussed earlier, attachment theory (and therefore attachment-related interventions) has assumed that maternal sensitivity is the strongest determinant of attachment security. Captivated by this concept, the field has focused on getting mothers to be more sensitive to their children in a variety of interactive settings (e.g., play, problem solving, or feeding), and has strayed away from the kind of sensitivity that is fundamental to attachment—sensitivity to a child's need for protection.

Even mothers with very traumatic and disturbed attachment histories are strongly motivated to protect their children (Fraiberg, 1980). In our experience, mothers with serious intellectual, behavioral, or adjustment problems, who may not be able to benefit immediately from insight-oriented therapy or some forms of didactic parent education, have been able to understand what it means to provide or fail to provide protection for their children. Attachment theory suggests that there may be other ways to influence mother-child attachment. We propose that one powerful influence that has been overlooked is intervention organized around the framework of the caregiving system—that is, a mother's evaluation of herself as effective in providing protection for her child.

Footnotes

1. A good question is raised here as to whether other maternal caregiving behaviors, also central to the baby's survival, may be considered "a part" of this system: e.g., nursing, cleaning, behavioral thermoregulation, "affectionate" behavior, grooming/licking/washing. Whether or not these behaviors are included, it is clear that a much wider variety of maternal behaviors can and must be brought to bear (organized) to serve the goal of protection, especially when the infant is immature and immobile.
2. We note that one might expect the interviews of these mothers to resemble the AAI discourse patterns of lack of resolution, since the unresolved adult attachment is conceived as analogous to child disorganization (e.g., George, West, & Pettem, 1999; Hesse & Main, 2006), and mothers' lack of resolution is associated with attachment disorganization in the child (Main & Hesse, 1990; Lyons-Ruth & Jacobvitz, this volume). The hallmark of lack of resolution in the AAI is an individual's inability to monitor discourse or reasoning. These monitoring-related features of thought were not observed in the caregiving interviews of mothers of disorganized/controlling children, despite the fact that many of these mothers were classified as unresolved with respect to loss on the AAI (George & Solomon, 1996). We see this as further support for our view that a mother's thinking about her caregiving and her attachment experiences are regulated by separate representational models, which are distinct components of the attachment and caregiving behavioral systems.

References

- Aber, J. L., Slade, A., Berger, B., Bresgi, I., & Kaplan, M. (1985). *The Parent Development Interview*. Unpublished manuscript.
- Ackerman, J. P., & Dozier, M. (2005). The influence of foster parent investment on children's representations of self and attachment figures. *Journal of Applied Developmental Psychology, 26*, 507-520.
- Ainsworth, M. D. S., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
- Almqvist, K., & Broberg, A. G. (2003). Young children traumatized by organized violence together with their mothers: The critical effects of damaged internal representations. *Attachment and Human Development, 5*, 367-380.
- Ammaniti, M. (1994). Maternal representations during pregnancy and early infant-mother interaction. In M. Ammaniti & D. S. Stern (Eds.), *Psychoanalysis and development: Representations and narratives* (pp. 79-96). New York: New York University Press.
- Anisfeld, E., Casper, V., Nozyce, M., & Cunningham, N. (1990). Does infant carrying promote attachment? An experimental study of the effects of increased physical contact on the development of attachment. *Child Development, 61*, 1617-1627.
- Bakermans-Kranenburg, M. J., Schuegel, C., & Van IJzendoorn, M. H. (1999). Unresolved loss due to miscarriage: An addition to the adult attachment interview. *Attachment & Human Development, 1*, 157-170.

- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Bokhorst, C. L., & Schuengel, C. (2004). The Importance of Shared Environment in Infant - Father Attachment: A Behavioral Genetic Study of the Attachment Q-Sort. *Journal of Family Psychology, 18*, 545-549.
- Bartels, A., & Zeki, S. (2004). The neural correlates of maternal and romantic love. *NeuroImage, 21*, 1155.
- Bell, D. C. (2001). Evolution of parental caregiving. *Personality and Social Psychology Review, 5*, 216-229.
- Bell, R. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review, 75*, 81-95.
- Belsky, J., Jaffee, S. R., Sligo, J., Woodward, L., & Silva, P. A. (2005). Intergenerational transmission of warm-sensitive-stimulating parenting: A prospective study of mothers and fathers of 3-year-olds. *Child Development, 76*, 384-396.
- Belsky, J., Rosenberger, K., & Crnic, K. (1995). *The origins of attachment security: 'Classical' and contextual determinants*. Hillsdale, NJ: Analytic Press.
- Belsky, J., & Rovine, M. (1987). Temperament and attachment security in the Strange Situation: An empirical rapprochement. *Child Development, 58*, 787-796.
- Benedict, T. (1959). Parenthood as a developmental phase: A contribution to the libido theory. *Journal of the American Psychoanalytic Association, 7*, 389-417.
- Benoit, D., Parker, K. C. H., & Zeanah, C. H. (1997). Mothers' internal representations of their infants assessed prenatally: Stability over time and association with infants' attachment classifications at 12 months. *Journal of Child Psychology, Psychiatry and Allied Disciplines, 38*, 307-313.

- Bernier, A., & Dozier, M. (2003). Bridging the attachment transmission gap: The role of maternal mind-mindedness. *International Journal of Behavioral Development, 27*, 355-365.
- Bibring, G., Dwyer, T., Huntington, D., & Valenstein, A. (1961). A study of the psychological processes in pregnancy and of the earliest mother-child relationship. *Psychoanalytic Study of the Child, 16*, 9-24.
- Bokhorst, C. L., Bakermans-Kranenburg, M. J., Fearon, R. M. P., van IJzendoorn, M. H., Fonagy, P., & Schuengel, C. (2003). The importance of shared environment in mother-infant attachment security: A behavioral genetic study. *Child Development, 74*, 1769-1782.
- Borghini, A., Pierrehumbert, B., Milkjkovitch, R., Muller-Nix, C., Forcada-Guex, M., & Ansermet, F. (2006). Mother's attachment representations of their premature infant at 6 and 18 months after birth. *Infant Mental Health Journal, 27*, 494-508.
- Bornstein, M. H. (Ed.). (2003). *Handbook of parenting: Children and parenting* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Bowlby, J. (1969/1982). *Attachment and loss: Vol 1. Attachment*. New York: Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2 Separation*. New York: Basic Books.
- Bowlby, J. (1980). *Attachment and loss: Vol. 3 Loss*. New York: Basic Books.
- Bowlby, J. (1988). *A secure base*. New York: Basic Books.
- Brazelton, T. B. (1981). *On becoming a family*. New York: Delacorte Press/Laurence.
- Bretherton, I. (2005). In pursuit of the internal working model construct and its relevance to attachment relationships. In K. E. Grossmann, K. Grossmann & E. Waters (Eds.),

- Attachment from infancy to adulthood: The major longitudinal studies.* (pp. 13-47) New York: Guilford Press.
- Bretherton, I., Biringen, Z., Ridgeway, D., Maslin, D., & Sherman, M. (1989). Attachment: The parental perspective. *Infant Mental Health Journal, 10*, 203-221.
- Bretherton, I., Lambert, J. D., & Golby, B. (2005). Involved fathers of preschool children as seen by themselves and their wives: Accounts of attachment, socialization, and companionship. *Attachment and Human Development, 7*, 229-251.
- Britner, P. A., Marvin, R. S., & Pianta, R. C. (2005). Development and preliminary validation of the caregiving behavior system: Association with child attachment classification in the preschool Strange Situation. *Attachment and Human Development, 7*, 83-102.
- Buchheim, A., & George, C. (in press). The representational, neurobiological and emotional foundation of attachment disorganization in Borderline Personality Disorder and Anxiety Disorder. In J. Solomon & C. George (Eds.), *Disorganized attachment and caregiving*. New York: Guilford Press.
- Buchheim, A., Erk, S., George, C., Kächele, H., Martius, P., Pokorny, D., Ruchow, M., & Walther, H. (in press). Neural correlates of attachment dysregulation in borderline personality disorder using functional magnetic resonance imaging *Psychiatry Research: Neuroimaging*.
- Buchheim, A., Erk, S., George, C., Kächele, H., Ruchow, M., Spitzer, M., Kircher, T. & Walther, H. (2006). Measuring attachment representation in an fMRI environment: A pilot study. *Psychopathology, 39*, 144-152.
- Carter, C. S., Ahnert, L., Grossmann, K. E., Hrdy, S. B., Lamb, M. E., Porges, S. W., & Sachser, N. (2005). *Attachment and bonding: A new synthesis*. Cambridge, MA, US: MIT Press.

- Cassidy, J. (2000). The complexity of the caregiving system: A perspective from attachment theory. *Psychological Inquiry*, 11, 86.
- Clutton-Brock, T. H. (1991). *The evolution of parent care*. Princeton, New Jersey: Princeton University Press.
- Cohen, L. J., & Slade, A. (2000). The psychology and psychopathology of pregnancy: Reorganization and transformation. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (2nd ed., pp. 20-36). New York: Guilford Press.
- Coleman, P., Nelson, E. S., & Sundre, D. L. (1999). The relationship between prenatal expectations and postnatal attitudes among first-time mothers. *Journal of Reproductive and Infant Psychology* 17, 27-39.
- Corter, C. M., & Fleming, A. S. (2002). *Psychobiology of maternal behavior in human beings*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Cote-Arsenault, D., & Dombeck, M.-T. B. (2001). Maternal assignment of fetal personhood to a previous pregnancy loss: Relationship to anxiety in the current pregnancy. *Health Care for Women International*, 22, 649-665.
- Cowan, P. A. (1991). Individual and family life transitions: A proposal for a new definition. In P. Cowan & M. Hetherington (Eds.), *Family transitions* (Vol. 2, pp. 3-30). Hillsdale, NJ: Erlbaum.
- Cowan, P. A., Bradburn, I., & Cowan, C. P. (2005). *Parents' working models of attachment: The intergenerational context of parenting and children's adaptation to school*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

- Cox, M. J., Paley, B., Payne, C. C., & Burchinal, M. (1999). *The transition to parenthood: Marital conflict and withdrawal and parent-infant interactions*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Crowell, J., Treboux, D., Pan, H., Gao, Y., Fyffe, C., & Waters, E. (2002). Assessing secure base behavior in adulthood: Development of a measure, links to adult attachment representations, and relations to couples' communication and reports of relationships. *Developmental Psychology, 38*, 679-693.
- Dario, M. (2005). Effects of early experience on female behavioural and reproductive development in rhesus macaques. *Proceedings: Biological Sciences, 272*, 1243-1248.
- De Wolff, M. S., & van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*, 571.
- Deutscher, M. (1971). First pregnancy and family formation. In D. Milmen & G. Goldman (Eds.), *Psychoanalytic contributions to community psychology* (pp. 233-255). Springfield, IL: Charles C. Thomas.
- Edwards, E. P., Eiden, R. D., & Leonard, K. E. (2006). Behavior problems in 18- to 36-month-old children of alcoholic fathers: Secure mother-infant attachment as a protective factor. *Development and Psychopathology, 18*, 395-407.
- Egeland, B., & Farber, I. A. (1984). Infant-mother attachment: Factors related to its development and changes over time. *Child Development, 55*, 753-771.
- Ellis, B. J., & Garber, J. (2000). Psychosocial antecedents of girls' pubertal timing: Maternal depression, stepfather presence, and marital and family stress. *Child Development, 71*, 485-501.

- Emde, R. N., Gaensbauer, T. J., & Harmon, R. J. (1976). Emotional expression in infancy: A behavioral study. *Psychological Issues Monograph Series, 10* (1, No. 37).
- Feldman, R. (2004). Mother-infant skin-to-skin contact (Kangaroo Care). *Infants and Young Children: An Interdisciplinary Journal of Special Care Practices, 17*, 145-161.
- Feldman, R., Weller, A., Sirota, L., & Eidelman, A. I. (2003). Testing a family intervention hypothesis: The contribution of mother-infant skin-to-skin contact (kangaroo care) to family interaction, proximity, and touch. *Journal of Family Psychology, 17*, 94-107.
- Fisher, N. K. (2000). *Mental representations of attachment and caregiving in women sexually abused during childhood: Links to the intergenerational transmission of trauma?* Unpublished Ph.D. dissertation. The City University of New York, New York.
- Fleming, A. S., & Li, M. (2002). *Psychobiology of maternal behavior and its early determinants in nonhuman mammals*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Fonagy, P., Steele, H., & Steele, M. (2001). Maternal representation of attachment during pregnancy predict the organization of attachment at one year of age. *Child Development, 62*, 891-905.
- Fossey, D. (1983). *Gorillas in the mist*. Boston: Houghton Mifflin Company.
- Fraiberg, S. (1980). *Clinical studies in infant mental health: The first year of life*. New York: Basic Books.
- Fullard, W., & Reiling, A. M. (1976). An investigation of Lorenz's "babyiness". *Child Development, 47*, 1191-1193.
- Gable, S., Belsky, J., & Crnic, K. (1992). Marriage, parenting, and child development: Progress and prospects. *Journal of Family Psychology, 5*, 276-294.

- George, C., Kaplan, N., & Main, M. (1984/1985/1996). *The Adult Attachment Interview*.
University of California.
- George, C., & Solomon, J. (1988/1993/2005/2007). *The Caregiving Interview: Caregiving representation rating manual*. Unpublished manuscript, Mills College, Oakland, CA.
- George, C., & Solomon, J. (1989). Internal working models of caregiving and security of attachment at age six. *Infant Mental Health Journal*, *10*, 222-237.
- George, C., & Solomon, J. (1996). Representational models of relationships: Links between caregiving and attachment. *Infant Mental Health Journal*, *17*, 198-216.
- George, C., & Solomon, J. (1999). Attachment and caregiving: The caregiving behavioral system. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications*. (1st ed., pp. 649-670). New York: Guilford Press.
- George, C., & Solomon, J. (in press). The disorganized caregiving system: Mothers' helpless state of mind. In J. Solomon & C. George (Eds.), *Disorganized attachment and caregiving*. New York: Guilford Press.
- George, C., & West, M. (2001). The development and preliminary validation of a new measure of adult attachment: The Adult Attachment Projective. *Attachment and Human Development*, *3*, 30-61.
- George, C., & West, M. (in press). *The Adult Attachment Projective: A new assessment of adult attachment*. New York: Guilford Press.
- Gobbini, M. I., & Haxby, J. V. (2006). Neural response to the visual familiarity of faces. *Brain Research Bulletin*, *71*, 76-82.
- Goodall, J. (1990). *Through a window: My thirty years with the chimpanzees of Gombe*. Boston: Houghton Mifflin Company.

- Grienenberger, J., Kelly, K., & Slade, A. (2005). Maternal reflective functioning, mother-infant affective communication, and infant attachment: exploring the link between mental states and observed caregiving behavior in the intergenerational transmission of attachment. *Attachment and Human Development, 7*, 299-311.
- Heller, S. S., & Zeanah, C., H. (1999). Attachment disturbances in infants born subsequent to perinatal loss: A pilot study. *Infant Mental Health Journal, 20*, 188-199.
- Hesse, E., & Main, M. (2006). Frightened, threatening, and dissociative parental behavior in low-risk samples: Description, discussion, and interpretations. *Development and Psychopathology, 18*, 309-343.
- Hinde, R. A. (1982). *Ethology*. New York: Oxford University Press.
- Hinde, R. A., & Stevenson-Hinde, J. (1991). Perspectives on attachment. In C. M. Parkes, J. Stevenson-Hinde & P. Marris (Ed.), *Attachment across the life cycle* (pp. 52-65). New York: Routledge.
- Hoghugh, M., & Lond, N. (Eds.). (2004). *Handbook of parenting: Theory, research and practice*. London: Sage.
- Hrdy, S. B. (1999). *Mother nature: History of mothers, infants, and natural selection*. New York: Random House.
- Hughes, P., Turton, P., Hopper, E., McGauley, G. A., & Fonagy, P. (2004). Factors associated with the unresolved classification of the adult attachment interview in women who have suffered stillbirth. *Development and Psychopathology, 16*, 215-230.
- Hughes, P., Turton, P., McGauley, G. A., & Fonagy, P. (2006). Factors that predict infant disorganization in mothers classified as U in pregnancy. *Attachment and Human Development, 8*, 113-122.

- Huth-Bocks, A. C., Levendosky, A., Bogat, G. A., & von Eye, A. (2004). The impact of maternal characteristics and contextual variables on infant-mother attachment. *Child Development, 75*, 480-496.
- Ilicali, E. T., & Fisek, G. O. (2004). Maternal representations during pregnancy and early motherhood. *Infant Mental Health Journal, 25*, 16-27.
- Kermorian, R., & Liederman, P. H. (1986). Infant attachment to mother and child caretaker in an east African community. *International Journal of Behavioral Development, 9*, 455-469.
- Kerverne, E. B. (1995). Neurochemical changes accompanying the reproductive process: Their significance for maternal care in primates and in other mammals. In C. R. Pryce, R. D. Martin & D. Skuse (Eds.), *Motherhood in human and nonhuman primates* (pp. 69-77). Basel: Karger.
- Kim, K., & Smith, P. D. (2000). Retrospective survey of marital relations and child reproductive development. *International Journal of Behavioral Development, 22*, 729-751.
- Kinsley, C. H., Gifford, G. W., Madonia, L., Tureski, K., Griffin, G. R., Lowry, C., Williams J., Collins, J., McLearie, H., & Lambert, K. G. (1999). Motherhood improves learning and memory. *Nature, 402*, 137.
- Kinsley, C. H., & Lambert, K. G. (2006). The maternal brain. *Scientific American, 294*, 72-79.
- Klaus, M. H., Kennell, J. H., & Klaus, P. H. (1995). *Bonding*. Reading, MA: Addison-Wesley.
- Langlois, J. H., Ritter, J. M., Cassey, R. J., & Sawin, D. B. (1995). Infant attractiveness predicts maternal behaviors and attitudes. *Developmental Psychology, 31*, 464-472.
- Lee, R. E. (1995). Women look at their experience of pregnancy. *Infant Mental Health Journal, 16*, 192-205.

- Leibenluft, E., Gobbin, M. I., Harrison, T., & Haxby, J. V. (2004). Mothers' neural activation in response to pictures of their children and other children. *Biological Psychiatry*, *56*, 225-232.
- Liefer, M. (1980). *Psychological effects of motherhood*. New York: Praeger.
- Liotti, G. (in press). Attachment disorganization and the clinical dialog: Theme and variations. In J. Solomon & C. George (Eds.), *Disorganized attachment and caregiving*. New York: Guilford Press.
- Lorberbaum, J. P., Newman, J. D., Dubno, J. R., Horwitz, A. R., Nahas, Z., Teneback, C. C., Bloomer, C. W., Bohning, D. E., Vincent, D., Johnson, M. R., Emmanuel, M., Brawman-Mintzer, O., Book, S. W., Lydiard, R. B., Ballenger, J. C., & George, M. S. (1999). Feasibility of using fMRI to study mothers responding to infant cries. *Depression and Anxiety*, *10*, 99-104.
- Lorenz, K. (1943). Die angeboren formen moglichend Erfahrung. *Zeitschrift fur Tierpsychologie*, *5*, 233-409.
- Lundy, B. L. (2002). Paternal socio-psychological factors and infant attachment: The mediating role of synchrony in father-infant interactions. *Infant Behavior and Development*, *25*, 221.
- Magill-Evans, J., Harrison, M. J., Rempel, G., & Slater, L. (2006). Interventions with fathers of young children: systematic literature review. *Journal of Advanced Nursing*, *55*, 248-264.
- Main, M. (1990). Cross-cultural studies of attachment organization: Recent studies, changing methodologies and the concept of conditional strategies. *Human Development*, *33*, 48-61.
- Main, M., & Goldwyn, R. (1984). *Adult attachment scoring and classification system*. Unpublished manuscript. University of California at Berkeley.

- Main, M., Goldwyn, R., & Hesse, E. (2003). *Adult attachment scoring and classification system*. Unpublished manuscript. University of California at Berkeley.
- Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. T. Greenberg, D. Cicchetti & E. M. Cummings (Eds.), *Attachment in the preschool years* (pp. 161-182). Chicago: University of Chicago Press.
- Main, M., Hesse, E., & Kaplan, N. (2005). Predictability of attachment behavior and representational processes at 1, 6, and 19 years: The Berkeley Longitudinal Study. In K. E. Grossmann, K. Grossmann, & E. Waters (Eds.), *Attachment from infancy to adulthood: The major longitudinal studies* (pp. 245-304). New York: Guilford Press.
- Main, M., Kaplan, M., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. Growing points in attachment theory and research. In I. Bretherton & E. Waters (Eds.), *Monographs of the Society for Research in Child Development, 50* (1-2 (Serial No. 209)), 66-104.
- Manning-Orenstein, G. (1997). *A birth intervention: Comparing the influence of doula assistance at birth versus Lamaze birth preparation on first-time mothers' working models of caregiving*. Unpublished doctoral dissertation. Saybrook Institute, San Francisco, CA.
- Marvin, R. S., & Pianta, R. C. (1996). Mothers' reaction to their child's diagnosis: Relations with security of attachment. *Journal of Clinical Child Psychology, 25*, 436-445.
- Mayseless, O., & Scharf, M. (2006). Maternal representations and psychosocial functioning. In O. Mayseless, (Ed.). *Parenting Representations: Theory, research, and clinical implications* (pp. 208-238). New York: Cambridge University Press.

- Meins, E. (1999). Sensitivity, security, and internal working models: Bridging the transmission gap. *Attachment and Human Development, 1*, 325-342.
- Meyers, S. A. (1999). Mothering in context: Ecological determinants of parent behavior. *Merrill-Palmer Quarterly, 45*, 332-357.
- Miller, B. D. (1987). Female infanticide and child neglect in rural North India. In N. Scheper-Hughes (Ed.), *Child survival: Anthropological perspectives on the treatment and maltreatment of children* (pp.164-181). Boston: D. Reidel.
- Moffitt, T. E., Caspi, A., Belsky, J., & Silva, P. A. (1992). Childhood experience and the onset of menarche. *Child Development, 63*, 47-58.
- Moss, E., Cyr, C., Bureau, J., Tarabulsky, G. M., & Dubois-Combois, K. (2005). Stability of attachment during the preschool period. *Developmental Psychology, 41*, 773-783.
- Nitschke, J. B., Heller, W., Etienne, M. A., & Miller, G. A. (2004). Prefrontal cortex activity differentiates processes affecting memory in depression. *Biological Psychology, 67*, 125-143.
- Novakov, M., & Fleming, A. S. (2005). The effects of early rearing environment on the hormonal induction of maternal behavior in virgin rats. *Hormones and Behavior, 48*, 528-536.
- O'Leary, J. (2005). The trauma of ultrasound during a pregnancy following perinatal loss. *Journal of Loss and Trauma, 10*, 183-204.
- Oppenheim, D., & Koren-Karie, N. (2002). Mothers' insightfulness regarding their children's internal worlds: The capacity underlying secure child-mother relationships. *Infant Mental Health Journal, 23*, 593-605.

- Oppenheim, D., Koren-Karie, N., & Sagi, A. (2001). Mothers' empathic understanding of their preschoolers' internal experience: Relations with early attachment. *International Journal of Behavioral Development, 25*, 16-26.
- Perry, B. D., Pollard, R. A., Blakley, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and “use dependent” development of the brain: How “states” become “traits.” *Infant Mental Health Journal, 16*, 271-289.
- Pianta, R. C., Marvin, R. S., Britner, P., & Borowitz, K. (1996). Parents reactions to their child's diagnosis: Relations with security of attachment. *Infant Mental Health Journal, 17*, 239-256.
- Pianta, R. C., O'Connor, T. G., & Marvin, R. S. (1993). *Measuring representations of parenting: An interview-based system*. Unpublished manuscript. University of Virginia, Charlottesville.
- Poindron, P., Terrazas, A., de la Luz Navarro Montes de Oca, M., Serafán, N., & Hernández, H. (2007). Sensory and physiological determinants of maternal behavior in the goat (*Capra hircus*). *Hormones and Behavior, 52*, 99-105.
- Posada, G., Gao, Y., Wu, F., & Posada, R. (1995). The secure-base phenomenon across cultures: Children's behavior, mother's preferences, and experts' concepts. *Monographs of the Society for Research in Child Development, 60*(2-3, Serial No. 244), 27-48.
- Pryce, C. R. (1995). Determinants of motherhood in human and nonhuman primates: A biosocial model. In C. R. Pryce, R. D. Martin & D. Skuse (Eds.), *Motherhood in human and nonhuman primates* (pp. 1-15). Basel: Karger.
- Rode, S. E., Chang, P., Fisch, R. O., & Sroufe, L. A. (1981). Attachment patterns in infants separated at birth. *Developmental Psychology, 17*, 188-191.

- Sameroff, A. J. (1993). Models of development and developmental risk. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (pp. 3-14). New York: Guilford Press.
- Schaller, G. B. (1963). *The mountain gorilla: Ecology and behavior*. Chicago University of Chicago Press.
- Schechter, D. S., Coots, T., Zeanah, C. H., Davies, M., Coates, S. W., Trabka, K. A., Marshall, R. D., Liebowitz, M. R., & Myers, M. M. (2005). Maternal mental representations of the child in an inner-city clinical sample: Violence-related posttraumatic stress and reflective functioning. *Attachment and Human Development, 7*, 313-331.
- Scheper-Hughes, N. (1987). Culture, scarcity and maternal thinking: Mother love and child death in Northeast Brazil. In N. Scheper-Hughes (Ed.), *Child survival: Anthropological perspectives on treatment and maltreatment of children* (pp. 291-317). Boston: D. Reidel.
- Slade, A., Belsky, J., Aber, J. L., & Phelps, J. L. (1999). Mothers' representations of their relationships with their toddlers: Links to adult attachment and observed mothering. *Developmental Psychology, 35*, 611-619.
- Slade, A. (2004). The move from categories to process: Attachment phenomena and clinical evaluation. *Infant Mental Health Journal, 25*, 269-283.
- Slade, A., Grienenberger, J., Bernbach, E., Levy, D., & Locker, A. (2005). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment and Human Development, 7*, 283-298.
- Solomon, J., & George, C. (1996). Defining the caregiving system: Toward a theory of caregiving. *Infant Mental Health Journal, 17*, 183-197.
- Solomon, J., & George, C. (1999a). *Attachment disorganization*. New York: Guilford Press.

- Solomon, J., & George, C. (1999b). The caregiving system in mothers of infants: A comparison of divorcing and married mothers. *Attachment and Human Development, 1*, 171-190.
- Solomon, J., & George, C. (1999c). The development of attachment in separated and divorced families: Effects of overnight visitation, parent and couple variables. *Attachment and Human Development, 1*, 2-33.
- Solomon, J., George, C. (1999d). The effects on attachment of overnight visitation in divorced and separated families: A longitudinal follow-up. In J. Solomon & C George (Eds.), *Attachment disorganization*. (pp. 243-264). New York: Guilford Press.
- Solomon, J., & George, C. (2000). Toward an integrated theory of caregiving. In J. Osofsky & H. Fitzgerald (Eds.), *WAIMH Handbook of Infant Mental Health* (pp. 323-368). New York: Wiley
- Solomon, J., & George, C. (in press-a). Dysregulation of maternal caregiving across two generations. In J. Solomon & C. George (Eds.), *Disorganized Attachment and Caregiving*. New York: Guilford Press.
- Solomon, J., & George, C. (Eds.). (in press-b). *Disorganized Attachment and Caregiving*. New York: Guilford Press.
- Solomon, J., George, C., & De Jong, A. (1995). Children classified as controlling at age six: Evidence of disorganized representational strategies and aggression at home and at school. *Development and Psychopathology, 7*, 447-463.
- Sroufe, L. A., & Fleeson, J. (1986). Attachment and the construction of relationships. In W. Hartup & Z. Rubin (Eds.), *The nature and development of relationships*. (pp. 51-71). Hillsdale, New Jersey: Earlbaum.

- Steele, H., Phibbs, E., & Woods, R. (2004). Coherence of mind in daughter caregivers of mothers with dementia: Links with their mothers' joy and relatedness on reunion in the strange situation. *Attachment and Human Development, 6*, 439-450.
- Steinberg, D. R., & Pianta, R. C. (2006). Maternal Representations of Relationships: Assessing Multiple Parenting Dimensions. In O. Mayseless (Ed.), *Parenting representations: Theory, research, and clinical implications*. (pp. 41-78). New York: Cambridge University Press.
- Stevenson-Hinde, J. (1994). An ethological perspective. *Psychological Inquiry, 5*, 62-65.
- Stovall-McClough, K. C., & Dozier, M. (2004). Forming attachments in foster care: Infant attachment behaviors during the first 2 months of placement. *Development and Psychopathology, 16*, 253-271.
- Suomi, S. J. (1995). Attachment theory and nonhuman primates. In R. M. S. Goldberg, & J. Kerr (Ed.), *Attachment Theory: Social, Developmental, and Clinical Perspectives* (pp. 185-201). Hillsdale, NJ: Analytic Press.
- Swain, J. E., Lorberbaum, J. P., Kose, S., & Strathearn, L. (2007). Brain basis of early parent-infant interactions: psychology, physiology, and in vivo functional neuroimaging studies. *Journal of Child Psychology and Psychiatry, 48*, 262-287.
- Tallandini, M. A., & Scalembra, C. (2006). Kangaroo mother care and mother-premature infant dyadic interaction. *Infant Mental Health Journal, 27*, 251-275.
- Trivers, R. L. (1974). Parent-offspring conflict. *American Zoologist, 11*, 249-264.
- Turton, P., Hughes, P., Fonagy, P., & Fainman, D. (2004). An investigation into the possible overlap between PTSD and unresolved responses following stillbirth: An absence of

- linkage with only unresolved status predicting infant disorganization. *Attachment and Human Development*, 6, 241-253.
- van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis. *Psychological Bulletin*, 117, 387-403.
- Volk, A. A., Lukjanczuk, J. M., & Quinsey, V. L. (2005). Influence of infant and child facial cues of low body weight on adults' ratings of adoption preference, cuteness, and health. *Infant Mental Health Journal*, 26, 459-469.
- West, M., & Sheldon-Keller, A. E. (1994). *Patterns of relating: An adult attachment perspective*. New York: Guilford Press.
- Wierson, M., Long, P. J., & Forehand, R. L. (1993). Toward a new understanding of early menarche: The role of environmental stress in pubertal timing. *Adolescence*, 28, 913-924.
- Zeanah, C. H., & Anders, T. F. (1987). Subjectivity in parent-infant relationships: A discussion of internal working models. *Infant Mental Health Journal*, 8, 237-250.
- Zeanah, C. H., Benoit, D., Hirschberg, L., & Barton, M. L. (1993). *Working Model of the child Interview: Rating scales and classification*. Unpublished manuscript. New Orleans: Louisiana State University School of Medicine.
- Zeanah, C. H., Benoit, D., Hirschberg, L., & Barton, M. L. (1994). Mothers' representations of their infants are concordant with infant attachment classification. *Developmental Issues in Psychiatry and Psychology*, 1, 1-14.

Table 1. Approaches to Measuring Caregiving Representations

Date	Source	Interview Summary	What is measured?	Age Group and Population	Research Findings
1985	Aber, Slade, Berger, Bresgi, & Kaplan	Parent Development Interview (PDI) 1 ½-2 hours Patterned after the AAI. Questions about mother's affective states, words to describe the relationship, how mother appraises separations from child.	Mother's representation of affective experience: Joy-Pleasure (includes <i>coherence</i>); Anger; Guilt-separation distress	Prenatal, infants, toddlers. Married and divorced mothers.	(Aber et al., 1999; Slade et al., 1999) Joy-Pleasure with positive maternal behavior and attachment security. Anger with Dismissing mothers and daily hassles.
1989	Bretherton, Biringen, Ridgeway, Maslin, & Sherman	Parent Attachment Interview, 1 hour. Mother's descriptions and emotional appraisals of specific caregiving events.	Parenting sensitivity/insight (content analysis)	Toddlers	(Bretherton et al., 2005) Sensitivity/insight significantly correlated with concurrent attachment security at 18 mos. and with [what???] representation 1 ½ years later.
1988	George & Solomon	Caregiving Interview, 1 hour (Modified PDI; see Aber et al., 1989)	Defensive processes: Flexible Integration Deactivation Cognitive Disconnection Helplessness/Segregate d Systems	Infants to age 12	(George & Solomon, 1989, 1996; Fisher, 2000; Solomon & George, 1999, 2006, in press) Significant concurrent concordance with security and protection ratings at 12 mos. and age 5. 91% concordance secure-insecure; 81% concordance with 4-group with age 5 reunion classification. Helplessness/segregated systems ratings predicted child attachment disorganization at age 6. Helplessness/segregated systems ratings predicted poor parenting outcomes for mothers with sexual abuse histories.

1993	Zeanah, Benoit, Hirschberg, & Barton	Working Model of the Child Interview (WMCI) 1 hour Emotional reactions to pregnancy; perceptions of infant's personality and development	<u>3 classification group scheme</u> Balanced, Disengaged, Distorted	Prenatal, infants	(Benoit et al., 1997; Zeanah et al., 1994) 69% concordance between prenatal interview and SS classification at 1 yr. 74% concurrent concordance between 3 mother caregiving groups and 3-group infant SS classification
1993	Pianta, O'Connor, & Marvin	Child-Parent Attachment Project Parent Development Interview (CPAP-PDI) 45 minutes (Modified PDI; see Aber et al., 1989)	Parent's representation of affective experience, compliance, caretaking, achievement, perspective-taking	Toddler – middle childhood Typical and atypical development.	(Button et al., 2001; Messina-Sayre et al., 2001; Steinberg et al., 2006) Validity for typical and disabled children. Overall PDI score correlated with maternal sensitivity at 36 mos. and 54 mos.
1996	Pianta, Marvin, Britner, & Horowitz	Reaction to Diagnosis Interview 15 minutes Parents' memories, beliefs, and feelings about learning about their child's diagnosis.	Resolved or Unresolved	Atypical development	(Marvin et al., 1996; Pianta et al., 1996) Unresolved diagnosis representation was unrelated to AAI classification.
1997/2000	Scharf & Maysless	The Parenting Representations Interview – Adolescents 1-1 ½ hours (Modified PDI)	<u>3 group classification scheme</u> Adequate/balanced Flooded Restricted		(Maysless & Scharf, 2006) 52% concordance with 3 AAI groups (F, Ds, E)

1998	Bates & Dozier	This is My Baby Interview 10 minutes Baby's personality and feelings about the baby.	Acceptance, Commitment, Belief in influence on baby Mind-mindedness: ability to think about and treat the child as having an autonomous mind (Meins, 1999)	Foster infants and toddlers	(Ackerman & Dozier, 2005; Bates & Dozier 2002; Bernier & Dozier, 2003) Secure _{AAI} mothers more accepting of and greater belief of influence on of early placed babies than late placed babies; not found for insecure AAI M's. No relation for commitment Mother investment @ age 6:= acceptance + commitment Investment → emotional security Negative correlations between M AAI security, baby SS security, and mind-mindedness
2001	Oppenheim, Koren-Karie, & Sagi	Insightfulness Assessment (IA) Mothers views of child's thoughts after viewing video segments from a 1 ½ hour laboratory visit at age 4-5.	Insightfulness: mother's insight into child's motives and complexity, and openness to new information about the child. <u>4 Group Classification Scheme</u> Balanced, One-Sided, Disengaged, Mixed	4-5 years	(Koren-Karie et al., 2002; Oppenheim, 2001, 2002) 56% secure-insecure concordance rate, 2 mos. infant SS classifications (no A's) as related to parent representation group and empathic understanding at 4-5 years. No association between infant attachment classification and disengaged parent representation.
2005	Slade, Grienberger, Bernbach, Levy, & Locker	Parent Development Interview (PDI) See Aber et al., 1985 above	Parental reflective functioning (RF): mother's capacity to understand and coordinate mother's own and child's mental states.	Infants	(Grienberger et al., 2005; Slade et al., 2005) RF measured when infants at 10 mo. Organized _{AAI} RF > U _{AAI} . Secure _{AAI} greatest RFgroups. No difference between Ds and E's. Infant attachment at 14 mo. Mothers of sec > insec., although not different from Mothers of A's Negative correlation between RF and AMBIANCE communication disruption.