

Chapter 8

What Is the Attachment Behavioral System? And, How Is It Linked to Other Behavioral Systems?

One of Bowlby's (1982) aims was to explain phenomena of psychodynamic interest without referencing psychic energy and drives. He found his solution, in part, in the ideas of ethologists who were studying motivated, organized behavior and, in part, control systems theory. Up until that point in time, control systems theory was being applied by engineers and early artificial intelligence scholars to model complex intelligent behavior by linking together the operations of multiple unintelligent subsystems (for a similar approach see Beckes, Ilzerman, & Tops, 2014). Drawing on the principles governing control systems, Bowlby realized that the concept of a *behavioral system* could provide an elegant way to explain normative and nonnormative psychological functioning. Unbeknownst to Bowlby, his behavioral systems concept became one of his main contributions to the field of psychology. In particular, the "behavioral system" has provided important insights into the study of close relationships, personality, social development, and motivational processes. Here we describe the concept of a behavioral system, review the literature about the various behavioral systems Bowlby and his followers examined, and offer some directions for future research.

WHAT IS A BEHAVIORAL SYSTEM?

Bowlby (1969/1982) suggested that people's behavior is guided by a set of innate *behavioral systems*¹. Through evolution these systems were shaped to increase the likelihood of an organism's survival and reproductive success. These species-universal neural programs or mechanisms, guide the choice, activation, and

1. The concept of unique behavioral systems each organizing a specific type of behavior and working together (or against each other) in guiding human behavior, is similar to the concept of modularity (eg, Fodor, 2005; Pinker, 2005). That said, modules tend to focus on general information-processing mechanisms [Pinker (1997): "modules should be defined by the specific operations they perform on the information they receive"]; whereas behavioral systems focus on behaviors (but do

termination of behavioral sequences in a way that serves a specific function, such as the forming of an attachment bond, seeking out affiliations, or providing care to a person in need. This takes place in a goal-corrected manner—that is—specific features of strategic behaviors can be altered to fit particular environments or social situations (eg, insecure behaviors may fit better a dangerous environment, so when exposed to signs of danger, people may exhibit more insecure behaviors).

WHAT ARE THE FEATURES OF A BEHAVIORAL SYSTEM?

As summarized by Mikulincer and Shaver (2003) behavioral systems have six central features: (1) a specific biological function that increases the likelihood of an individual's survival or reproductive success; (2) a set of activating triggers; (3) a repertoire of interchangeable responses. These responses include the primary and secondary strategies people use to attain a particular goal state; (4) a specific set-goal—the change in the person–environment relationship that terminates system activation; (5) a range of cognitive operations that guide the system's functioning; and (6) associations with other behavioral systems. We describe each of these features in the following sections.

The Biological Function of the Attachment System

Although all behavioral systems share the ultimate goal of guiding behavior in a way that would increase survival and reproduction, each system has a unique function that separates it from the other systems. The function of the attachment system is to guide the individual to maintain proximity to a stronger, wiser caregiver (attachment figure). The adaptive value of the system is relatively easy to appreciate in infancy given that human infants are born immature, without the ability to feed or protect themselves. The function of attachment in adulthood, however, is subject to debate (see Lee Kirkpatrick's work and chapter: *What Is an Attachment Relationship?*).

The Triggers That Activate the Attachment System

Triggers are the perceived threats and dangers that could compromise a person's survival. The presence of these triggers leads an individual to engage in specific behaviors or responses and pursue the system's goals. These triggers can be external/environmental cues, or internal cues—thoughts, emotions, worries, and

▶ have an information-processing component). Furthermore, the features that characterize modules and behavioral systems are different [compare the list Fodor (1983) provided—domain specificity, encapsulation, mandatory operation (automaticity), inaccessibility to consciousness, speed, shallow outputs, fixed neural localization, and characteristic breakdown patterns, with the list we bring in the chapter]. So, the two different intellectual traditions converge on the same idea, but emphasize different parts of it. We hope that by highlighting this similarity between modularity and behavioral systems we might help people familiar with, say, modularity, to better appreciate the attachment perspective.

alike. For example, a stranger in one's vicinity can act as such a trigger (as is the case in the strange situation; Ainsworth, Blehar, Waters, & Wall, 1978).

The Repertoire of Interchangeable Responses

Like other behavioral systems, the attachment system is thought to be organized around a primary strategy. In the case of attachment, this primary strategy is regaining (or maintaining) proximity to a stronger and wiser close other. The responses associated with the primary strategy include behaviors such as crying, smiling, and reaching out to security-providing figures. This repertoire of behaviors or behavioral tendencies is activated automatically when people are exposed to relevant triggers that signal danger (eg, a loud noise or a stranger approaching). The behaviors are deactivated or terminated by cues signaling goal attainment—a sense of security. If the primary strategy does not work, people may try using secondary strategies, such as hyperactivating or deactivating the attachment system (Mikulincer & Shaver, 2003).

The Set Point for the Attachment System

The set point of the system is thought to be a sense of security (what is sometimes called felt security; Sroufe & Waters, 1977a). Once security is threatened or its level decreases below the set-point, the system is activated and people are motivated to try and return the system to “baseline.” To accomplish this they engage in behaviors that lead to a change in the person–environment relationship (eg, reach out to an attachment figure). Once that change is achieved—the set point is reached—the system's activation is terminated.

The Cognitive Operations of the Attachment System

The attachment system operates in a complex goal-corrected manner. For this operation to occur, people need to process, monitor, and appraise their interactions with attachment figures. Based on the monitoring of one's environment, people adjust their behavior. Over time, these interactions and whatever modifications are made to the system are stored as mental representations and become a part of the system's programming or guidelines. Thus, if a caregiver or a partner is being insensitive and rejecting, the system will come to represent him or her, and close others more generally, as being unavailable and in turn tendencies to approach others under stressful circumstances are deactivated. These representations are what Bowlby termed internal working models of self and others (see chapter: What Are Attachment Working Models?) and they can be positive or negative in valence.

Associations With Other Behavioral Systems

Whereas each behavioral system has its own function, triggers, and responses, the systems do not work in isolation. Instead, the systems are thought to interact

with each other and jointly affect people's behavior. This interaction can take different forms as we review later in this chapter.

HOW CAN WE EXAMINE THE CONCEPT OF A BEHAVIORAL SYSTEM?

One approach researchers have adopted to examine the dynamics of behavioral systems is by exposing people to potential activating triggers of the system, and testing the outcomes of the system's activation. For example, Mikulincer, Gillath, and Shaver (2002) showed that exposure to threat prime words—such as *separation* and *death*—led to increased accessibility of names of attachment figures. This increase was specific to attachment figures (these effects were not found with the names of close others who were not security-providing attachment figures) and was replicated across different tasks (lexical decision and stroop) in three different experiments.

Simpson, Rholes, and Nelligan (1992) examined the activation of the attachment system by putting couples in anxiety-provoking or stressful situations in the laboratory. Independent observers then evaluated each partner's behavior, revealing that in such situations people tend to make efforts to seek and give emotional support (no comparison or control condition was used in this study).

Fraley and Shaver (1998) took the investigation regarding the activation of the attachment system outside the laboratory. They argued that one way to study attachment behavior naturalistically in adult romantic relationships is by observing couples separating from one another in a context similar to that of the strange situation. To do so, they examined the behavior of couples who were separating from one another at a large metropolitan airport. There are at least two reasons why this is a useful context in which to study adult attachment dynamics. First, when couples are separating from one another for an extended period of time, attachment-related concerns may be raised. People may worry about whether their partner will make it to their destination safely. Some of them may even wonder whether their partner will want to return. Second, airports provide a public context (ie, a place where people's behavior is seen by others and hence can be observed by researchers) in which people exhibit private behavior (that they otherwise might only exhibit in private settings).

The study was conducted before 9/11 when airports in the United States allowed anyone to enter the gate area, whether they were ticketed passengers or not. Fraley and Shaver (1998) coded the behavior of each individual in a relationship as they waited in the gate area for their planes. Importantly, some of the couples in the study were in fact separating (one person was leaving and the other was staying behind), but approximately half of the couples were not; they were flying together. The observers, however, were not aware of the flying together versus separating status before boarding time. Fraley and Shaver reported that many of the observed behaviors were indicative of attachment.

For example, couple members would often hold hands and maintain proximity to one another. When the separation was imminent, they would often express sadness and seek comfort from one another. Couples also showed resistance to the separation by refusing to let go of a partner's hand as he or she left to board the plane.

Couples exhibited not only attachment-related behaviors, but caregiving and sex behaviors too. For example, one person often patted the other on the back as a way of providing comfort and support. And, on the sexual end, comforting embraces occasionally transformed into intimate kisses and light fondling. Importantly, Fraley and Shaver (1998) found that all three kinds of behaviors (ie, attachment, caregiving, and sex) were more pronounced among couples who ended up separating from one another than couples who were flying together. The implication of this finding is that, in adulthood, physical separations have the potential to activate not only attachment-related behavior, but caregiving and sexual behavior too.

Researchers have studied other behavioral systems using similar kinds of methods. For example, Gillath, Mikulincer, Birnbaum, and Shaver (2008) activated the sex behavioral system by exposing people to sex-related cues (eg, pictures of naked opposite sex members). They found that subliminal activation of the sex system resulted in increased: (1) willingness to self-disclose, (2) accessibility of intimacy-related thoughts, (3) willingness to make sacrifices for one's partner, and (4) preference for using positive conflict-resolution strategies. All four outcomes represent initiation and maintenance, which are thought to be two of the goals of the sex system (the main function of the sex system is to facilitate reproduction, more than once; initiation and maintenance increase the likelihood of reproduction happening—by finding a sex partner, initiating a relationship, and staying with him or her). The studies reviewed above demonstrate the effects of exposure to relevant triggers on a behavioral system. Next, we review the interplay between behavioral systems and describe how this interplay changes when one system is activated.

WHAT HAPPENS WHEN ONE BEHAVIORAL SYSTEM “MEETS” ANOTHER?

Human behavior is complex, and is often guided by more than one behavioral system. Hinde (1982), Bowlby (1982), and others (eg, Cicchetti & Serafica, 1981; Shaver & Hazan, 1987) have suggested that rather than studying one system at a time researchers should study the dynamic interplay between different systems. Researchers have used different ways to study this interplay, but in this chapter we focus on two approaches. One examines the interplay as a developmental process—development of a species, development of a new close relationship, or the development of an individual—from the beginning of his/her life through to the end or as Bowlby (1979) put it “from the cradle to the grave” (p. 127). Another way of studying the interplay is by examining the effects of

the levels of one behavioral system—either chronic levels, or state levels due to activation—on other behavioral systems. For example, one can examine the effects of being securely or insecurely attached on caregiving or exploration tendencies and behaviors.

WHAT CAN DEVELOPMENT TEACH US ABOUT THE INTERPLAY BETWEEN BEHAVIORAL SYSTEMS?

Evolution

Studying the evolution of a species can shed light on when, why, and how behavioral systems evolved. In turn, this understanding can provide insights into the links and the interplay between behavioral systems, such as, whether particular conditions result in the prioritized activation of systems. That is, are there situations in which the activation of one system is likely to take priority over another? Eastwick and Finkel (2012) examined the evolution of the sex and attachment behavioral systems and put forward predictions regarding the interaction between these systems. They predicted that the attachment system, which presumably evolved later in evolution than the sex system, will have the ability to mute or refocus adaptations of the sex system to ensure the maintenance of adult pair bonding (eg, attachment would reduce the likelihood that people act based on their attraction to an alternative potential mate when they are already in a relationship). Examining their prediction they found that among women who were strongly attached to their partners, conception probability (assessed as ovulatory cycle phase) positively predicted reports of intimate physical contact and sexual motives regarding intimacy. Conversely, among unbonded women, these same associations were negative. The results held even when controlling for attachment anxiety and avoidance, relationship satisfaction, relationship commitment, and partner physical attractiveness. These findings, using the timeline of hominid evolution (ie, phylogeny), support the idea that behavioral systems do not function independently. As shown in this study, the attachment system has the potential to modify the functioning of other behavioral systems, including the sex system. More broadly it suggests that behavioral systems can either “cooperate” or “compete” with each other when guiding human behavior (we will elaborate on this idea later).

Shifting to attachment and caregiving, Fraley, Marks, and Brumbaugh (2005) used phylogenetic analysis of data across multiple mammalian species to examine the evolution of specific behaviors. They found that pair-bonded species (the authors’ way of operationalizing the presence of adult romantic attachment across species) were more likely to have fathers who played a direct role in child rearing than were nonpairing species. They also found that species in which offspring were more developmentally immature were more likely to exhibit pair bonding (see chapter: What Is an Attachment Relationship?). Based on their analysis Fraley et al. concluded that the link between paternal care

and adult attachment (or pair bonding) is likely to be a functional one (ie, due to convergent evolution—coping with the same environmental pressures). In contrast, the link between neoteny and adult attachment is likely due to homology (ie, shared ancestry—the reason these traits come together is because they evolved together in the same ancestor). Because pair bonding emerged after paternal care in mammalian evolution, Fraley and colleagues have speculated that the presence of paternal care sets the stage for pair bonding. Fathers who played a greater role in child care, which increased the survivability of offspring, were more likely to be around not just the child, but also the mother. This, in turn, increased the probability of pair bonding. Together, these lines of work show that attachment takes precedence over sex, and caregiving facilitates the development of adult attachment.

Development of a Close Relationship

A different approach to studying development involves examining the interplay between behavioral systems in the context of forging a close relationship. According to Hazan and Shaver (1994) and Zeifman and Hazan (2008), three behavioral systems—attachment, sex, and caregiving—facilitate the formation and maintenance of pair bonding. In theorizing about the development of romantic love, Hazan and Shaver (1994) suggested that sexual interest serves as the initial force that brings adults together. Later on, they claimed, the attachment and caregiving systems come into play and facilitate the development and maintenance of the relationship (Fig. 8.1 depicts hypothetical trajectories).

Gillath et al. (2008a) provided support for the role of sex in the initiation of pair bonding, by demonstrating that exposure to sexual cues or triggers (ie, pictures of naked opposite sex members) results in the activation of relational goals (such as initiating or maintaining a romantic relationship). Thus, participants exposed to sexual images demonstrated behavioral tendencies that facilitate the initiation (self-disclosure and intimacy) and maintenance (willingness to sacrifice for one's partner, and positive strategies to resolve conflicts) of a romantic relationship. This is not to say that adult pair bonding must develop from sex or sexual interest. Some relationships may evolve out of a friendship, while other relationships may result from an alternative set of processes or circumstances (such as in the case of an arranged marriage). Regardless of how adult pair bonding comes to be, studying its development can teach us a lot about the interplay between behavioral systems.

Once a romantic relationship has been established, behavioral systems “take turns” in guiding each partner's behavior. For example, romantic partners tend to switch between the roles of caregiver and care recipient. When one partner is threatened or stressed, and his or her attachment system is activated, he or she assumes the role of care recipient. Seeking help is likely to be guided by the attachment system. The other partner, in response, is likely to assume the role of a caregiver, and thus, his or her caregiving system is activated and guides

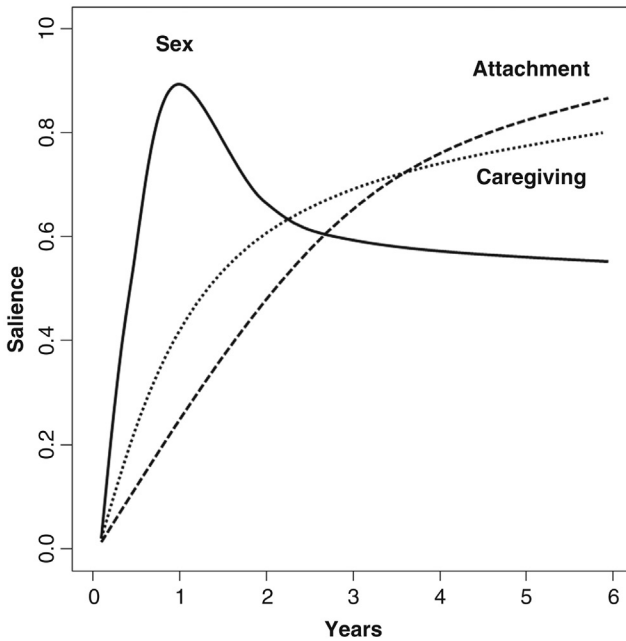


FIGURE 8.1 Developmental course of the three components of romantic love. (Adapted from Hazan and Shaver (1994).)

his or her behavior (interestingly, whether or not the partner will provide help is guided not only by his or her caregiving system, but also by his/her attachment system—see further). So within couple interactions, the caregiving system of one partner is activated by their reactions to distress signals from the other partner—signals that are generated by the partner’s activation of his or her attachment system.

According to Bowlby (1969/1982), each partner in a romantic relationship can be, and usually is, the target of all three systems (attachment, caregiving, and sex) for the other partner. That is, at different times in the relationship, a partner can be the attachment figure (attachment system), the care provider (caregiving system), or the object of sexual attraction (sex system) for his or her partner. This makes for the possibility that the systems can operate at the same time, and either facilitate or interfere with the achievement of each system’s goals. Regarding goal facilitation, Davis, Shaver, and Vernon, (2004) have found that some people engage in sexual behavior—a response related to the sex system—to comfort or care for their partner—a behavior associated with their caregiving system. Other people have sex to feel more secure—a behavior related with the attachment system. Both of these examples could be interpreted as motives or behaviors associated with the sex system that facilitate the fulfillment of goals and functions related to the other systems.

Regarding interference with goal attainment, situations may arise when the motivations or acts associated with one system are at odds or compete with the motivations or acts of another system. For example, when a couple is facing a danger, each partner's attachment system is likely to become activated, guiding him or her to avoid the danger by running away or looking for an attachment figure. At the same time, seeing one's partner in potential danger is likely to activate the caregiving system, motivating each partner to stick around and provide care for his or her partner. Thus, the motivations generated by the two systems "compete" with each other, and the actual behavior is likely to be based on which system generates stronger activation. This is in line with the work of Eastwick and Finkel (2012) described previously, who claimed that the attachment system overrides the sex system to facilitate relationship maintenance.

Development of an Individual

A third approach involves the study of an individual's development. Both the evolutionary perspective and the perspective focusing on relationship development suggest that the sex system precedes the caregiving and attachment systems developmentally. Conversely, examining the development of the individual shows that attachment is the first system to emerge, guiding infants' behavior from a very early age. Attachment behaviors are observable among infants who are a few months old, and attachment style can be evaluated in infants as young as 9 months of age. Developing at a later point in the individual's lifespan, the caregiving system is thought to guide behavior at a very young age. Infants as young as 1 year old show concern for others (Davidov, Zahn-Waxler, Roth-Hanania, & Knafo, 2013), and preschoolers actually exhibit caring behavior (Kestenbaum, Farber, & Sroufe, 1989). Sexual behavior is thought to emerge last in an individual's development, emerging during the onset of puberty.

This is not to say that the systems are not innate. Rather, these three systems exist from birth, but differ in when they start guiding behavior. Furthermore, a distinction should be made here between behavior and *organized* behavior. Whereas young children may exhibit certain behaviors related to a behavioral system it is unclear whether this represents behavior organized to achieve the set goal of the given system or not. For example, Bowlby reports that infants do engage in sexual behavior, such as pelvic thrusts; however, the behavior is not organized in a way that enables it to lead to predictable outcomes related to sexual functioning. Likewise, when "care" for certain objects or people is exhibited by children, it is unclear whether this is organized caregiving behavior or merely behavior that is indicative of the system. That is, although the behavior may represent a caring response, this behavior might not be indicative of the operation of the caregiving behavioral system per se.

HOW DO THE LEVELS OF ONE BEHAVIORAL SYSTEM AFFECT OTHER SYSTEMS?

A different approach to study the interplay between the behavioral systems is to take a cross-sectional perspective, where researchers investigate how the levels of one system (eg, security or insecurity) affect the functioning of another system (eg, the tendency to explore one's environment). According to Bowlby (1982), high levels of attachment insecurity and the activation of the attachment system are likely to interfere with the functioning of other behavioral systems. Conversely, the sense of security or having a secure base (in the form of an accessible attachment figure) can support or facilitate the functioning of other systems. Ainsworth et al. (1978) demonstrated this in their *strange situation* laboratory procedure. In this procedure, children explored a new unfamiliar environment when they felt secure (ie, the exploration system was activated), but ceased to explore or avoided exploration (deactivation of the exploration system) when they felt insecure and were preoccupied by the whereabouts of their attachment figure. Numerous studies have been carried out throughout the years, highlighting the associations between attachment style, or levels of attachment (in)security, and the functioning of other behavioral systems (eg, Gillath, Shaver, & Mikulincer, 2005b).

Below we review some of the work that has been conducted on the interplay between the attachment system and other behavioral systems (eg, caregiving, sex, exploration, affiliation). A significant proportion of the research investigating the interactions between the attachment system and other systems has focused on the caregiving system, largely due to the early work of Shaver, Hazan, and Bradshaw (1988) and others. Therefore we commence by focusing on the caregiving system. After describing the characteristics of the caregiving system we discuss research regarding the interactions between this system and the attachment system.

WHAT IS THE CAREGIVING SYSTEM?

The *caregiving system* is activated when another being (human or otherwise) experiences suffering or is in need of care and protection (Canterberry & Gillath, 2012; Gillath et al., 2005b). Thus, the caregiving system can be seen as complementary to the attachment system in that it motivates individuals to offer assistance, comfort, and support in response to the cues generated by another person's distress (Canterberry & Gillath, 2012; Karantzas & Simpson, 2015).

Mikulincer and Shaver (2009) suggested that studying the activation of a behavioral system can improve the understanding of how individual differences are associated with the functioning of the system. For example, with regard to attachment, people high on attachment anxiety tend to hyperactivate their attachment system—they are more vigilant to cues in the environment and are more likely to turn to their attachment figures for help. Conversely, people high on avoidant

attachment tend to deactivate their attachment system, disregard cues or threats in the environment, and are less likely to turn to their attachment figure (compulsive self-reliance) even when they feel threatened or stressed. Further, Mikulincer and Shaver have suggested that individual differences in the caregiving system can also be conceptualized as patterns of hyperactivation or deactivation of the system. Across various studies, they have demonstrated that hyperactivation or deactivation of the caregiving system is associated with problems in the regulation of emotions, impulses, and goal-directed actions and puts a person at risk for emotional problems and maladjustment (eg, being less helpful or showing less care and more distress in various caregiving contexts). We discuss the outcomes of co-occurring system activation in detail in the following section.

Although caregiving and attachment are separate behavioral systems, and each system affects behavior in a unique way, the two systems have been proposed by Bowlby (1969/1982) to also interact in shaping people's behavior (see also, George & Solomon 2008; Mikulincer & Shaver, 2009). We (Canterberry & Gillath, 2012; Gillath et al., 2005b) and others (eg, Feeney & Collins, 2001) have argued that while there is a natural tendency to provide care to dependent or needy others, the interplay between the two systems can result in caregiving tendencies being overridden or suppressed by attachment insecurity (Kunce & Shaver, 1994). Thus, a person's attachment style (ie, secure or insecure) or state attachment (sense of security or insecurity) is thought to influence the interplay between the two behavioral systems, and the outcomes of this interplay (eg, providing help or not).

The interplay between the two systems is even more complicated as caregiving (mainly in childhood) is likely to affect the development of attachment style. Thus, sensitive, supportive caring by one's primary caregivers is likely to result in a secure attachment, which can facilitate an individual's ability to provide sensitive, supportive caregiving later in life. Conversely, insensitive, unsupportive caring is likely to result in an insecure attachment style, which is known to be associated with poor caregiving in adulthood. This suggests a developmental link between attachment and caregiving (eg, Kestenbaum et al., 1989).

The degree of sensitive and responsive care that an individual experiences in childhood and adulthood not only influences the development of one's attachment style, but is theorized to also shape one's caregiving style (Kunce & Shaver, 1994). Experiencing responsive and sensitive parenting promotes a secure attachment style and provides good models of how to deliver effective caregiving. As a result, individuals develop a pattern of behavior that reflects sensitive and responsive caregiving—attending to others' needs through the provision of support and maintenance of proximity, cooperating with the care-recipient in ways that effectively deal with threats and challenges, and providing help in a nonsmothering or noncompulsive manner. On the other hand, experiencing inept and inconsistent parenting promotes an insecure attachment style and impedes the development of models of effective caregiving. As a result, individuals develop a pattern of behavior that reflects a highly insensitive approach to caregiving—providing help in either a distant and cold manner, or a highly controlling and intrusive manner

(Collins & Feeney, 2000; Kuncze & Shaver, 1994). Specifically, being securely attached facilitates a caregiving style characterized by high proximity, sensitivity, and responsiveness; being avoidant facilitates a more controlling and distant approach to caregiving coupled with low proximity and sensitivity; and finally being anxiously attached facilitates a compulsive, intrusive caregiving style that is inconsistent and that lacks sensitivity and responsiveness.

WHAT HAPPENS WHEN BOTH SYSTEMS ARE ACTIVATED?

Previously we described a situation where the attachment and caregiving systems motivate people to behave in two potentially opposing ways—a self-focused manner versus an other-focused manner (ie, either save oneself or save/care for another). In this section we elaborate on the outcomes that can ensue when both the attachment and caregiving systems are activated. One outcome is that people may ignore the distress of others and continue to focus on their own worries. This is likely to be the case for insecure individuals whose self-focused worries and concerns can disrupt caregiving behaviors.

An alternative outcome is that people may shift their focus away from their own anxieties and concerns to address the distress of others through the provision of care and support (for a similar idea see Batson, Fultz, & Schoenrade, 1987). However, what determines if the interplay between the two systems results in a reaction of self-focused concern (an act of nonprosociality) or an other-oriented response (provision of help/care—an act of prosociality)?

One determinant relates to whether a person has the necessary mental resources available to attend compassionately to other people who are in need of help (Mikulincer & Shaver, 2004). As mentioned earlier, work by Gillath et al. (2005b) and others suggests that attachment security can be conceptualized as a mental resource that is available for individuals when they are faced with demanding situations. In particular, secure individuals are thought to possess various mental resources (eg, attention and energy) as well as the flexibility to direct these resources toward the functioning of other behavioral systems such as the caregiving system. Secure people are also thought to be able to regulate their own emotions, which could otherwise generate personal distress, cognitive and emotional strain, and depletion of mental resources (eg, Batson et al., 1987; Finkel & Campbell, 2001; Fredrickson, 2001).

Thus, attachment security allows a person to perceive others not only as a source of safety and support, but also as people who might themselves be in need of help. This sense of security allows people to temporarily overcome their own anxieties and forgo their needs in order to attend to the plight of others. Finally, mental representations associated with attachment security are thought to provide a model for helping behavior that secure individuals can implement. That is, remembering how one was assisted in the past, or how a caregiver behaved in the past, can provide procedural knowledge and guidelines on how to deal with a situation when help is needed.

In contrast to securely attached individuals, insecure individuals may fail to notice people in need, or may lack the mental resources necessary to provide sensitive and effective care to others even if they do notice a need (Gillath et al., 2005b; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). Even when noticing others in need, and possessing some resources to provide support (eg, time, money, energy), insecure people appear to lack the mental models or experience on which to base their provision of help (Mikulincer & Shaver, 2004). Lack of models and experience may render the help of insecure individuals unfit or inappropriate—they may be too controlling, insensitive, or intrusive. Thus, insecure individuals not only lack the sense of security to buffer the negative feelings evoked by the threatening situation, but they also lack the procedural knowledge about how to respond, and the mental resources (such as cognitive flexibility) to mobilize an effective and coordinated caregiving response. Therefore, individuals who are insecurely attached are less likely to provide help compared to secure individuals. Specifically, avoidant individuals are more likely to distance themselves from caregiving situations, whereas anxious individuals are more likely to become overwhelmed and render ineffective caregiving.

WHAT EMPIRICAL EVIDENCE EXISTS FOR THE INTERPLAY BETWEEN THE CAREGIVING AND ATTACHMENT SYSTEMS?

The association between attachment style and caregiving has been demonstrated across different situations involving prosocial behavior and relationship contexts. For example, secure individuals have been found to endorse more prosocial values such as benevolence and universalism, engage in more volunteering activities and spend more time doing so, exhibit generosity, and report altruistic reasons for volunteering as compared to people scoring high on attachment avoidance or anxiety (eg, Gillath et al., 2005b). Moreover, research by Gillath and colleagues on attachment, caregiving, and volunteerism has replicated the associations just outlined across different cultures (similar results were obtained in the United States, the Netherlands, and Israel).

Similar findings regarding attachment and prosociality have been found in other contexts. For instance, high-school students high on attachment anxiety or avoidance were perceived by peers as less supportive than their secure classmates, and were less likely than secure students to engage in reciprocally supportive relationships (Priel, Mitrany, & Shahar, 1998). Within the context of family caregiving, researchers have found that attachment anxiety and avoidance are negatively associated with adult children's current care of older parents (Carpenter, 2001; Crispi, Schiaffino, & Berman, 1997; Karantzas, 2012; Karantzas et al., 2010; Karantzas, Evans, & Foddy, 2010). Relatedly, lower scores on the anxiety and avoidance dimensions (ie, secure attachment) were found to predict adult children's future care plans for older relatives, suggesting that secure adults are care-oriented even before care is explicitly called for (Sörensen, Webster, & Roggman, 2002; see also Karantzas, 2012; Karantzas et al., 2010).

As attachment security has been repeatedly associated with numerous positive caregiving-related outcomes, orienting people toward a secure attachment style or enhancing their sense of security is likely to result in increased caregiving and helping behavior, and less caregiver-related strain. Thus, fostering attachment security and effective functioning of the caregiving system can enhance people's prosocial tendencies and behaviors. We next review the literature on the enhancement of attachment security and its effects on outcomes related to caregiving and prosociality more broadly.

WHAT HAPPENS WHEN SECURITY IS ENHANCED?

Enhancing one's sense of security has been found to increase other-oriented prosocial tendencies and behaviors (see chapter: What can Social Cognition and Priming Tell us About Attachment?). For example, Mikulincer et al. (2001a), and Mikulincer et al. (2003) showed that exposing people to attachment security primes (eg, attachment-security-related words, such as *love*, *hug*, and *secure*) led participants to endorse more self-transcendence values (universalism and benevolence) and report higher willingness to behave more empathically toward people in need (eg, spend more time and money on helping a girl who lost her parents). Moreover, participants who were exposed to a security prime actually exhibited a greater willingness to take the place of a fellow participant who could not complete various aversive tasks, as compared with participants in the control condition (Mikulincer et al., 2005). For example, Mikulincer et al. (2005) exposed people in the laboratory to either attachment-security-related prime or a control prime. Following exposure to the prime, participants were instructed to watch another study participant (via a monitor), who was supposedly in the next room, engaging in a series of increasingly aversive tasks (eg, watching gory pictures, placing one's hand in a bucket of ice water, petting a tarantula).

The participant engaging in the aversive tasks was in fact a study confederate. Halfway through the aversive tasks, the confederate exclaims that she cannot continue. At that point in time, the experiment is stopped, and the participant watching the clip is asked to complete a few questionnaires, tapping into, among other things, his or her willingness to help the confederate by volunteering to take over from where the confederate left off. After completing the questionnaires the participant is given the option to go into the other room and help by actually taking the "other participant's" place. Once this option was given to the participant the study concluded. Mikulincer et al. found that 70% of the people primed with security were willing to help—this was significantly more than the people in the control condition (less than 30%).

Experimentally increasing people's sense of attachment security (even in people with an insecure attachment) has also been found to increase compassionate responses to the suffering of others (Mikulincer et al., 2005). People high on attachment avoidance typically have less empathic reactions to others' suffering, including being less willing to help a distressed person. However,

when exposed to a security prime, avoidantly attached people tend to be more prosocial, compassionate, and helping; thus their behavioral responses appear similar to their secure counterparts (eg, Mikulincer et al., 2005). Anxiously attached people are more likely to have an emotional reaction to a person in need. That is, they do not ignore or downplay the event, but rather experience negative affect, a response termed by Batson as *personal distress* (Batson et al., 1987). The negative emotions accompanied by a sense of being overwhelmed by these emotions make anxious people focus inward. Thus, while they may want to help others (in order to stop experiencing negative emotions) they often cannot, because they are overwhelmed by their own distress. This, in turn, leaves anxious individuals in a state where they are not more (or less) likely to provide help. However, when exposed to a security prime anxiously attached people, much like avoidant individuals, show increased levels of caregiving (for similar findings see Mikulincer et al., 2001a, 2003). These findings provide evidence for a possible causal link between attachment security and the tendency to care, such that enhancing one's sense of attachment security increases a person's tendency to be more compassionate and behave in a more prosocial manner.

WHAT ABOUT SEX?

Numerous studies have focused on another interplay between two behavioral systems—attachment and sex (eg, Shaver & Mikulincer, 2012). The function of the *sex system* is to pass the genes from one generation to another via intercourse with an appropriate partner (eg, Buss & Kenrick, 1998). The system is activated by a variety of cues, including being in the presence of an attractive potential mate. The system's responses include approaching such a partner (initiating a relationship/interaction), getting an erection or experiencing vaginal wetness, pelvic thrusting, engaging in sexual activity, and experiencing enjoyable sex (ie, increases in positive mood and approach motivation). For example, Gillath et al., 2008a exposed people to either sex-related words or sexual images (pictures of naked opposite sex members) and then measured their willingness to self-disclose and the accessibility of intimacy-related words. Gillath and colleagues found that participants demonstrated increases across both outcomes following exposure to a sexual prime. These outcomes are thought to be related to initiating new relationships (ie, the propensity to self-disclose and to thinking about intimacy), suggesting that when the sex system is activated, people are more inclined/open to initiate new sexual relations.

In many of the studies focusing on attachment and sex, an association was found between attachment security and higher sexual satisfaction, attentiveness to a partner's sexual needs, openness to experience within the sexual domain (and in general), and a preference for engaging in sex within the boundaries of long-term committed relationships as opposed to short-term relationships (Gillath & Schachner, 2006). Insecure attachment, conversely, was found to be associated with less sexual satisfaction and pleasure, and with sex as means

to obtain other nonsex-related goals, such as status, prestige, and enhanced self-esteem. Insecure people are less likely to have sex, less likely to enjoy it, and more likely to feel coerced to do it (Brassard, Shaver, & Lussier, 2007; Karantzas et al., 2016). Avoidant individuals tend to have more uncommitted and non-emotional or distant sex, and have the tendency to poach others' relationship partner. Anxiously attached individuals have an ambivalent approach to sex, and use it as means to gain love, reassurance, and closeness as well as to prevent rejection (eg, Davis, Shaver, & Vernon, 2004). Overall, anxiously attached people seem to conflate sex with love, which may reflect a fusion (or confusion) of the attachment and the sex behavioral systems.

Although there are plenty of studies about attachment and sex, there is relatively less systematic research targeting directly the sex behavioral system and its interplay with attachment (eg, Shaver & Mikulincer, 2012). Birnbaum and Gillath (2006) and Gillath et al. (2008a) have attempted to address these gaps by examining the activation and functioning of the sex system. Specifically they theorized that the system has three main subgoals: initiation (of new sexual relationships), maintenance (of existing relationships), and enjoyment (experiencing sex as fun and harboring a desire to approach a partner for sex). Initiation is meant to generate new relationships or opportunities to have sex. Maintenance is meant to sustain existing relationships so people can have multiple opportunities to engage in sex and thereby increase (1) the probability of fertilization and (2) the likelihood that a couple will stay together and tend to their progeny, which can increase the survival chances of the offspring. Enjoyment is meant to motivate people to continue to engage in sex, and again, increase the chances of fertilization.

Gillath et al. (2008a) and Gillath and Collins (2016) showed that, when the sex system was activated (subliminally or supraliminally), people exhibited tendencies or behaviors in line with the pursuit of the suggested subgoals. For example, in a series of studies, Gillath et al. exposed people to images of naked members of the opposite sex or control images (eg, pictures of the same individuals dressed) and then assessed their willingness to make sacrifices for one's partner, or to use positive conflict-resolution strategies. People exposed to sexual images reported higher willingness to sacrifice and a higher tendency to use positive conflict-resolution strategies than people exposed to the control images. These findings support the idea that when the sex system is activated people are motivated to maintain their romantic relationship.

As with the caregiving system, researchers have examined the interactions between the sex system and the attachment system, and how priming people with attachment security or insecurity cues affects their sexual responses. For example, Gillath and Schachner (2006) reported that priming people with attachment security cues lowered their preference for short-term sexual strategies (such as engaging in a one night stand), and increased their preference for long-term strategies (looking for a long-term partner, or dating the "right" partner). Conversely, priming people with insecurity cues increased people's preferences for short-term strategies, especially among men (Gillath, Landau, Selcuk, & Goldenberg, 2011).

We cannot finish the review about the interplay between attachment and sex without referring, if briefly, to the evolutionary perspective advocated by Lee Kirkpatrick (2005). Kirkpatrick suggested that attachment in adulthood is very different from attachment in childhood. In childhood the function of the system is protection, in adulthood it is similar to that of the sex system—reproduction. Furthermore, adult attachment styles represent, according to Kirkpatrick, one’s preference for long- or short-term sexual strategies. In other words, Kirkpatrick suggests that the two systems (attachment and sex) do not simply interact with each other in adulthood, but rather are two manifestations of the same phenomenon.

Another view that has emerged from evolutionary psychology is expressed in the work guided by Life History Theory (see Del Giudice, Gangestad, & Kaplan, 2015; Gillath et al. 2011 for a review). Researchers adopting this view suggest that both attachment style and sexual strategies are shaped by the environment in which people grow up. For example, growing up in a poor and dangerous neighborhood is likely to result in the development of an insecure attachment style and a preference for short-term sexual strategies. These evolutionary-based theories offer an opportunity to broaden the research on the interplay between attachment and sex and challenge existing assumptions about how these behavioral systems are related.

ARE THERE OTHER BEHAVIORAL SYSTEMS AND IF SO, WHAT ABOUT THEIR INTERPLAY?

Whereas Shaver and colleagues (Shaver & Hazan, 1988; Shaver et al., 1988) focused their research on adult pair bonding or romantic love to three behavioral systems (attachment, caregiving, and sex), more and more research has been carried out on other behavioral systems (eg, exploration, affiliation, anger/dominance). It is not clear exactly how many systems exist; people have different opinions on what should be considered as a behavioral system. For example, Leedom (2014) suggested that there are four behavioral systems, each aligned with a different class of social reward. These behavioral systems are the attachment, caregiving, dominance, and sex systems. Each of these systems organizes humans’ processing of social information and the coordination of responses. In addition to the systems just noted, it has been suggested by some that behavioral systems extend beyond the social realm and can include systems associated with domains such as the physical functioning of an individual. For example, Leedom (2014) and Schaller and Duncan (2007) propose the existence of physical systems such as the feeding system and the immune behavioral system. Does this mean that anything can be described as a behavioral system?

According to Hinde (2005), the behavioral systems framework can be used broadly to describe various behaviors. The framework conceptualizes “the motivation and control of a group of behavior patterns that are closely and more or less causally (and often also functionally) related to each other” (Hinde et al.,

2005, p. 6). As long as the behavior is goal-directed and the characteristics of the “system” meet the qualifications outlined previously (see also Leedom, 2014 for additional conditions) then it is possible for any number of organized behavioral patterns to constitute a behavioral system. In the current chapter, however, we only focus on the systems that have been studied with regards to attachment.

The Exploration Behavioral System

The research regarding the links between attachment and other behavioral systems such as the exploration, affiliation, and anger systems, especially among adults, is quite sparse. For example, a handful of studies have examined the links between attachment and exploration in adults. The goal of the *exploration behavioral system* is to curiously explore and learn about the environment. Ainsworth et al. (1978) based the strange situation task—used to classify infants into attachment styles—on the interplay between the attachment and the exploration systems. Ainsworth’s assumption was that secure infants tend to explore their environment, whereas infants who feel insecure do not. However, neither she nor other researchers that followed investigated the exploration system among adults. The first researchers to address this limitation were Green and Campbell (2000). They found that both attachment anxiety and avoidance were negatively correlated with willingness to explore the environment. Green and Campbell found similar results for different types of exploration, namely, social exploration (eg, I would like the chance to meet strangers), intellectual exploration (eg, I would like to go to a modern art museum), and environmental exploration (eg, If I had the time and money, I would like to travel overseas this summer). They also found that people who were primed with security were more open to exploration.

Elliot and Reis (2003) found similar results. Their work focused on integrating the exploration system as discussed within attachment theory with R. W. White’s (1959) concept of effectance motivation (also known as competence motivation or mastery). Elliot and Reis also integrated the constructs of motives and goals as part of their research given their central importance in the achievement motivation literature. Then they reported four studies in which attachment security was found to be associated with achievement motivations (positively with need for achievement and negatively with fear of failure), and goals (positively associated with mastery-approach goals, and negatively with mastery-avoidance and performance-avoidance goals). Attachment insecurity was associated with a low need for achievement and a high fear of failure. Insecurity was also positively associated with mastery-avoidance and performance-avoidance goals, and negatively associated with approach-personal goals and mastery-approach goals.

Insecurity was also found to be associated with lower trait curiosity (Mikulincer, 1997), lower creativity following induction of positive affect (Mikulincer & Sheffi, 2000), and lower cognitive openness and higher dogmatic thinking

(Mikulincer, 1997). Coy, Green, and Davis (2012) showed that attachment style affected duration and enjoyment of exploration, such that insecurity was associated with shorter duration and less enjoyment. Gillath et al. (2008b) found that the contextual activation of security via repeated security priming was also associated with exploration in the form of people's creativity. Specifically, Gillath and colleagues reported that individuals that were repeatedly primed with security demonstrated higher creativity as compared with a control group. Focusing on exploration, but its interplay with caregiving rather than attachment, Feeney (2004) showed that responsive (nonintrusive) caregiving by a relationship partner in response to an individual's goal strivings and explorations, resulted in greater happiness, self-esteem, and perceived likelihood of achieving specific goals by the target individual.

The Affiliation Behavioral System

Another behavioral system thought to be related to attachment is the *affiliation behavioral system* (Gillath & Karantzas, 2015; Weiss, 1998). The affiliation system is thought to promote survival by motivating people to socialize with others. Being sociable protects humans and nonhumans from predators, increases the likelihood of finding mates, and enhances people's abilities to collect food, build shelter, and explore the environment (Cassidy, 2008; Mikulincer & Selinger, 2001). According to Weiss (1998) the affiliation system fulfills various social functions, including: (1) companionship and friendship; (2) development of knowledge and skills; (3) intellectual and social stimulation; (4) engagement in diverse social activities such as play; and (5) development of alliances to defend against protagonists or outgroup members. Mikulincer and Selinger (2001) argued that the affiliation system is activated when a person is in a good mood and there is no immediate source of stress; however, Mikulincer and Selinger did not mention a specific trigger, and did not provide any information regarding when people are likely to initiate new relationships. For example, are they more likely to initiate a new friendship when they are having a good time with someone, or when they feel lonely and in need of company?

When describing the interplay between the attachment and the affiliation behavioral systems, Bowlby (1982) coined the concept "attachment-affiliation balance." Affiliation behavior is enacted during periods when an individual is in a state of felt security, which means the attachment system is in a state of deactivation. However, when an individual experiences distress or threat and the attachment system is activated, affiliation behaviors (in a similar fashion to behaviors guided by other behavioral systems such as the caregiving; eg, Gillath et al., 2005b) are inhibited. Insecurity is thought to interfere with and even inhibit affiliation activities. Insecure individuals are self-focused, preoccupied with their relationship concerns or have difficulties trusting one's partner—characteristics that can be disruptive for affiliation behaviors (Mikulincer

& Selinger, 2001). Conversely, attachment security fosters engagement in affiliation behaviors—perceiving others not only as a source of security, but also as meeting nonattachment needs such as companionship and other social or instrumental needs.

Gillath and Karantzas (2015) have recently suggested that the interplay between the attachment and affiliation systems can be successfully examined via the prism of social networks in at least two different ways. First, attachment figures are thought to be a part of one's attachment network (ties that fulfill people's needs for love, comfort, and security, see chapter: What Is an Attachment Relationship?), which in turn is a part of people's general network (Dunbar & Spoons, 1995; Sutcliffe, Dunbar, Binder, & Arrow, 2012). Gillath and Karantzas suggested that members of one's general social network can gradually become members of the attachment network (or become attachment figures), as people learn to trust each other and the closeness between them increases. This is especially likely to happen during life transitions, when people may lose contact with their old ties or become separated from their existing attachment figures.

A different way that attachment and networks are linked is similar to the interaction we describe above between levels of (in)security and the functioning of other behavioral systems. Specifically, attachment style may predict the perception and management of social networks. To examine this proposition, Gillath and Karantzas (2015) conducted a study in which they asked participants to complete various self-report measures on social networks. Participants first listed anywhere between 10 and 30 people with whom they shared an acquaintance and who were thus part of their social network. They were then asked to rate their closeness to each person as well as their perceptions of the closeness between all pairs of network members. Measures were also administered to assess the extent that network members fulfilled various attachment and affiliative functions as well as the frequency with which network members interacted with one another. These assessments allowed Gillath and Karantzas to compute a series of social network indices. These indices included network density (the extent to which network members were known to one another), tie strength (the closeness experienced between network members), and multiplexity (the number of social functions that network members fulfill). Participants also completed a self-report measure of attachment.

Gillath and Karantzas found that attachment anxiety was negatively correlated with network density and tie strength. These findings suggest that anxiously attached individuals' perceptions of network ties share similarities with their appraisals of their romantic relationships—thus anxious people perceive the ties between themselves and network members as lacking closeness. Attachment avoidance was not associated with closeness or density, but rather it was negatively associated with multiplexity. Gillath and Karantzas suggested that the concerns about trust that avoidant individuals harbor as part of their dyadic relationships may apply broadly to their connections with social network members. That is, rather than trusting one or a few close others to fulfill all their

attachment and affiliative functions, they use a large number of close others—each fulfilling only one or a limited amount of functions, which results in low multiplexity. Avoidance was also associated with initiating fewer new ties, and dissolving a greater number of existing ties. Overall, these findings suggest that insecurity hinders the functioning of the affiliation behavioral system.

The Power Behavioral System

The *power behavioral system* is another system likely to interact with the attachment system. According to Shaver, Segev, and Mikulincer (2011) the goal of the system is to gain or control materials and social resources in a world of competitors or thwarters. The triggers of the system include (1) attempts by others to acquire one's valuable psychological or physical resources and (2) efforts by others to constrain one's access to such resources. Once the system is activated, it motivates people to engage in behaviors aimed at protecting or restoring resources and regaining a sense of control or influence. This motivation manifests in behaviors such as asserting dominance, expressing confidence in one's strengths, deterring others from competing for or exerting control over one's resources, and verbally or physically attacking (or threatening to attack) others (eg, Gilbert, 2000).

While there is no research explicitly investigating the associations between the attachment and power behavioral systems, some insights regarding the interplay between these systems can be gleaned from research investigating associations between attachment and anger. For example, in a study by Diamond and Hicks (2005), attachment anxiety was found to be positively associated with outbursts of anger, aggression, and violence. People high on anxiety reported more anger and had lower vagal tone (a physiological indicator of the downregulation of negative emotions) during and after anger-provoking tasks. These findings suggest that individuals high on attachment anxiety exhibit hyperactivation of the power system, reflected in intense anger that is difficult to subdue. Simpson, Rholes, and Phillips (1996) found a similar association between anxiety and anger, among dating couples who discussed an unresolved problem in their relationship. Attachment anxiety has also been found to be a predictor of domestic violence, antisocial behavior (such as delinquency and criminality), and intergroup aggression (see Mikulincer & Shaver, 2007a, for a review).

Similar associations have been reported between avoidant attachment and variables thought to index the hyperactivation of the power system (Simpson et al., 1996). For instance, avoidant individuals have been found to express hostility toward others, but also to perceive others as hostile (Mikulincer, 1998a,b).

The Health Behavioral System and the Morality Behavioral System

Two other potential behavioral systems for which we provide a cursory note are the *health behavioral system* and the *morality behavioral system*. With regard to health, the system's goal is to promote health and reduce health risks such

as exposure to diseases and pathogens (see Schaller & Park, 2011). There are many studies about attachment style and health. These studies generally demonstrate a positive correlation between attachment insecurity and symptom reporting, lower health-care utilization, and restriction of daily living activities (eg, Feeney, 2000; Kidd & Sheffield, 2005; Sakaluk & Gillath, 2016). Furthermore, attachment insecurity has been shown in numerous studies to be associated with poor well-being and psychopathology (eg, Dozier, Stovall-McClough, & Albus, 2008, see chapter: *What Are the Implications of Attachment Processes for Psychopathology and Therapy?*). In other words, attachment insecurity may hamper or hinder the functioning of the health system.

With regard to morality, the system's goal seems to be in between those of the caregiving and the health behavioral systems, promoting authenticity, honesty, and morality (eg, van IJzendoorn, 1997). A few researchers have shown that attachment security is positively associated with moral reasoning and authenticity whereas insecurity is negatively associated with these constructs. For example, Cole (2001) found that insecure attachment was associated with dishonesty, and similarly, Lopez and Rice (2006) found that both attachment anxiety and avoidance were inversely related to unwillingness to engage in or accept deceptive and inaccurate self and partner representations. Gillath, Sesko, Shaver, and Chun (2010) showed that priming people with security reduces their propensity to lie and increases their authenticity.

Readers may wonder how many behavioral systems are out there and whether anything and everything can be considered a behavioral system. For example, does JavaScript programming qualify as a behavioral system? Do people's sleep-wake cycles reflect another kind of behavioral system? The list of potential behavioral systems can go on and on. Likewise, readers may wonder what we as a field gain by describing findings regarding attachment and other behaviors, like aggression, in terms of the interactions between behavioral systems (eg, attachment and power). Readers may also wonder why we touched on the interplay of attachment and anger/power, for example, rather than the interplay between attachment and other emotions. Starting with the last question first, in this chapter we only covered findings from studies in which researchers had explicitly acknowledged and defined that their investigation involved understanding the functioning of a behavioral system. There might be other behavioral systems we have not covered in this chapter, like for example a nutrition behavioral system (Wilkinson, Rowe, Bishop, & Brunstrom, 2010); however there is not enough work currently to allow a fuller discussion of such systems here. Therefore, we do not know, and perhaps may never know, how many behavioral systems (or modules) are in existence (some scholars write about hundreds; Schmitt & Pilcher, 2004). As for the question "Can anything be described as a behavioral system?"—the short answer is "no," the long answer however is "it is complicated." Any set of behaviors (ie, not one behavior) that were shaped over the course of evolutionary history, and are organized around the six criteria described earlier in

this chapter (eg, having a function, triggers, responses, goals), can qualify as a behavioral system. However, readers must keep in mind that a behavioral system has to be species universal, functional (ie, contribute to the organism's survival and reproduction), innate, and motivate goal-corrected behavior. These criteria limit the possibilities of what constitutes a behavioral system. Further research is needed before more specific conclusions can be drawn. We next summarize the work we have reviewed throughout the chapter and suggest ways it can be applied to other systems in the future.

IMPLICATIONS AND CONCLUSIONS

The current chapter reviewed the different behavioral systems and their interplay (mainly with regard to the attachment system). Overall there are many similarities in the ways the different behavioral systems interact with the attachment system. Bowlby (1982) suggested that attachment security is a basis for the development and functioning of other behavioral systems. Bowlby further suggested that the operation of different behavioral systems is connected by excitatory or inhibitory links, such that activation of one system can activate or deactivate other systems. As reviewed in this chapter, various scholars have conducted studies that support Bowlby's claims regarding the interplay between behavioral systems. Although we focused on attachment, other systems interact as well. For example, a new potential mate, which triggers the sex system, may also activate the exploration system, resulting in exploration of interests and desires, which may further facilitate the formation of a sexual relationship (Mikulincer & Shaver, 2009).

Multiple systems can lead to the same or a similar behavioral outcome. Thus, a behavior such as moving physically closer to another person can be motivated by the attachment system—if, for example, the intent is to obtain support, comfort, or relief from threats and stressors. However, it can be also motivated by the sex system—if the intent is to increase the likelihood of sexual intercourse. In other words, we may describe and study each system separately, but in real life the systems are much more entwined—and it is often hard to know what certain behaviors mean because of the multicausal nature of things.

It is also important to note that the functioning of behavioral systems yields both visible outcomes in the form of physical acts (eg, seeking out protection and care) and invisible outcomes such as the subjective feelings that are associated with physical acts (eg, experiencing felt security after seeking out protection). So even when a system is activated, a person may not show overt changes. This does not mean that changes are not taking place on a cognitive or affective level. Furthermore, some of these changes may be long term, so for example, activation of the caregiving system in the long run may affect the attachment system by making people more secure (Gillath et al., 2008b).

In summary, the behavioral systems model is a comprehensive model of personality, motivation, and social behavior, which considers both individual differences and the impact of the environment (relationship partners, characteristics of the social situation, etc.) on one's behavior. By conceptualizing behavior in terms of goals and the social-cognitive regulation of goal-directed behavior, Bowlby (1982) laid the foundation for a behavioral systems approach to the study of human relationships, and potentially a comprehensive theory of motivation.