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Adult Attachment Theory, Emotion Regulation, and Prosocial Behavior

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Parts of this chapter are adapted with permission from Mikulincer and Shaver's recent publications.

Attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1982) is a theory of the developmental origins of individual differences in emotion regulation within the context of close relationships. Early studies based on the theory (e.g., Ainsworth, Blehar, Waters, & Wall, 1978) were concerned with human infants' "attachment to" or "emotional bonding with" their mothers, because individual differences in relational orientations and affect-regulation strategies were thought to begin in infancy. In recent years, however, much of the emphasis has shifted to emotional attachments in adolescents and adults, including attachment to romantic or marital partners, and to individual differences in emotion regulation associated with different patterns of attachment or "attachment styles" (Mikulincer & Shaver, 2003, in press). In the present chapter, we outline attachment theory, review psychological and neuropsychological research on attachment-related individual differences in emotion regulation, and show how security-related regulation processes foster mental health and prosocial mental states and behaviors.

Various typologies and dimensional conceptions of individual differences in "attachment style" have been proposed. One of the conceptual schemes used most often by researchers in personality and social psychology is a model proposed originally by Bartholomew (1990) and developed further by Fraley and Shaver (2000) and Mikulincer and Shaver (2003). According to this model, attachment styles can be viewed as regions in a two-dimensional space defined by anxious attachment and avoidant attachment, with low scores in these dimensions representing a dispositional sense of attachment security or a secure attachment style. In recent years, experimental research – both behavioral and brain-oriented (e.g., using functional magnetic resonance imaging, or fMRI) – has revealed some of the dynamics of emotion regulation related to these dimensions of attachment style. Along with insights and findings about emotion regulation generally, research on adult attachment indicates that attachment security and

associated emotion-regulation processes foster effective coping with stress, development of prosocial values, and socially desirable interpersonal and group behavior.

*Attachment Theory and the Construct of Attachment Style*

According to Bowlby (1973, 1980, 1982), human beings and many nonhuman primates are born with an innate psychobiological system (the *attachment behavioral system*) that motivates them to seek proximity to significant others (*attachment figures*) in times of need as a way of protecting themselves from threats and alleviating distress. Bowlby (1973) also described important individual differences in attachment-system functioning that result from social experiences with attachment figures beginning in childhood. Interactions with attachment figures who are available and responsive in times of need promote a sense of attachment security – “felt security” (Sroufe & Waters, 1977) – based on expectations that attachment figures will be available and helpful when needed. These expectations are organized into relatively stable *working models*: mental representations of self and others in the context of close relationships.

When attachment figures are not reliably available and supportive, however, a sense of security is not attained, negative working models of self and/or others are formed, and strategies of affect regulation other than normal proximity seeking are engaged. These *secondary attachment strategies* can be conceptualized in terms of two roughly orthogonal dimensions, avoidance and anxiety. A person’s position on the first dimension, *avoidance*, reflects the extent to which he or she distrusts relationship partners’ goodwill and strives to maintain behavioral independence and emotional distance from partners. The second dimension, attachment-related *anxiety*, reflects the degree to which a person worries that a partner will not be available in times of need. People who score low on these two dimensions are said to be secure or securely attached.

Attachment styles begin to be formed in interactions with primary caregivers during early childhood, as a large body of research has shown (Cassidy & Shaver, 1999), but Bowlby (1988) claimed that memorable interactions with other people throughout life can alter a person's working models and move him or her from one region of the two-dimensional space to another. Moreover, although attachment style is often conceptualized as a single global orientation toward close relationships, and can definitely be measured as such (e.g., Brennan, Clark, & Shaver, 1998), a person's attachment orientation is rooted in a complex cognitive and affective network that includes many different episodic, context-related, and relationship-specific, as well as fairly general attachment representations (Mikulincer & Shaver, 2003). In fact, research shows that attachment style can change, subtly or dramatically, depending on natural or experimentally induced contexts and recent experiences (e.g., Baldwin, Keelan, Fehr, Enns, & Koh Rangarajoo, 1996; Mikulincer & Shaver, 2001).

#### *Attachment-System Functioning and Emotion Regulation in Adolescence and Adulthood*

When an adolescent or adult finds him- or herself in a threatening or stressful situation, perceiving that attachment figures are unavailable or unresponsive compounds the distress (as also occurs in infancy; Bowlby, 1982). This state of insecurity forces a decision about the viability of further (more active, more intense) proximity seeking as a protective strategy. The appraisal of proximity as feasible or essential – because of attachment history, temperamental factors, or contextual cues – results in energetic, insistent attempts to attain proximity, support, and love. These attempts are called *hyperactivating strategies* (Cassidy & Kobak, 1988) because they involve up-regulation of the attachment system, including constant vigilance and intense concern until an attachment figure is perceived to be adequately available and supportive.

Hyperactivating strategies include strident attempts to elicit a partner's involvement, care, and support through crying, begging, clinging, and controlling behaviors (Davis, Shaver, & Vernon, 2003) and overdependence on relationship partners as a source of protection (Shaver & Hazan, 1993). Hyperactivating strategies cause a person to remain perpetually vigilant about threat-related cues and cues of attachment figures' unavailability, the two kinds of cues that activate the attachment system (Bowlby, 1973). Hence, once they become the focus of a person's attention, they more or less guarantee that the attachment system will remain continuously active. These aspects of attachment-system hyperactivation account for many of the empirically documented correlates of attachment anxiety (Mikulincer & Shaver, 2003, in press).

Hyperactivation also intensifies negative emotional responses to threats. Anxiously attached individuals often perceive negative emotions as congruent with their attachment goals and therefore sustain or exaggerate them. Such people are guided by an unfulfilled wish to get attachment figures to pay attention and provide more reliable protection, which causes them to intensify their bids for love and care. As a result, hyperactivating strategies can intensify emotions associated with crying out for attention and care, such as jealousy and anger, or implicitly emphasize a person's vulnerability, helplessness, and neediness, such as sadness, anxiety, fear, and shame. This kind of emotional expression runs counter to typical conceptualization of emotion regulation in terms of *down*-regulation of distress. In the case of anxiously attached persons, however, "regulation" can also include distress intensification.

How is anxious hyperactivation sustained? One way is to exaggerate appraisals, perceptually heightening the threatening aspects of even fairly minor threats, hold onto pessimistic beliefs about one's inability to manage distress, and attribute threat-related events to uncontrollable causes and global personal inadequacies. Another regulatory technique is to shift

attention to internal indicators of distress (engaging in what Lazarus and Folkman, 1984, called “emotion-focused coping”). This involves hypervigilant attention to the physiological changes associated with emotion, heightened recall of threat-related feelings, and rumination on actual and potential threats. Another strategy is to intensify negative emotions by making self-defeating decisions and taking ineffective courses of actions that are likely to end in failure. All of these strategies create a self-amplifying cycle of distress, which is maintained by ruminative thoughts even after a threat subsides. As a result, anxious individuals have ready access to undesirable emotions, their cognitive system is often burdened by distress, and their stream of consciousness is clogged with threat-related ideation.

Appraising proximity seeking as unlikely to alleviate distress results in deliberate deactivation of the attachment system, inhibition of the quest for support, and commitment to handling distress alone, especially distress arising from the failure of attachment figures to be available and responsive. These strategies of affect regulation are called *deactivating* (Cassidy & Kobak, 1988) because their goal is to keep the attachment system down-regulated, to avoid the frustration and pain of attachment-figure unavailability. Deactivating strategies include avoidance of intimacy and dependence in close relationships and maximization of emotional distance from others, and suppression of attachment-related thoughts, feelings, concerns, and wishes. These strategies account for the empirically documented correlates of attachment avoidance (Mikulincer & Shaver, 2003, in press).

Avoidant defenses include inhibition of emotional states that are incongruent with the goal of keeping one’s attachment system deactivated. These inhibitory efforts are directed mainly at fear, anxiety, anger, sadness, shame, guilt, and distress, because such emotions are triggered by threats and can cause unwanted activation of the attachment system. In addition,

anger implies emotional involvement in a relationship, and such involvement may be incongruent with an avoidant person's commitment to self-reliance (Cassidy, 1994). Moreover, fear, anxiety, sadness, shame, and guilt can be interpreted as signs of weakness or vulnerability, which contradict an avoidant person's sense of strength and independence. Avoidant individuals may even feel uncomfortable with joy and happiness, because they encourage interpersonal closeness and may be interpreted by a relationship partner as indications of investment in the relationship (Cassidy, 1994). Like secure people, avoidant ones attempt to down-regulate threat-related emotions. But whereas secure people's regulatory attempts usually promote accurate perception, effective communication, and relationship maintenance, avoidant people's efforts are aimed at minimizing perceived threats, closeness, and interdependence, regardless of the deleterious effects on a relationship.

Inability or unwillingness to deal openly with the causes of painful emotional states confines avoidant people to a single regulatory path: suppressing emotion or dissociating oneself from its manifestations in experience and behavior (by using what Lazarus & Folkman, 1984, called "distancing coping" and Gross, 1999, called "response-focused emotion regulation"). These regulatory efforts consist of denial or suppression of emotion-related thoughts and memories, diversion of attention from emotion-related material, suppression of emotion-related action tendencies, and inhibition or masking of verbal and non-verbal expressions of emotion. By preventing the conscious experience and expression of emotions, avoidant individuals make it less likely that emotional experiences will be integrated into their memory structures or that they will use the experiences effectively in information processing and behavior.

### *Empirical Evidence for Attachment-Related Emotion Regulation Strategies*

There is extensive empirical evidence for the theoretical ideas outlined in the previous section. Here, we will review several examples that link the theoretical analysis with the diverse kinds of emotion regulation that have been studied to date.

#### *Experiencing and Managing Death Anxiety*

Adult attachment researchers have examined how attachment styles are related to the experience and management of specific emotional states. For example, a number of studies conducted in Mikulincer's laboratory have examined attachment-style differences in the strength of death anxiety, measured in terms of overt statements on questionnaires (Florian & Mikulincer, 1998; Mikulincer, Florian, & Tolmacz, 1990), less conscious, indirect indicators of death anxiety (e.g., responses to projective TAT cards; Mikulincer et al., 1990), and the accessibility or inaccessibility of death-related thoughts in the context of laboratory experiments (e.g., the number of death-related words a person produces in a word completion task; Mikulincer & Florian, 2000; Mikulincer, Florian, Birnbaum, & Malishkowitz, 2002).

Attachment-anxious individuals (identified with self-report measures, such as those created by Brennan et al., 1998) intensify death concerns and keep death-related thoughts active in working memory. That is, attachment anxiety is associated with heightened fear of death at both conscious and unconscious levels, as well as heightened accessibility of death-related thoughts even when no death reminder is present. Avoidant individuals suppress death concerns and show signs of dissociation between their conscious claims and unconscious dynamics. For example, attachment-related avoidance (again, assessed with self-report measures) is related to both low levels of self-reported fear of death and heightened death-related anxiety assessed with a projective TAT measure.

Attachment-style differences have also been noted in the meanings people assign to death or the process of dying (Florian & Mikulincer, 1998; Mikulincer et al., 1990). Anxiously attached people tend to attribute their fear to a dreaded loss of social identity after death (e.g., “People will forget me”), whereas avoidant people tend to attribute their anxiety to the unknown nature of death, dying, and any experiences that may occur after death (e.g., “Uncertainty about what to expect”). These findings are compatible with the two kinds of secondary attachment strategies discussed earlier. Anxious people hyperactivate worries about rejection and abandonment, viewing death as yet another relational setting in which they may be abandoned or forgotten. Avoidant people try to remain self-reliant and in control, which leads to fear of the uncertain and unknown aspects of death, which threaten loss of control.

A related line of research has linked attachment theory with “terror management theory” (Greenberg, Pyszczynski, & Solomon, 1997), or TMT for short. According to TMT, human beings’ knowledge that they are destined to die, coexisting with strong wishes to perceive themselves as special, important, and immortal, makes it necessary for them to engage in self-promotion, defend their cultural worldview, and deny their mortality, physicality, and animality. Much creative research has shown that experimentally induced death reminders lead to more negative reactions to moral transgressors and more hostile and derogatory responses to members of out-groups (see Greenberg et al., 1997, for a review). However, Mikulincer and colleagues have shown that this reaction is more characteristic of attachment-insecure than of secure individuals. For example, experimentally induced death reminders produced more severe judgments and punishments of moral transgressors and greater willingness to die for a cause only among insecurely attached people, either anxious or avoidant (Caspi-Berkowitz, 2003; Mikulincer & Florian, 2000). Securely attached people were not affected by death reminders, did

not recommend harsher punishments for transgressors following a mortality salience induction, and were generally averse to endangering people's lives to protect cultural values.

Some of the studies reveal special ways in which securely attached adults react to death reminders. Mikulincer and Florian (2000) found that secure people reacted to mortality salience with an increased sense of symbolic immortality – a transformational, constructive strategy that, while not solving the unsolvable problem of death, leads a person to invest in his or her children's care and to engage in creative, growth-oriented activities whose products will live on after one's death. Secure people also react to mortality salience with heightened attachment needs – a more intense desire for intimacy in close relationships (Mikulincer & Florian, 2000) and greater willingness to engage in social interactions (Taubman Ben-Ari, Findler, & Mikulincer, 2002).

#### *Experiencing and Managing Anger*

Adult attachment researchers have also studied connections between attachment style and the experience and management of anger. In Bowlby's (1973) analysis of emotional reactions to separation, he viewed anger as a functional response to separation from an attachment figure, insofar as it succeeded in gaining the attention of an unreliable figure or caused the figure to become more available. Anger is functional to the degree that it is not intended to hurt or destroy the attachment figure but only to discourage his or her frustrating or frightening behavior and to reestablish a warm and satisfying relationship. However, Bowlby (1973, 1988) also noted that anger sometimes becomes so intense that it alienates the partner or becomes vengeful rather than corrective. In particular, Bowlby (1988) discussed how some cases of family violence can be understood as exaggerated forms of otherwise functional behavior. For example, he characterized certain coercive behaviors within close relationships (including battering) as

strategies for controlling the other and precluding separation. In Bowlby's (1988) view, although violent and uncontrollable outbursts of anger may have functional roots (being evolutionarily 'designed' to discourage a partner's negative behavior), it is dysfunctional when it becomes so extreme that it destroys a relationship one is attempting to maintain.

Bowlby's analysis of the complex, multifaceted nature of anger is consistent with other theoretical perspectives on anger which view it as motivated by either constructive or destructive goals, expressible in functional or dysfunctional ways, resulting in positive or negative relational behaviors, eliciting positive or negative responses from a relationship partner, and having positive or negative effects on a relationship (e.g., Averill, 1982; Tangney et al., 1996). Functional forms of anger are motivated by constructive goals (e.g., maintaining a relationship, bringing about a beneficial change in a partner's behavior), are typically expressed in the form of focused complaints and problem-solving discussions, and do not entail animosity, hostility, or hatred. In contrast, dysfunctional forms of anger include resentment toward one's partner, deliberately injuring the partner emotionally or physically, and seeking revenge, which can easily weaken emotional bonds (Tangney et al., 1996).

Functional expressions of anger seem to be typical of securely attached people. They attempt to deal with negative emotions in a constructive, transformational manner while maintaining stable and satisfying relationships; they have positive working models of others and believe that others' negative behavior can be corrected through discussion. Indeed, Mikulincer (1998) found that, when confronted with anger-provoking events, secure people held optimistic expectations about their partner's subsequent behavior (e.g., "He/she will accept me") and made well-differentiated, reality-attuned appraisals of their partner's intentions. Only when there were clear contextual cues, provided by the experimenter, indicating that a partner actually had acted

with hostile intent did secure people attribute hostility to the partner and react with anger. Moreover, secure people's accounts of anger-eliciting events were characterized by the constructive goal of repairing a relationship, engaging in adaptive problem solving, and experiencing positive affect following the temporary period of discord.

The constructive nature of secure people's anger has also been demonstrated in a recent study by Zimmermann, Maier, Winter, and Grossmann (2001). In this study, adolescents performed a frustrating, difficult cognitive task with the help of a friend, and the researchers assessed reports of disappointment and anger during the task as well as disruptive behavior toward the friend (e.g., rejection of the friend's suggestions without discussion). The results indicated that disappointment and anger were associated with more frequent disruptive behavior only among insecurely attached adolescents (identified with the Adult Attachment Interview, a narrative measure of attachment style; Hesse, 1999). Among securely attached adolescents, these emotions were associated with less rather than more disruptive behavior. Therefore, secure people's anger seemed to be well regulated and channeled in useful directions.

Theoretically, avoidant individuals' attempts to sidestep negative emotions include suppressing anger, which might indicate vulnerability or over-involvement in a relationship. This anger suppression might result in anger being expressed in unconscious or unattended ways, which might include showing 'unexplained' hostility toward a partner (what Mikulincer, 1998, labeled "*dissociated anger*"). In support of this view, he found that although individuals scoring high on avoidant attachment did not report overly intense specific anger in reaction to another person's negative behavior, they scored higher on a more general hostility measure and exhibited intense physiological arousal during stressful interactions. They also reported using distancing strategies to cope with potentially anger-provoking events and attributed hostility to a partner

even when there were clear contextual cues (provided by the experimenter) concerning the partner's non-hostile intent.

Anxiously attached individuals' intensification of negative emotions and tendency to ruminate about threats can fuel intense and prolonged bouts of anger. However, their fear of separation and desperate desire for others' love may hold their resentment and anger in check and re-direct it toward the self. As a result, anxious people's anger can include a complex mixture of resentment, hostility, self-criticism, fear, sadness, and depression. Mikulincer (1998) provided evidence for this characterization of anxiously attached people's anger experiences: Their recollections of anger-provoking life experiences included an uncontrollable flood of angry feelings, persistent rumination on these feelings, and sadness and despair following conflicts. Mikulincer (1998) also found that anxious people held more negative expectations about others' responses during anger episodes and tended to make more undifferentiated, negatively biased appraisals of a relationship partner's intentions. They attributed hostility to their partner and reacted in kind, even when there were ambiguous cues (in the experiment) concerning hostile intent. There is also evidence in other studies that attachment anxiety is associated with anger, aggression, and hostility (e.g., Buunk, 1997; Calamari & Pini, 2003; Zimmerman, 2004).

The dysfunctional nature of anxious people's anger has also been observed in studies of dyadic interactions. Simpson, Rholes, and Phillips (1996) found that attachment anxiety was associated with displaying and reporting more anger and hostility while discussing an unresolved problem with a dating partner. And in a study of support seeking, Rholes, Simpson, and Orina (1999) found no association between attachment anxiety and anger toward a dating partner while waiting for an anxiety-provoking activity, but after the participant was told that she would not really have to undergo the expected stress, attachment anxiety was associated with anger toward

the partner. Interestingly, this was particularly true if participants had been more upset during the “waiting” period and had sought more support from their partner. It therefore seems that anxious participants’ strong need for reassurance counteracted, or led to suppression of, angry feelings and expressions during support seeking, but after support was no longer necessary the angry feelings surfaced, reflecting hyperactivating strategies that perpetuate distress.

Anxious people’s problems in anger management have also been documented using physiological measures. Diamond and Hicks (2005) exposed young men to two anger-provoking experimental inductions (performance of serial subtraction accompanied by discouraging feedback from the experimenter; recollection of a recent anger-eliciting event) and measured reports of anxiety and anger during and after the inductions. They also recorded participants’ vagal tone (indexed by resting levels of respiration-related variability in heart rate), a common indicator of parasympathetic down-regulation of negative emotion. Diamond and Hicks found that attachment anxiety was associated with lower vagal tone – a sign that the parasympathetic nervous system responded less quickly and flexibly to the stressful tasks and that attachment-anxious participants recovered poorly from frustration and anger. In addition, attachment anxiety was associated with self-reports of distress and anger during and after the anger-induction tasks, and vagal tone mediated the association between attachment anxiety and reports of anger.

### *Romantic Jealousy*

Adult attachment studies have also explored associations between attachment strategies and romantic jealousy. In general, secure people tend to report less jealousy (e.g., Buunk, 1997; Collins & Read, 1990; Hazan & Shaver, 1987; Radecki-Bush, Farrel, & Bush, 1993; Sharpsteen & Kirkpatrick, 1997), milder emotional reactions to jealousy-provoking events (e.g., Guerrero, 1998; Radecki-Bush et al., 1993; Sharpsteen & Kirkpatrick, 1997), fewer interfering thoughts

and worries in response to these events (Guerrero, 1998), and greater use of constructive coping strategies, such as openly discussing matters with one's partner and attempting to put the relationship back on a better course (Guerrero, 1998).

Attachment anxious people tend to experience jealousy in intense and dysfunctional ways, allowing it to ignite other negative emotions, overwhelm thought processes, and erode relationship quality. They score high on measures of jealousy (e.g., Buunk, 1997; Collins & Read, 1990; Hazan & Shaver, 1987; Radecki-Bush et al., 1993; Sharpsteen & Kirkpatrick, 1997); experience fear, guilt, shame, sadness, and anger along with jealousy (Guerrero, 1998; Radecki-Bush et al., 1993; Sharpsteen & Kirkpatrick, 1997); report higher levels of suspicion and worry in jealousy-eliciting situations (Guerrero, 1998); and cope by expressing hostility toward one's partner and engaging in more surveillance (mate-guarding) behavior (Guerrero, 1998).

Avoidant individuals, like their secure counterparts, report low levels of jealousy and do not react to jealousy-eliciting events with strong negative emotions or disrupted thinking. But they are the least likely to engage in coping efforts aimed at restoring relationship quality (Guerrero, 1998). Instead, they prefer to avoid discussing the problem and seem, at the moment, to overlook the problem (Guerrero, 1998). This is another example of deactivating strategies and is likely to contribute to relationship cooling and dissolution.

#### *Neuroscience Studies of Attachment and Emotion Regulation*

Attachment-related patterns of emotion regulation have been examined in a variety of studies, using different measures of attachment style, different experimental interventions, and different kinds of outcome measures. Because the availability of fMRI as an assessment technique now makes it possible to investigate some of the brain processes underlying attachment effects, relevant studies are beginning to appear in the literature.

In one recent study, Gillath, Bunge, Shaver, Wendelken, and Mikulincer (2005) built upon prior behavioral studies of attachment style and thought suppression (e.g., Fraley & Shaver, 1997) and examined neural processes underlying the ability to suppress negative thoughts and associated emotions. Participants were asked, while lying in an MRI scanner, to think and then to suppress thoughts about both neutral and emotion-provoking experiences with a relationship partner, including previous and imagined losses (e.g., a breakup, the death of one's partner). In general, all participants showed activation in the anterior cingulate cortex (ACC) and medial prefrontal cortex (MPFC) when asked to suppress either a neutral or an emotional experience, as had been found in earlier studies (e.g., Phan et al., 2005; Wyland, Kelley, Macrae, Gordon, & Heatherton, 2003).

Of greater interest here, participants who scored low on avoidant attachment deactivated other brain regions (e.g., lateral prefrontal cortex, or LPFC, and subcallosal cingulate cortex, or SCC) while activating the ACC and MPFC, but avoidant individuals did not. This lack of deactivations had been noted in previous studies (e.g., Binder et al., 1999; Mazoyer et al., 2001; Shulman et al., 1997; Hester et al., 2004) and associated with poor performance on certain cognitive tasks, and on particular trials within these tasks. This may help to explain results obtained by Mikulincer, Dolev, and Shaver (2004) in a study of avoidant suppression of loss-related thoughts. Avoidant people seemed to be good at suppressing such thoughts until an additional cognitive task, or "load," was added. Under a high cognitive load, they tended to lose control of both loss-related thoughts and negative self-relevant traits.

In the Gillath et al. (2005) study, anxious individuals showed greater activation in emotion-related brain areas such as the anterior temporal pole (ATP) and lower activation in control-related frontal regions such as the orbitofrontal cortex (OFC) when thinking about

relationship losses, suggesting that one reason for their intense negative emotions in everyday life is high activation of emotion circuitry combined with under-control or insufficient emotion regulation. The reciprocal relation between activation in emotion-related and control regions of the brain has been documented in several studies (Beer, Shimamura, & Knight, 2004; Levesque et al., 2003; Ochsner, Bunge, Gross, & Gabrielli, 2002; Ochsner & Gross, 2005), but without much focus on individual differences. Gillath et al. (2005) found that the correlations between anxious attachment, high ATP activation while thinking about losses, and low OFC activation were so high that the inverse correlation between activation in the ATP and OFC, which is expected based on anatomical connections, dropped to insignificance when attachment anxiety scores were statistically controlled.

These results suggest that clinical interventions that lowered emotionality and/or increased self-regulatory skill would be especially helpful for attachment-anxious individuals. The results also suggest that fMRI could be used to monitor the success or failure of such clinical interventions.

Another recent study, although not specifically focused on attachment theory, investigated the neural correlates of handholding and threat regulation. Coen, Schaefer, and Davidson (in press), found that when married women whose brains were being monitored in an MRI scanner were threatened with periodic electric shocks, several stress- and emotion-related brain regions showed increased activation. These levels of activation, however, were decreased when the women held their spouse's hand. (For example, activation in the ventral ACC, posterior cingulate, and left caudate decreased significantly.) Moreover, the wife's level of marital satisfaction (but not the husband's) moderated some of the brain activation effects, indicating that the wives' sense of security in the marriage determined how comforting it was to hold her

partner's hand while under threat. Informal discussions with one of the authors of this study (Coan) revealed that attachment style measures were also included in the study and yielded interesting and theory-consistent effects that will be reported in a subsequent paper. Thus, there would seem to be a bright future for social neuroscience studies of hypotheses derived from attachment theory and previous behavioral studies of attachment and emotion-regulation.

### *The Attachment System in Relation to the Caregiving System*

Besides providing a detailed analysis of the hypothesized “attachment behavioral system,” Bowlby (1982) proposed additional behavioral systems as a way of accounting for motivated behavior that previous psychodynamic theories had attributed to drives or instincts. Among these other behavioral systems were an exploration system, to account for infants' and children's tendency to explore their environments and learn new skills when provided by a good attachment figure with a sense of security (Ainsworth et al., 1978), and a caregiving system, to account for attachment figures' seemingly innate responsiveness to infants and other people in need. Bowlby also discussed an affiliation system (related to play and leisure interactions at later ages) and a sexual system, to account for sexual attraction and sexual relationships. Here, because we are interested in connections between attachment security or insecurity, on one hand, and prosocial feelings, values, and behavior, on the other, we give special attention to the caregiving system.

### *Defining the Caregiving Behavioral System*

Among attachment researchers, caregiving is viewed not only as the primary ingredient in parental behavior, but also as a major contributor to romantic and marital relationships, and as a key constituent of all forms of prosocial behavior. For young children, parents are usually the primary providers of protection, support, and security, and differences in the way they fulfill or

abdicate this role have dramatic effects on their children's socio-emotional development in general, and on their attainment of felt security in particular. Similarly, romantic partners are frequently called upon to provide comfort, assistance, and security to one another in times of need, and the quality of the support they are willing and able to provide is one of the major determinants of relationship quality and stability (Collins & Feeney, 2000; Collins, Guichard, Ford, & Feeney, 2006).

According to attachment theory, the aim of the caregiving behavioral system is to reduce others' suffering, protect them from harm, and foster their growth and development (e.g., Collins et al., 2006; George & Solomon, 1999; Gillath, Shaver, & Mikulincer, 2005; Kuncze & Shaver, 1994). In other words, the caregiving system is designed to accomplish the two major functions of a security-providing attachment figure: to meet another person's needs for protection and support in times of danger or distress (which Bowlby, 1982/1969, called providing a "safe haven") and to support that person's exploration, autonomy, and growth when exploration is safe and viewed by the explorer as desirable. (Bowlby called this function "provision of a secure base for exploration").

Although we assume that everyone is born with the potential to become an effective caregiver, the smooth and effective operation of the caregiving system depends on several intra- and interpersonal factors. For example, caregiving can be impaired by emotional states, beliefs, and concerns in the mind of a potential caregiver that inhibit sensitivity and responsiveness to another person's needs. It can also be impaired by a careseeker's failure to express needs appropriately, by his or her rebuff of a caregiver's helping attempts, or by external obstacles to support provision. As Collins et al. (2006) noted, "It is clear that effective caregiving is a

difficult process that is likely to be easier for some people than for others, and in some relationships compared to others” (p. 160).

*Attachment Style, Emotion Regulation, and Caregiving*

Bowlby (1982) noticed that different behavioral systems can interfere with each other. Because of the urgency and priority of threats to oneself (especially during early childhood), for example, activation of the attachment system is likely to disrupt smooth operation of the exploration system. A threatened or frightened child usually terminates exploration and quickly devotes all of his or her energy to attaining protection from an attachment figure. This kind of disruption or interference can also occur in caregiving situations (Kunze & Shaver, 1994), because a potential caregiver may feel so threatened that obtaining care for him- or herself seems more urgent than providing it to others. At such times even adults are likely to be so focused on their own vulnerability that they lack the mental resources necessary to attend compassionately to others’ needs for help and care. Only when some degree of safety is attained and a sense of attachment security is restored can most people perceive others not only as sources of security and support, but also as human beings who need and deserve comfort and support.

Securely attached individuals’ positive working models and sense of felt security also sustain effective care provision in non-family situations. Their comfort with closeness and interdependence allows them to approach others in need, which is important because it is usually necessary to accept others’ need for sympathy, support, and sometimes physical assistance in order to help them through a crisis (Lehman, Ellard, & Wortman, 1986). Secure people’s effective emotion-regulation skills help them maintain their own emotional stability while addressing another person’s needs, a task that can otherwise generate great personal distress

(Batson, 1991). Positive models of self also sustain a sense of control and confidence in one's ability to cope with a partner's distress and reduce one's own distress.

Attachment theorists have also suggested that insecure people's deficits in emotion regulation can lead to difficulties in providing effective care (Collins et al., 2006; George & Solomon, 1999; Mikulincer & Shaver, 2005; Shaver & Hazan, 1988). Although anxiously attached people may have some of the skills and qualities necessary for effective caregiving (e.g., comfort with intimacy and closeness), their deficits in emotion regulation may result in personal distress that interferes with sensitive and responsive care. Their tendency to intensify distressing emotions can trigger disruptive memories when they encounter other people's pain and suffering, which draws attention inward rather than outward toward what might be done for someone else. If this state is prolonged during a crisis, it can lead to emotional overload, "burnout," and exhaustion. Anxiously attached people easily become sidetracked by self-focused worries and concerns and hence may fail to maintain the good judgment and psychological boundaries necessary to help in sensitively appropriate ways. Moreover, their excessive need for closeness may cause them to become overly involved and intrusive, and their lack of self-confidence can make it difficult for them to adopt the role of care provider (Collins et al., 2006).

Avoidant individuals, who often try to distance themselves from interaction partners, especially ones who signal neediness and dependency, are likely to react coolly or unresponsively to needy others and avoid being "sucked in" by empathy and compassion. They do not approve expressions of need and vulnerability, in themselves or their relationship partners, and have little desire to get entangled with someone who seems needy. For them, besides being a "hassle" and a drain on personal resources, a distressed person threatens to become a mirror of the self's own weaknesses and suppressed weaknesses and vulnerabilities.

When obliged by social norms or interpersonal commitments to help others, avoidant people are likely to grumble about the burden, express disapproval, lack sympathy and compassion, and behave insensitively. Moreover, their reactions to another person's suffering are likely to take the form of pity rather than compassion, which means viewing the sufferer as inferior to oneself and excusing oneself from suffering while perhaps showing disgust or disdain (Ben-Zeev, 1999).

In short, although hyperactivating and deactivating strategies lead to opposite patterns of emotion regulation (intensification versus suppression), both result in dysfunctional emotion regulation and caregiving. Security-based regulation of one's emotions, in contrast, allows caregivers to deal effectively with the tension and discomfort associated with another person's pain and distress, thereby promoting effective care provision. Deficient emotion regulation can overwhelm a care provider with intense personal distress, causing him or her to slip over into the role of the needy person rather than the care provider, or to physically, emotionally, or cognitively distance from needy other to reduce his or her own distress, even if this means abdicating the caregiving role. The following section reviews some of the evidence supporting this theoretical analysis.

#### *Attachment, Compassion, and Prosocial Behavior*

Studies of preschoolers show that attachment insecurities measurable during infancy predict less empathic concern for an adult stranger's or other children's distress later on, as indicated by teachers' ratings and researchers' observations of children's behavior (e.g., Kestenbaum, Farber, & Sroufe, 1989; van der Mark, van IJzendoorn, & Bakermans-Kranenburg, 2002). Moreover, secure attachment to parents during adolescence had been found to contribute positively to compassionate, empathic responses to needy people (e.g., Laible, Carlo, & Raffaelli, 2000; Markiewicz, Doyle, & Bredgen, 2001). These findings led researchers to explore

the possibility that emotion regulation strategies associated with attachment style would influence prosocial values, intergroup tolerance, and altruistic behavior in adults.

### *Self-Transcendent Values*

In three experiments, Mikulincer, Gillath, et al. (2003) found theoretically predictable attachment-related differences in value orientations. Avoidant attachment (measured with a self-report questionnaire) was inversely associated with endorsing two self-transcendent values, benevolence (concern for close others) and universalism (concern for all humanity), supporting the expectation that avoidance fosters lack of concern for others' needs. In addition, experimentally priming mental representations of attachment-figure availability, as compared with positive-affect or neutral primes, strengthened endorsement of these two prosocial values.

### *Altruistic Helping*

In a recent series of studies, Mikulincer, Shaver, Gillath, and Nitzberg (2005) examined the decision to help or not to help a person in distress. In the first two experiments, participants watched a confederate while she performed a series of increasingly aversive tasks. As the study progressed, the confederate became very distressed by the aversive tasks, and the actual participant was given an opportunity to take the distressed person's place, in effect sacrificing self for the welfare of another. Shortly before the scenario just described, participants were primed with either representations of attachment-figure availability (the name of a participant's security provider) or attachment-unrelated representations (the name of a close person who does not function as an attachment figure, the name of a mere acquaintance). This priming procedure was conducted at either a subliminal level (rapid presentation of the name of a specific targeted person) or supraliminal level (asking people to recall an interaction with the targeted person). At

the point of making a decision about replacing the distressed person, participants completed brief measures of compassion and personal distress.

In both studies, avoidant attachment was related to lower compassion and lower willingness to help the distressed person. Attachment anxiety was related to heightened personal distress, but not to either compassion or willingness to help. In addition, subliminal or supraliminal priming of representations of a security-provider figure decreased personal distress and increased participants' compassion and willingness to take the place of a distressed other.

### *Inter-group Hostility*

Mikulincer and Shaver (2001) examined the effects of manipulated felt security on the regulation of inter-group hostility. Children as young as 3 years of age have shown that a secure attachment style with their primary caregiver was associated with increased exploration, curiosity, empathy, and reduced fear of strangers. Perhaps, having this sense of security may allow adults to be open to unfamiliar others without fear and, as a result, exhibit caregiving behaviors. In a series of five experiments conducted in Israel, Mikulincer and Shaver (2001) primed participants, supraliminally or subliminally, with thoughts and feelings related to attachment security by having them imagine being cared for by a loved one or quickly presenting them with words such as *love*, *hug*, and *secure*. Participants' feelings were then assessed toward a variety of outgroups (as viewed by the secular, Jewish university students who participated in the studies): Israeli Arabs, Ultra-Orthodox Jews, Russian immigrants, and homosexuals. Attachment style was measured beforehand and relevant control conditions such as positive mood were included.

As expected, security enhancement, whether induced supraliminally or subliminally, eliminated the difference between attitudes toward in-group and out-group members. Similar

effects did not occur for neutral primes or positive primes that were unrelated to love and affection. In addition, the results were not attributable to changes in positive mood. Anxious attachment was consistently related to perceiving out-group members as threatening. Finally, the interaction between security priming and dispositional attachment style was not significant, suggesting that security enhancement increases out-group tolerance in all people.

In summary, across a wide variety of correlational and experimental studies, attachment security has been associated with greater compassion, greater openness to others, and greater willingness to help someone in need. Avoidant attachment has been consistently associated with lower levels of compassion and altruistic helping. Anxious attachment has been associated with heightened personal distress that did not translate into greater willingness to help. All of these results support the hypothesis that altruistic motivations for caregiving and the ability to provide sensitive, responsive care are conditional upon a certain degree of attachment security and the associated ability to regulate emotions.

#### *The Neuroscience of Attachment, Compassion, and Altruism*

There is as yet no neuroscience research on the links we have discussed in previous sections between attachment style, compassion or empathy, and prosocial behavior. But there is a very interesting emerging literature on the neuroscience of empathy which could fruitfully be extended into the domain of attachment research. As explained by Decety and Jackson (2006) in a recent overview:

A handful of fMRI studies have indicated that the observation of pain in others is mediated by several brain areas that are implicated in processing the affective and motivational aspects of one's own pain. In one study, participants received painful stimuli and observed signals indicating that their partner, who was present in the same room, had

received the same stimuli (Singer et al., 2004). The [anterior] ACC, the insula, and the cerebellum were active during both conditions. In another study, participants were shown photographs depicting body parts in painful or neutral everyday-life situations, and were asked to imagine the level of pain that these situations would produce (Jackson, Meltzoff, & Decety, 2005). In comparison to neutral situations, painful conditions elicited significant activation in regions involved in the affective aspects of pain processing, notably the ACC and the anterior insula. (p. 55)

Other studies have identified some of the brain regions involved in adopting another person's perspective. Ruby and Decety (2004) asked study participants to imagine how they would feel if they were in certain situations and how their mothers would feel in the same situations. When participants adopted their mother's perspective, there was notable activation in the frontopolar cortex, the ventromedial PFC, the medial PFC, and the right inferior parietal lobule – areas that have been associated in previous studies with taking another person's perspective. Regions involved in emotional processing, including the amygdala and the temporal poles, were activated in conditions that would provoke emotions in oneself or one's mother.

Decety and Jackson (2006) also mention, however, that other brain regions activate differently in the self and mother cases, indicating that empathy and personal distress, or emotional contagion, are not necessarily the same, as found in some of the studies we reviewed, which showed that anxious attachment is associated with personal distress in reaction to another's pain, whereas secure attachment is not. Moreover, there are hints in recent research concerning how avoidant individuals might avoid becoming empathic with another person's pain or suffering. Recent fMRI studies (e.g., Kalisch et al., 2005) have revealed regions in the anterolateral and medial PFC that are associated with reappraising situations so as to deny their

self-relevance. Thus, there are numerous methodological models available for studying the brain correlates, or underpinnings, of attachment-style differences in compassion and empathy.

### *Concluding Comments*

We have reviewed extensive evidence suggesting a link between attachment-related differences in emotion regulation and prosocial behavior. Attachment security and the ability to regulate emotions is associated with a variety of prosocial feelings and caregiving behaviors, including self-transcendent values, compassion and altruism toward people who are suffering, and increased tolerance for outgroup members. A stable prosocial stance seems to be based on a foundation of attachment security, and it can be enhanced by contextual manipulations of security. Security makes it easier to focus on other people's needs, perceive those needs and the options for meeting them accurately, and act effectively. In contrast, attachment insecurity is associated with self-concerns that interfere with accurate and empathic perception of others' needs, which makes effective altruism less likely.

We have shown how the attachment-related influences on emotion regulation can be studied using social-cognition research paradigms and emerging neuroscience methods. Much still needs to be learned about how security can be enhanced on a longer-term basis, as we know often happens with effective education, coaching, and psychotherapy (Mikulincer & Shaver, in press).

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