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## Evolution, Relationships, and Health: The Social Shaping Hypothesis

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**D**ealing with environmental stressors such as predators, aggressive rivals, and the divergent interests of conspecifics is one of the primary evolutionary challenges faced by all creatures. In this respect, nature has often been ingenious in its solutions: thick skin, sharp teeth, quick reflexes, and even camouflage. Humans, like many other primate species, have adapted group living and deep investment in social bonds as a primary solution to the problems of survival and reproduction (Caporeal, 1997; Dunbar, 1998). This observation has long been acknowledged in both evolutionary biology and evolutionary psychology but until recently, few scholars have recognized how important social relationships are for managing stress, for health, and for longevity. Recent converging evidence from biology and psychology reveals the manifold benefits of social relationships.

Social relationships are vital resources for managing the demands of the environment. Suggestive evidence for this assertion is provided by the fact that social isolation is associated with a heightened risk of disease and early mortality in both animals and humans (Cacioppo & Hawkey, 2003; House, Landis, & Umberson, 1988). Thus, the absence of social ties is toxic for health. Social relationships themselves can have dramatic and long-lasting effects on biological functioning and health as well. A harsh social environment characterized by cold, conflictual, or neglectful interactions is associated with a high risk of prolonged illness and early mortality, whereas warm and supportive relationships have long-term benefits for health and longevity. Social support, common to these latter relations, is the perception or experience that one is loved and cared for by others, esteemed and valued, and part of a social network of mutual assistance and obligations (Wills, 1991). The impact of social support on health equals or exceeds that of well-established predictors of health outcomes, including smoking and lipid levels.

## THE SOCIAL SHAPING HYPOTHESIS

In this chapter, we begin by proposing a general model of how social relationships may influence biopsychosocial functioning and health, which we call the *social shaping* hypothesis. Social shaping refers to how social relationships modulate an individual's psychological, biological, social, and behavioral responses to stressful events and circumstances. These effects, as we will show, can be both short- and long-term and can have effects on biological, emotional, and social functioning. Social shaping is based on the idea that humans have evolved in such a way that a person's social relationships help to shape and regulate that person's stress responses. To this end, we suggest that social shaping serves three primary functions.

First, relationships can serve a calibration function. Specifically, relationships help to shape the stress systems that respond to threats in the environment. As we will show, caregiving relationships, particularly those early in life, especially serve this function. Beginning at birth, the quality of caregiving can permanently affect an infant's biological, emotional, and social responses to stressful conditions across the life span. These effects can occur at the level of gene expression, they can exert permanent organizational effects on biological responses to stress, and they ultimately predict longevity and the likelihood of a broad array of illnesses.

The second function is regulation. That is, social relationships help to regulate stress responses during daily interaction by influencing the magnitude of stress responses. This more proximal function interacts with the more distal calibration just described such that individuals' responses to stress depend both on how their systems (physiological and psychological) developed early in life and how their current relationships moderate their biopsychosocial responses to threat. Relationships can increase tension and exaggerate stress response or buffer an individual against the deleterious biological effects of stress.

Finally, relationships serve an information function, transmitting important knowledge about the environment to relationship partners. This information function may be direct, as when one person warns another about an impending threat. It may also be indirect, in that relationships themselves are affected by highly stressful conditions, often deteriorating in threatening times. For example, the lower a person's socioeconomic status (SES), the more he or she is exposed to a broad array of day-to-day hassles and threats (e.g., Adler, Boyce, Chesney, Cohen, Folkman, & Syme, 1994; Adler, Marmot, & McEwen, 2000); rancorous social relationships of all kinds are often the consequence of such environmental stress. Spousal abuse, divorce rates, child abuse, and other indicators of social strain, such as homicide or assault, all show moderate social class gradients (see Taylor, 2002 for a review). More focused investigations also reveal how stress in one domain of life, such as work, spills over into other life arenas, such as family life (see Taylor, 2002 for a review). Thus, social relations provide information by acting as a barometer of how stressful the environment is.

We first detail the biological mechanisms whereby stress adversely affects health and note how social relationships may reduce or augment those biological responses. Then we develop the rationale for the social shaping hypothesis and review evidence for it. In so doing, we focus especially on three types of relationships and how

they each illustrate the functions of social shaping. We then detail the important effects relationships have on health and survival. We first turn to the parent–child relationship, especially the mother–child relationship, and show how the nature of this early relationship can calibrate the biological stress response of the offspring, and what implications this has for health across a lifetime and, perhaps, into the next generation. Second, we review research showing that the male–female pair-bond can affect the stress responses of the individuals in the relationship. Finally, we discuss how same-sex ties influence responses to stress by providing important information about the challenges and opportunities of an individual’s immediate environment.

## HOW STRESS CAN AFFECT HEALTH

The impact of social relationships on biological and psychological functioning is heavily mediated by stress responses. The human response to stress implicates several interacting systems. The amygdala is responsive to novel conditions or signs of potential danger in the environment. Together with the other areas in the brain (the anterior cingulate cortex may be implicated, for example), it sends signals to the hypothalamus, which engages stress responses in the sympathetic nervous system (SNS) and the hypothalamic pituitary adrenal (HPA) axis. These systems are responsible for the release of hormones that mobilize the organism to fight or flee in response to stress.

The actions of the SNS are mediated primarily by the catecholamines, norepinephrine and epinephrine, which exert effects on adrenergic receptors in target tissues to produce, among other changes, increases in heart rate and blood pressure, dilation of the airways, and enhanced availability of glucose and fatty acids for energy. These coordinated responses facilitate short-term mobilization of an organism’s resources for the rapid, intense physical activity involved in the “fight-or-flight” response.

The HPA axis also plays a central role in managing threat. Corticotropin-releasing hormone (CRH), produced in the para-ventricular nuclei (PVN) of the hypothalamus, stimulates the secretion of adrenocorticotrophic hormone (ACTH) by the anterior pituitary, resulting in the release of glucocorticoids. The primary glucocorticoid in humans is cortisol and corticosterone in animals. Glucocorticoids serve an important function at low basal levels by permitting or restoring processes that prime homeostatic defense mechanisms (Munck & Naray-Fejes-Toth, 1994). This integrated pattern of HPA axis activation modulates a wide range of somatic functions including energy release, immune activity, mental activity, growth, and reproductive function. At low basal levels, glucocorticoids promote mental and physical health as well as normal development.

However, larger, more frequent, and more long-lasting increases in glucocorticoids, as occurring in chronically or recurrently stressful environments, can compromise health. A hyperresponsive HPA axis influences the development of hypertension and cardiovascular disease, immune suppression, hyperinsulinemia, and insulin resistance, enhancing risk for diabetes. Glucocorticoids are also implicated in age-related decreases in immune competence and cognitive

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functioning. Hyperactivity of the HPA axis is also thought to contribute to anxiety disorders and depression, as well as to growth retardation and developmental delay. As this analysis suggests, the HPA axis interacts with other systems, including the autonomic nervous system and the immune system, such that changes in HPA axis functioning will affect these and other systems as well.

Thus, coordinated stress responses can assume the form of hypervigilance, intense biological stress responses (SNS and HPA axis), strong emotional reactions such as anxiety, and social reactions such as clinging, aggression, or withdrawal. Such fast-acting hair-trigger responses are adaptive for coping with immediate threats. Alternatively, through feedback from the prefrontal cortex, stress responses may be moderated and down-regulated. That is, the realization that a threat is not as severe as it first appeared or that one has the resources to cope with it, including social resources, lessen these stress responses.

The long-term effects of social relationships on health and longevity are mediated, in part, by the prevalence and intensity of these stress responses. With chronic or recurrent activation, the functioning of these stress systems may be compromised, as physiological systems change to meet the recurring demands of a stressful environment. Constant or recurrent exposure to stressful circumstances can lead to alterations in SNS functioning and HPA axis responses to stress and potentially to disruptions in other systems such as immunologic, dopaminergic, and serotonergic functioning (McEwen, 1998). Deficiencies in the ability to mount a parasympathetic system (PNS) response to stress may be affected as well (see Repetti, Taylor, & Seeman, 2002 for a review). Through these processes, repeated social challenges can ultimately disrupt homeostatic processes that are central to the maintenance of health. The consequences may be cascading, potentially irreversible effects that can lead to stress-related physical and emotional disorders.<sup>1</sup> Conversely, supportive social relationships can be protective against these sorts of changes by preventing a stress response altogether in situations that are not particularly threatening or that are merely novel, by muting the strength of biological stress responses, and/or by promoting faster recovery of these system from the effects of stress. Social support may exert its regulatory effects on biological functioning, in part, via the prefrontal cortical pathway noted above, in that even mere awareness that one has social support available can lead to less intense responses to stress and/or faster recovery from stress.

Having described the social shaping hypothesis in general terms and its biological underpinnings, we next consider specific evidence for it. To illustrate the regulatory role of social relationships in an individual's biological, emotional, and social functioning, we examine specific social relationships, beginning with child-parent ties, with a special emphasis on how these relationships may calibrate an offspring's stress response.

## PARENT-CHILD BOND

The parent-child bond has long been recognized as vital to survival. However, that recognition has not led to substantial research regarding the ways in which

such bonds are protective. Although the importance of the idealized bond of closeness and warmth between parent and child, especially mother and child, is widely acknowledged, the mother–child relationship is studied as much for its rifts and deviations (e.g., infanticide) as for the vital functions it provides (see, for example, Hrdy, 1999). In the following section, we discuss ways in which the mother–infant bond is vital for the developing offspring, with particular focus on how these early relationships may calibrate physiological response to stress. In theory, these comments apply to father–infant relations as well, in that human parenting is marked by substantial paternal investment relative to other species, but more of the relevant literature has focused on the mother–infant bond.

The often-cited survival functions of the maternal–infant bond include protection from harm, feeding through nursing, and provision of care during childhood, especially during illness or injury. Adopting an evolutionary health psychology perspective reveals that the functions of the maternal–infant bond are far broader. Across multiple encounters with her offspring, the mother's behavior toward her offspring conveys information about the stressfulness of the external environment, sending signals to her infant, which in turn affect the infant's development of psychological and biological responses to stress.

These powerful effects have been especially well documented in animal studies. For example, Meaney and associates (Francis, Diorio, Liu, & Meaney, 1999; Liu et al., 1997) studied the impact of maternal nurturance on offspring responses to stress. They employed a paradigm in which infant rats are separated from the mother for a brief period and subsequently returned to the cage. The maternal response to being reunited is typically to begin vigorous licking and grooming and arched-back nursing of the returned offspring. The immediate effect of these maternal behaviors is to reduce corticosterone responses and sympathetic activity in offspring and mother alike. But the long-term effects of maternal nurturance are important as well. Offspring who are the recipients of this nurturant attention also get lifelong protection against stress. Specifically, as adults, rat pups who had been the recipients of warm maternal care in this paradigm had reduced plasma ACTH and corticosterone responses to acute stress, increased hippocampal glucocorticoid receptor messenger RNA expression, enhanced glucocorticoid feedback sensitivity, and decreased levels of hypothalamic CRH messenger RNA, all factors that reflect a better regulated and more efficient HPA axis stress response. As they matured, the offspring also showed more open-field exploration, suggesting that they were experiencing less anxiety in novel situations. As adults, they were less likely to show age-related onset of HPA axis dysregulation in response to challenge and were less likely to exhibit age-related cognitive deficits. As noted, some of these effects were evident at the level of gene expression.

We interpret these findings to indicate that maternal nurturance or its absence acts as a signal to the offspring as to how stress responses should develop. When maternal responses are nurturant, reflective of a benign environment, the HPA axis of offspring operates efficiently and returns to baseline quickly following a stressful encounter; and these effects can persist across the offspring's life span. The offspring show fewer signs of anxiety, less HPA axis activity in response to stress, and fewer signs of compromised HPA axis functioning in

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adulthood. In contrast, rats from species that are low lickers and groomers or who, for other reasons, do not receive this warm, nurturant activity (as through experimental manipulations) have what amount to hair-trigger HPA axis responses to stress. They are quick to show signs of anxiety and slow to explore new environments; their corticosterone responses to stressful conditions are strong and persistent, and over the long term, they experience the accumulated damage that Meaney and colleagues documented in adulthood. Thus, these studies provide important evidence that maternal behavior actively shapes the offspring's biological and socioemotional responses to potentially stressful or merely novel situations across the life span.

If this reasoning is correct, then one would expect to see evidence that variations in stressful circumstances in the environment are reflected in maternal behavior. Rosenblum, Coplan, Friedman, Bassoff, Gorman, and Andrews (1994) manipulated the environments in which mother macaque monkeys raised their offspring by altering how easy or difficult it was for them to find food. The purpose of the study was to see if harsh or difficult conditions influenced the mother's caregiving toward her infants and to examine how the infants' development was affected as a result. In one environment, food was readily available and in those environments, the mother monkeys were attentive to their offspring whose development proceeded normally. In a second environment, finding food required more effort but the mothers still raised their offspring with attentiveness, and normal development of the offspring ensued. In the third environment, however, food was sometimes plentiful and sometimes not, and under these "variable foraging" conditions, the mothers became harsh and inconsistent in their mothering.

The offspring of the variable foraging mothers showed clear alterations in their life-long biological, emotional, and social responses to stress. As infants, they exhibited sustained clinging to the mother, low levels of social play and exploration, and high levels of affective disturbance. In adulthood, they had more extreme HPA axis responses to stress, and they were fearful and socially maladapted as well. They had more dominance struggles and lower levels of grooming, suggesting long-term deficits in social behavior. Variable foraging was also related to elevated levels of serotonin and dopamine metabolite concentrations (Coplan et al., 1998), suggesting some disruption in these systems as well. The authors concluded that when mothers are psychologically unavailable to their infants, due to ongoing stress in the environment, the resulting attachments will be less secure, normal emotional and social development will be disrupted, and psychopathology will more likely develop (Rosenblum & Pauly, 1984; see also Coplan et al., 1996). The important role that early nurturance plays in normal growth and socioemotional development is now well documented in animal studies.

This work is significant, in part, because the environments in which the mothers raised their offspring were manipulated, thus demonstrating the causal importance of the stressful social environment in maternal nurturance. Studies that cross-foster offspring to caregivers high or low in nurturance illustrate the remaining piece of this causal pathway, and show how caregiving style can alter the phenotypic expression of genetically based temperamental differences. For example,

Suomi (1997) assigned rhesus monkeys selectively bred for differences in temperamental reactivity to foster mothers who were either unusually nurturant or within the normal range of mothering. Highly reactive infants cross-fostered to normal mothers exhibited deficits in social behavior and in adulthood, tended to drop and remain low in the dominance hierarchy (Suomi, 1991). Reactive infants cross-fostered to highly nurturant females, in contrast, showed higher levels of social skills, and in adulthood, they were more likely to rise to the top of the dominance hierarchy. When highly reactive female offspring became mothers themselves, they adopted the maternal style of their foster mothers, independent of their own reactivity profile (Suomi, 1987). Studies like these demonstrate the behavioral intergenerational transfer of nurturance and its centrality to the development of emotional and social skills (see also Francis et al., 1999). Studies like these also demonstrate how rapidly these major changes in stress-responsive biological systems can occur and how enduring their effects can be.

In humans, attachment is a marker for the maternal–infant bond, and attachment is implicated in the relation of early family environment to emotional, social, and biological responses to health. Early in childhood, attachment style is typically assessed by a child's response to the strange situation (Ainsworth, Blehar, Waters, & Wall, 1978). In the strange situation, a young child (generally 12–18 months) is put in a novel environment and then goes through a series of separations and reunions with a parent, usually the mother, both in the presence of a stranger or alone. Children who are distressed while separated but easily soothed by the return of the parent are considered to have a secure attachment style. Children who either show little distress while the parent is absent, or who greatly protest during the absence of the parent and are not easily soothed when the parent returns, are considered to have an insecure attachment style. In several studies, insecurely attached infants who participated in a strange situation task had higher cortisol responses than securely attached infants (Gunnar, Brodersen, Nachmias, Buss, & Rigatuso, 1996; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996; Spangler & Grossman, 1993). Studying children receiving well-baby examinations, Gunnar and her associates found that securely attached children were less likely to show elevated cortisol responses to normal stressors such as inoculations than less securely attached children (Gunnar, Brodersen, Krueger, & Rugatuso, 1996). As was true in the animal model of Suomi (1991), the protective effects of secure attachment were especially evident for socially fearful or inhibited children (see also Hart, Gunnar, & Cicchetti, 1996; Levine and Weiner, 1988).

In a related work, Repetti et al. (2002) examined the emotional, social, and biological impact of growing up in a family lacking in nurturance and characterized instead by overt conflict and aggression, by a cold and unaffectionate interaction style, or by neglect. In a review of several hundred studies, they concluded that offspring from these “risky” families have gaps in their emotional and social regulatory skills and show heightened sympathetic and HPA axis responses to stress. In an empirical investigation, Taylor, Lerner, Sage, Lehman, and Seeman (in press) found that a stressful environment in early childhood (operationalized as low SES) promoted these risky family characteristics and their

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consequences: The offspring from risky families were more likely to experience symptoms of depression and anxiety, they showed gaps in social support, they had elevated cortisol responses to stress, and their self-rated health was poor; in males, heart rate and blood pressure responses to stress were elevated.

Findings consistent with this reasoning were also reported by Felitti and colleagues (Felitti et al., 1998), who related early family environment characteristics to health outcomes in adulthood. In a study of 13,494 adults, they found a strong, graded relationship between exposure to abuse and household dysfunction during childhood and risk for a broad array of adult health outcomes, including heart disease, some cancers, chronic lung disease, skeletal fractures, liver disease, depressive episodes, and whether a suicide had ever been attempted. As in the animal studies, some of these family dynamics may derive from shared genetic inheritance, but evidence suggests that environmental factors are implicated as well (Cadoret, Yates, Troughton, Woodworth, & Stewart, 1995).

As noted in both the animal and human studies just reviewed, emotional and social functioning as well as biological functioning, are critically involved in these pathways (Repetti et al., 2002). Children from risky families appear to lack certain emotion regulation skills. For example, they do not do well at recognizing their own emotions, recognizing the emotional states of others, and managing their emotional responses to social situations. As evolutionary psychologists have noted, the ability to send and receive emotional cues about the nature of the environment is a vital survival skill, so much so that some of these processes may be universal or near-universal across cultures (Ekman, 1972, 1992). But children from risky families instead exhibit high levels of internalizing symptoms (social withdrawal and anxiety) or externalizing symptoms (aggression and hyperactivity) in response to potentially stressful circumstances. In other words, they show signs of a hair-trigger flight-or-flight response to situations that are interpreted by others as normal or, at least, as less stressful.

Risky family environments also produce offspring lacking in social competence (Repetti et al., 2002). Researchers who have documented this relation often go into the home to observe the child's family environment and then obtain ratings from teachers and peers regarding the target child's social competence. Risky family environments can produce children who exhibit a range of socially inappropriate behaviors, leading to the result that they are not well liked. In some cases, the child may be highly aggressive and in other cases, socially withdrawn (Repetti et al., 2002). These findings, too, are suggestive of an exaggerated fight-or-flight response to social situations. These poor social skills may also represent risk factors for disease later in life, because people with deficits in social skills may have difficulty attracting and maintaining social relationships, with the result that their ability to gain social support may be compromised.

To summarize, then, the parent-child bond, especially the mother-child bond, appears to function not only to ensure the immediate survival of offspring, but also to act as a general signal to the offspring's developing affective, social, and biological systems as to how stressful the environment will be and what responses will be needed to meet its demands. Children from non-nurturant families respond to novel and potentially stressful circumstances with more reactive



biological responses to stress, including autonomic reactivity and HPA axis reactivity; they exhibit deficits in the abilities to send and read emotional cues from others; and their social skills reveal gaps and impairments. In essence, fight-or-flight responses to stress on all three levels (biological, emotional, and social) are ratcheted up in those whose early relationships are low in nurturance. Children who grow up in highly nurturant families instead show more muted biological responses to novel or potentially stressful circumstances; they greet novel environments with more enthusiasm and exploration; they show fewer signs of aggression or withdrawal (fight-or-flight) in response to potentially stressful circumstances; and their emotional and social skills are better developed. The fact that evidence from related animal models so closely parallels the findings in humans suggests substantial cross-species commonalities in the functions of these early bonds.

There are some important implications of the calibration function of early social relationships. The first is that a parent may shape a child's stress response to be adaptive in the short term, but in ways that forecast long-term costs. This observation has some theoretical precedent. It has been proposed that different attachment styles (secure, anxious, and ambivalent) are all adaptive to the rearing environment (Belsky, Steinberg, & Draper, 1991), but sometimes at the cost of long-term social and emotional functioning. This issue leads to some provocative questions. What happens when an individual's circumstances change? For example, will changing from a difficult and unpredictable environment to one that is safe and predictable alter an individual's stress responses? It may be possible to alter one's stress responses, but the likelihood of substantial change would seem to depend on a number of conditions: (1) that there is a fundamental shift in the stressfulness of the environment; (2) that there is a change in the individual's social relationships that reflects the changing circumstances; and (3) that the individual has relatively little experience with the pre-existing environment. Thus, we would expect that alterations in biological stress responses in a direction more beneficial for long-term health will be more likely if a person moved from a dangerous neighborhood to a safe one, married an emotionally stable spouse, and was still relatively young, rather than moving to a slightly safer neighborhood, with an existing spouse, and lived in the dangerous neighborhood for most of his/her life. We take up the question of short-term benefits and long-term costs at more length in our conclusions.

A second implication of the calibration function can be drawn: Recent research has shown that the early attachment relationship can provide a prototype model of attachment that continues to influence behavior into late adolescence and early adulthood (Fraley, 2002) and theoretically throughout the lifetime (Bowlby, 1973, 1980). Moreover, attachment style can be transmitted across generations (mothers who are insecure tend to have insecure infants and mothers who are secure tend to have secure infants) (e.g., Suomi, 1991; van Ijzendoorn, 1995). Thus, early relationships in humans, like those in other animal species, may not only modulate an individual's own stress response for a lifetime, but also affect adult attachment status, parenting ability, and the stress responses of offspring.<sup>2</sup>

## PAIR-BONDING

Analyses of pair relationships in evolutionary biology and evolutionary psychology have focused heavily on factors that go into mate selection, because of its relevance to sexual selection. However, a growing body of work also shows the significance of the pair bond for health and survival. Just as the parent–child bond shapes the biological, social, and affective functioning of offspring, especially in response to stress, intimate relationships including the marital bond affect these systems in ways that influence health and longevity. In this next section, we focus on the ways in which pair-bonds may regulate the moment-to-moment stress responses of each partner and what implications this process may have for health.

Research on adult attachment shows how individuals engage intimate partners to help regulate their response to stressful circumstances. Drawing on the writings of Bowlby (1973, 1980) and research on caregiver–offspring attachment, adult relationship researchers have proposed that adult romantic relationships can also be conceptualized from an attachment perspective (e.g., Hazan & Shaver, 1987).<sup>3</sup> In this perspective, individuals who have a secure attachment style believe that intimate partners are reliable sources of support in stressful times. In contrast, individuals who have an insecure attachment style (either anxious ambivalent or avoidant) believe that intimate partners will be relatively unreliable sources of support during stressful times. An important implication is that adult attachment guides how individuals use partners to regulate behavioral and physiological responses during stressful situations. Moreover, adult attachment also affects how individuals provide care to partners who are facing stressful situations. Thus, the attachment system, which is rooted in our evolutionary past, affects the way individuals interpret and communicate information about the stressfulness of the environment and also has implications for how intimate partners may draw on each other to help regulate their responses to acute stressors.

Studies have investigated how adult attachment affects individuals' seeking and provision of support to each other in the face of stress. In one study, women anticipated participating in a stressful laboratory task. Those who had a secure attachment style were more likely to seek support from their partners, but only when they felt anxious about the impending task. Male partners who had a secure attachment style were more likely to provide support, but only when their partners showed more anxiety about the impending task. Insecurely attached women and men showed the opposite pattern, seeking and providing support respectively when the women were less anxious rather than more anxious (Simpson, Rholes, & Nelligan, 1992). In another study, men anticipated participating in a stressful laboratory task. Female partners who had a secure attachment style were more likely to give support if their partners sought it than women who had an insecure attachment style (Simpson, Rholes, Orina, & Grich, 2002). These effects have also been replicated with a real-world stressor (one's partner getting on an airplane to leave) (Fraley & Shaver, 1998).

Attachment also affects how romantic partners provide care for each other during stressful times. Specifically, Feeney and Collins (2001) showed that

individuals with an insecure attachment style are relatively poor at providing care when their partner is facing a stressful situation; in contrast, individuals with a secure attachment style are better at calibrating the amount of care they need to provide to meet the needs of their partner (Collins & Feeney, 2000; Feeney & Collins, 2001). Thus, the adult attachment system affects the way individuals interpret information about the stressfulness of the environment, determines whether individuals use intimate partners to regulate their own responses to stressful situations, and affects how partners regulate the responses of a distressed partner. Those who have a secure attachment style are better at eliciting and using support from their partner when needed and at providing care for intimate partners in ways that match the demands of stressful circumstances.

Adult attachment may also affect the ways in which individuals use relationship partners to manage their physiological responses to stress. Carpenter and Kirkpatrick (1996) found that women with an insecure attachment style had an elevated heart rate and blood pressure response to a stressful task when their partner was present, relative to when their partner was not present and relative to women with secure attachment styles. In another study, Feeney and Kirkpatrick (1996) investigated the effect of partner separation and attachment on heart rate and blood pressure responses to a stressful laboratory task in women. When the partner was absent during the first half of the stressor (and present during the second half), women with anxious and avoidant attachment styles had exaggerated heart rate and blood pressure before, during, and after the stressor, but this was not the case when the partner was present during the first part of the stressor (and left during the second half of the stressor). This pattern suggests that individuals who have insecure attachment styles are especially sensitive to their partner being absent when a stressful event first occurs.

The implication of this work is that women with insecure attachment styles may find their romantic partners to be a liability during time of stress. These women have greater blood pressure and heart rate reactivity when the partner is present during a stressful event, especially if the partner was absent at the start of the stressor and later arrived, relative to when the partner was absent throughout the stressful event. This response is not found in women with secure attachment styles. (Note that women with secure attachment styles do not necessarily benefit physiologically from the presence of a partner; they merely do not suffer the same costs that women with insecure attachment styles suffer.)

Consistent with these conjectures, people in poor-quality marriages have a higher likelihood of illness, they report more physical symptoms, they experience a poorer long-term prognosis if they are ill, and they experience a longer recovery from illness (see Kiecolt-Glaser & Newton, 2001 for a review). Among other findings, low marital quality has been tied to higher blood pressure and heart rate responses to stress, increased likelihood of cancer, adverse changes in rheumatoid arthritis disease, heightened risk of death among those already diagnosed with cancer, and a broad array of disabilities. These relations are typically stronger for women than men. An epidemiological study of marriage and mortality in Sweden showed that both men and women who were divorced, separated, or widowed were at increased mortality risk (Hemstrom, 1996).

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As these findings imply, the marital bond has been heavily studied in the context of stress and coping, because it is both a major source of social support for most adults and a major source of chronic strain for many.<sup>4</sup> Like the mother-child bond, marital quality reflects and conveys information about the stressfulness of the external environment. For example, SES (a marker for environmental stress) is significantly related to an increased likelihood of divorce and spousal abuse. Men may disproportionately be the stress carriers in these relations. For example, work spillover effects, whereby stress at work spills over into more conflictual interactions with family, have been demonstrated primarily in studies of men (see Taylor, 2002 for a review). In addition, Repetti (1997) found that stressful workdays promoted fight (i.e., conflict) or flight (i.e., withdrawal) behavior in married men, but the same relations were not found for married women.

The significance of marital quality for health is undeniable. Generally, marriage acts as a tie that benefits health and mental health, much as the early caregiving relationship does. These effects are especially pronounced for men. Married men have a 250% lower mortality rate, compared to single age-matched, SES-matched unmarried men. Marriage is only modestly related to age at mortality for women. Traditionally, this difference has been attributed to the fact that men's single lifestyles are more health compromising than women's and married men's are (e.g., Umberson, 1987). For example, single men practice poorer health habits than married men do, and they are more likely to abuse substances, such as alcohol and drugs, that can be associated with a heightened risk of disease or accidental death; single men's lifestyles are more likely to involve risky activities (such as risky sports and heightened risk of vehicular accidents), and they have a higher frequency of aggressive encounters that may lead to health-compromising or fatal consequences. There are marked parallels in other primate species, in which unattached males are vulnerable to attack by conspecifics or predators and to infection and disease. For example, unattached male primates are more likely to have parasitic infections, because they are less likely to be groomed by others, whereas males with social attachments are groomed more frequently with resulting health benefits. Thus, the male-female bond appears to foster a healthy lifestyle for males and to have survival advantages for males as a result.

Gender differences in social support may contribute to the beneficial effects of marriage on men's health. Men report that they get their social support primarily from their partner, relative to other potential sources of support, such as men friends, relatives, and children. Women, however, seek and obtain social support from a broad array of contacts, especially female friends and relatives, and report that they turn to their spouse less than to other sources of social support (see Taylor, 2002 for a review). Consequently the health benefits of social support through marriage are more likely to accrue to men than to women, who even when single, may have a broader array of social supportive relationships available to them.

Men and women have different patterns of autonomic and HPA axis reactivity to events in marriage that may affect their health and longevity differently. For example, for men, home acts as a safety signal; when men return home after a workday, their autonomic arousal shows a marked decline. The autonomic arousal

of married women, however, remains elevated long into the evening (e.g., Frankenhaeuser, 1993; Frankenhaeuser et al., 1989; Goldstein, Shapiro, Chicz-DeMet, & Guthrie, 1999), perhaps because traditionally, women's roles have extended throughout the day, rather than being demarcated by a specific period of activity. Having a partner is a source of comfort and support for men in times of stress, but not to the same degree for women. For example, empirical investigations of responses to laboratory challenges show that men's biological stress responses are lower when their partner is present (Kiecolt-Glaser & Newton, 2001). In fact, merely thinking about their partner reduces men's biological stress responses to laboratory challenges (Broadwell & Light, 1999). These benefits are not found for women, whose biological stress responses are often stronger when their partner is present (Kiecolt-Glaser & Newton, 2001) and who show no stress-buffering effect of thinking about their partner (Broadwell & Light, 1999). Patterns of reactivity to marital conflict also vary between the genders. In studies assessing autonomic and HPA axis responses to laboratory-induced marital conflict, men often show little or no change in heart rate, blood pressure, and other indicators of stress. Women, in contrast, show strong autonomic and HPA axis responses to marital conflict (see Kiecolt-Glaser & Newton, 2001 for a review).

To summarize, when considering the protective impact of the pair-bond on health, there are a confluence of influences to be considered, some of which may cancel each other out. Specifically, when men draw on social support for coping with stress, they typically turn to their partners. The benefits, in terms of muted biological responses to stress and health, are now well established. Moreover, even the negative effects of conflictual interactions with their partner have a lesser impact on men. The additional fact that home functions as a safety signal for men may also be significant in the strong protective relation of marriage on men's health.

In the case of women, however, married women experience elevations in stress responses for a longer part of the day. Women seek social support disproportionately from friends and relatives and are somewhat less likely to turn to their partners. In response to marital conflict, they show stronger autonomic and HPA axis responses than men do. Consequently, the health advantages that might accrue to women from the social support of marriage appear to be attenuated by these mitigating factors, such that women gain only modest health benefits from marriage. Nonetheless, the pair-bond, like the parent-child relationship, is informed by the stressfulness of the environment and subsequently shapes biological responses to stress, with long-term outcomes for health. The patterns show considerable differentiation by gender, however.

## SAME-SEX TIES

Gender differences in patterns of social support point to the importance of studying friendship as a bond that may be health protective as well. As an object of investigation, same-sex ties have not received the attention they are due either in evolutionary psychology or in health psychology. In this section, we describe ways

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in which these social ties may shape biological and socioemotional functioning, especially in stressful conditions, with special emphasis on how these ties provide valuable information about the stressfulness of the environment.

The study of men's bonds with each other has been heavily influenced by several early accounts of male collectivities, notably Lionel Tiger's (1969) *Men in Groups*, Karl Lorenz's (1966) *On Aggression*, and Robert Ardrey's (1961) *African Genesis*. The template for understanding men's relations with each other has come from studying primate species and accordingly, scientists have noticed and emphasized these commonalities, particularly hierarchies, coalition formation, and aggression. The image of men's groups that is conveyed by these volumes and that has guided many anthropological accounts of men's ties with other men is that male aggression, fueled by testosterone, underlies many of men's interactions with each other. These accounts suggest that the ability to rise to the top of a hierarchy, pursue goals single-mindedly, and even engage in warfare may be attributed to the interpersonal challenges that men pose for each other. Historically, groups of men have taken on survival-related tasks for the social group, including hunting, defense, and war. When a group is organized around a vital task, a hierarchy with a clear dominance structure and established coalitions is beneficial, because it provides a chain of command for structured, coordinated action.

The struggle for dominance and the use of aggression to get it are present in men's groups, but recent analyses of both primate species and humans suggest that, rather than fostering aggression, the dominance hierarchies that are characteristic of boys' and men's groups often contain, control, and marginalize aggression instead. Contrary to earlier stereotypes, men who rise to the top of male hierarchies are not typically those who are most aggressive but rather those with socioemotional skills, the ability to work with others to form coalitions and relationships, and the skills to lure, appease, and cajole and marginalize those who violate norms and rules (Taylor, 2002). In essence, those who can get others to play by the social rules are most likely to rise to the top of a hierarchy.

Although aggression is high when dominance hierarchies are unstable, once a hierarchy is established, aggression is rarer and typically plays only a modest role in maintaining the social structure. Spontaneous submission, grooming, alliances, and active intervention by high-status males smoothes over much of the incipient conflict that could otherwise arise. In his studies of olive baboons, Sapolsky (1998) recounts how those who rise to the top of a dominance hierarchy typically have skills for reconciliation, reassurance, and appeasement for restoring social relations. Similarly, Goodall (1986) reported how alpha males maintain control through savvy skill and gentle bullying, often stopping fights by sitting between quarreling parties to keep them from renewing their conflict. Thus, evidence suggests that well-controlled responses to stress and socioemotional skills lead to success in negotiating adult life, among at least some primate species.

Just as maternal nurturance can underlie the development of socioemotional skills, experience with male peers is thought to be vital to the refinement of these skills among males as well. Consider the ubiquitous rough-and-tumble play of male humans and many animal species. At one time, researchers believed that play-fighting in males constituted practice for adult combat. However, the

evidence now suggests that play-fighting is distinctly different from combat and that the two activities involve little overlap in skills. Rather, play appears to help animals distinguish play-fighting from true aggression (e.g., Pellis & Pellis, 1998). Although this knowledge is not necessarily critical in childhood, it can assume substantial importance as animals become sexually mature and stronger and begin competing for mates and for dominance in a social group (Pellis & Pellis, 1996). In a test of this hypothesis, Koolhaas and colleagues (Van den Berg, Hol, Van Ree, Spruijt, Everts, & Koolhaas, 1999) raised young male rats without contact with male peers, and then compared their behavior in adulthood with that of male rats who had grown up with the normal rough-and-tumble play of the male peer group. The rats without play experiences were less likely to deal effectively with both friendly and aggressive encounters from other males and adults. Thus, rather than practice in aggression, the rough-and-tumble play characteristic of young males of many species instead appears to teach young males how to manage it.

The picture that is emerging of male–male relationships, then, is that, much as mother–infant relations shape the parameters of emotional, social, and biological responses to novelty and stress, so do male–male encounters continue to refine a male’s skills for detecting threatening vs. nonthreatening circumstances and for responding appropriately to them. Thus, male–male relationships may convey information about the nature of the environment and provide guidelines for addressing its social demands.

Male–male bonds also influence biological functioning, in part, by regulating hormones such as testosterone and serotonin. Testosterone naturally increases when men compete, as they do in struggles for dominance. Once dominance struggles have ended, the higher-status males typically have higher levels of testosterone than the lower-status males, which may promote reproductive success. Serotonin also appears to be significant in dominance struggles and aggression. In a study demonstrating this point, Raleigh and colleagues (Raleigh, McGuire, Brammer, Pollack, & Yuwiler, 1991) created small groups of vervet monkeys, each with three adult males and three adult females and offspring. After a dominance hierarchy had been established, they removed the dominant male from the group and then selected one of the two remaining subordinate males and injected him with a drug that either enhanced or diminished serotonergic activity. In every case, the monkey that was treated with the serotonin enhancer became the dominant monkey, whereas the monkey who received a drug that diminished serotonergic functioning dropped in status (i.e., his male cage-mate became dominant). Interestingly, the impact of serotonin on dominance was socially mediated. Specifically, injection with a serotonin enhancer led to more prosocial activity and more acceptance by the females in the group, whereas treatment that diminished serotonergic activity led to quarrelsome, irritable, aggressive behavior in the males that alienated the group’s females. In short, socioemotional skills determined which monkeys moved into leadership positions, and serotonin played a regulatory role in these social processes.

There are clear implications of these processes for health. In his studies of olive baboons, for example, Sapolsky (1998) found that on every hormone and

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physiological measure he studied, subordinate baboons looked worse than dominant baboons. For example, they had higher levels of resting stress hormones, more sluggish stress responses, lower levels of HDL cholesterol (high levels of HDL are an indicator of good health), and fewer T cells, suggesting a poorly functioning immune system. As noted, these effects are mirrored in human hierarchies, in the robust relationships between SES and health outcomes. Health statistics uniformly show that lower-status men are more likely to die of homicide, suicide, complications from assaults and wounds, and premature chronic disease than any other segment of the population. In summary, then, male–male relations clearly shape biological, emotional, and social functioning in ways that reflect the stressfulness of the environment, affect responses to stress, and have long-term implications for health.

What of female ties to each other? Women form bonds with other women, but these bonds have been less studied than those of men, in part because they tend to be more informal and flexible. However, like the parent–infant bond and the pair-bond, females' relationships with each other are responsive to the stressfulness of the external environment. Taylor and colleagues (Taylor, 2002; Taylor, Klein, Lewis, Gruenewald, Gurung, & Updegraff, 2000) maintain that women's ties follow from an evolutionary heritage that selected for female friendship, because female "befriending" acts as an organized system for coping with stress by women. Specifically, the need for food, safety, the care of children, and comfort in the face of stress have been met by these ties.

Women's and men's friendship patterns are reliably different. Throughout life, women seek more close friends than men do. Beginning in early childhood, girls develop more intimate friendships than boys do. Although in adulthood, men's networks are larger, primarily because they are more likely to be employed and to participate in political and social activities, women continue to maintain large numbers of informal ties.

The inclination of women to bond together may have biological origins that are evident in animal species as well. For example, McClintock found that when too few individual cages necessitated housing her female Norway rats together in groups of about five, the rats lived 40% longer than when they were housed alone (McClintock, 1998). Male rats, in contrast, live longer if they live in proximity to each other, but not in the same cage, which tends to promote male–male aggression.

Women's networks form an inner core of social life that may be barely visible in nonstressful times, but these bonds become more prominent under conditions of stress. Often the bonds are based on kinship with mothers, sisters, aunts, and children, and other times, they are based on friendship. The needs they meet are fundamental for survival: getting food, caring for children, protecting against violence, and regulating stress responses. All of these tasks involve the transmission of important information, such as where to best find food, how to soothe a crying infant, what places are dangerous, and the like. Turning to the group in times of stress is beneficial to both men and women, of course. But the particular importance of the social group for women in times of stress may stem from the fact that it has traditionally fallen to women to provide safety for herself and her offspring, a task that is especially benefited by alliances with a social group (Taylor, 2002).



Female primates, including humans, typically need to gather food for themselves and their offspring, and female friends and relatives help them with these tasks. Primatologist Richard Wrangham (1980) suggests that female friendships may have evolved primarily to manage food collection and distribution, with females sharing information about where the food is, harvesting food collectively, and driving off rival groups (see Taylor, 2002).

Childcare is also a vital function performed primarily through female–female associations. In some primate species, females trade off childcare with kin, friends, or younger female “baby-sitters,” so that their time is freed up to forage for food. Infant sharing of this kind has been reliably related to health outcomes (Hrdy, 1999). When care of infants is shared among females (both human and primates), the offspring grow faster, whether it is because their mothers are freer to forage for food, because their sitters feed them, or both. Not incidentally, these “baby-sitting” arrangements act as childcare training for younger females (Keverne, Nevison, & Martel, 1999). McKenna (1981) estimates that among some primate species, allomothering, that is, taking care of others’ infants, may constitute up to 50% of the caregiving an infant receives. Among humans, childcare appears to have resided with the biological mother in most societies, including hunter–gatherer societies as well as current-day ones (Corter & Fleming, 1990; Hrdy, 1999). But allomothering is ubiquitous among humans as well. The preferred form of childcare is care by a female relative. Present statistics suggest that upwards of 97% of childcare workers are women, and 85% of teenage baby-sitters are female (Taylor, 2002).

Bonds among females appear to reliably strengthen and become more coordinated in times of stress. Several primate studies (see De Waal, 1996) have found that under conditions of stress or threat, even in species in which female–female bonds are typically weak, those bonds may strengthen to meet challenges. For example, female chimpanzees do not typically have strong bonds with each other, but in the captive environment, they are more likely to bond together to protect themselves against abusive males (De Waal, 1996).

As this point suggests, bonds with other females also provide protection from potential predators. In early history, mothers attempting to protect both themselves and their children from predators would have needed help from others. Although a protective male is likely to have provided some of that assistance, the fact that women spent much of their lives apart from men and are involved in different tasks meant that men would not have been a constant source of protection. Moreover, men themselves are often the primary predators of women. Murphy and Murphy (1974) have described how among the Mundurucu of Brazil, women travel in groups because of their vulnerability to unwanted intercourse. A study of domestic violence in Papua, New Guinea found levels of wife beating as high as 97% in some provinces (Counts, 1990). However, in two provinces the rate was very low. Anthropologist William Mitchell (1990) argues that women in these two communities formed bonds both with their own kin and with female friends that acted as deterrents against male aggression. Parallel evidence suggests that when females are isolated from each other, they experience greater vulnerability to abuse. For example, Wolf (1975) studied young Chinese brides and documented

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the risk of physical abuse they experienced upon marrying, because custom dictated that they move away from family and friends to live near their husbands' families.

If the necessity of female bonds under stress is as great as just maintained, there should be evidence that females draw on social support more than men do in times of stress. Indeed, this is the case. Although the margin by which women seek social support under stress more than men (and girls more than boys) is small, it is extremely robust. The overwhelming majority of studies show that women are more likely to seek social support for coping with stress (e.g., Tamres, Janicki, & Helgeson, 2002.). Field studies of particular stressful circumstances suggest that networks of women often arise spontaneously to meet survival needs. For example, in poor communities (Newman, 1999) or in communities under intense stress (such as Eastern Europe following the fall of communism), networks of women develop to help with the provision of food, childcare, shelter, and other necessities (see Taylor, 2002).

Do these relationships have effects on health? Throughout the world, women live longer than men.<sup>5</sup> Although not all the reasons underlying this difference are known, gender differences in social ties and stress responses appear to be implicated. As noted, men are more likely to respond to stress with behavioral indications of fight (such as aggression) or flight (social withdrawal or substance abuse); women are more likely to respond to stress with processes we have characterized as "tend-and-befriend" (Taylor, 2002; Taylor et al., 2000), that is, tending to offspring in times of stress and drawing on the social group, especially other women, for managing stressful events. Thus, part of the gender difference in age at mortality may be explained by men's greater propensity to experience stress-related problems marked by fight-or-flight, such as homicide, suicide, assault, substance abuse, and early heart disease. Women, in contrast, may enjoy some protection from the fact that they draw on social support for managing stress more than men do, and indeed, some evidence suggests that women experience more health benefits in response to social support than men do (Schwarzer & Leppin, 1989). Thus, the social ties that women enjoy with other women clearly merit investigation as a potentially significant predictor of women's health and longevity. It may be that some component of the large difference in age at mortality between women and men is accounted for by the friendships that women create with other women.

To summarize, ties among women are typically informal and flexible, and they may have been selected for because they helped to provide nourishment for families and safety for women and children. Women who affiliated with each other were better able to fend off threats than those who did not, thereby ensuring their own survival and enhancing the likelihood that their children would survive as well.

## GIVING HELP AND SOCIAL SUPPORT

We have reviewed substantial evidence for social shaping, namely the phenomenon that a person's social relationships reflect the stressfulness of the environment

and actively craft his or her biological, emotional, and social responses to stress. Whereas rancorous relationships promote stress reactions that are strong and easily engaged, socially supportive relations keep stress responses at a more modest level and/or reduce them more rapidly when they occur. In the long term, these effects of relationships have a substantial impact on health. The clear regulatory functions that social support serves suggest that these supportive processes would not be left to chance, but would rather be selected for, in the evolutionary sense. But what induces people to provide help to each other? What processes ensure that the regulatory functions that social support provides will be met?

Within evolutionary biology, this debate has often centered around the apparent paradox of altruism: What induces people to give help, provide sustenance, and meet the needs of others when these actions can potentially compromise personal resources and safety? Altruistic behavior has long been a thorny issue for evolutionary biology and evolutionary psychology. Implicitly, the assumption underlying much of the debate has been that getting help from others is a good thing, but giving it is costly (Hamilton, 1963; Trivers, 1971). This assumption has carried over into the literature addressing social support and health. The argument maintains that when a person provides social support for another, it taxes his or her resources, time, and attention. As such, the implicit understanding within the social support literature has been that there are few, if any, benefits to providing social support for others and a broad array of potential costs.

This argument is unquestionably valid at extreme levels of help-giving. An important source of evidence for this conclusion has been studies of caregivers. Research uniformly suggests that intense caregiving is associated with deleterious effects on health (see Taylor, 2002 for a review). But generalizing from caregiver studies to situations of help-giving more generally may be risky. Caregiver studies usually look at extreme situations involving labor-intensive disorders. These studies also focus disproportionately on elderly caregivers who are at risk for the exacerbation of immune-related disorders. Thus, although caregiver studies have been valuable in identifying the impact of social strain on immune functioning and health, these experiences may not be representative of the effects of support provision on immune function and health.

Recent research by Brown and associates (Brown, Nesse, Vinokur, & Smith, 2003) has examined the relative contributions of providing vs. receiving social support to mortality in older adults. They found that death was significantly less likely for individuals who *provided* support to others. Indeed, in this study, receiving social support had no impact on mortality, when providing support was statistically controlled. (These effects were significant only for females, although the trend was in the same direction for males.) On the surface, such results are startling because they run contrary to so much thinking about social support and altruism more generally. How are they to be understood?

The implications of findings like these are just emerging, but they are likely to be profound. They suggest there has been a bias in the literature regarding providing support to others. Giving support may not be inherently biologically costly. When people give support to others, they may simultaneously be receiving psychological and biological benefits. Mothers reunited with offspring following a

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stressful period, whether in animal studies or studies of working women, have lower stress responses; that is, tending is stress-reducing for mothers. When men and women turn to each other or to friends for support, they are typically both giving and receiving support at the same time. Although clearly at very taxing levels of support-giving, this relationship breaks down, giving support to others appears to be associated with psychological benefits and with benefits for health. Nor are the benefits of giving support confined to current human social conditions. Help-giving at moderate levels appears to be associated with processes underlying resistance to infection, recovery from illness, and wound-healing, all of which would have been vital during humans' early history. As such, the paradox of altruism would seem to be lessened.

## CONCLUSIONS

We have reviewed a broad array of evidence for social shaping, that is, the idea that social relationships (1) provide information about and reflect the stressfulness of the environment; (2) are implicated in the development of biological stress regulatory systems; and (3) influence the magnitude of biological, emotional, and social responses during stressful episodes with consequent effects on health. Rancorous and conflictual social relationships of all kinds often result from stressful conditions and increase the likelihood of recurrent or prolonged stress responses, most notably in the autonomic system and the HPA axis. As was noted in the research on "risky families," evidence from animal and human studies suggests that these encounters can have permanent organizational effects on emotional, social, and biological responses to stress. The health-compromising effects of elevated, recurrent, protracted, or chronic responses to stress are increasingly well documented, as stress has been tied to a broad array of adverse health conditions. For example, early onset of chronic diseases such as heart disease, hypertension, and Type 2 Diabetes and exacerbation of immune-related disorders have been tied to protracted stress responses (McEwen & Lasley, 2002).

Accordingly, one may well ask, what would be potentially adaptive about these long-term effects of problematic social relationships on stress responses, given their uniform association with poor health? Are there functions to be discerned from these processes or are they merely an unfortunate by-product of rancorous social ties? The significance of an overactive or recurrent stress response for long-term health outcomes such as chronic diseases is now well known, but at the time that these processes evolved, few people lived long enough to experience their long-term costs. Rather, having a hair-trigger response to potentially stressful circumstances undoubtedly had substantial adaptive value for survival. The autonomic nervous system and the HPA axis together mobilize an individual for fight-or-flight as an efficient and effective means for warding off many stressors, such as attack by potential predators or conspecifics. Rancorous or stressful social relationships appear to act as signals that the environment is a threatening one, and that having finely tuned, highly keyed, quick-acting, and long-lasting stress responses will be protective. This process is most evident in research regarding

the mother–offspring relationship, explored in animal and human studies, but it is also evident in adult social relationships as well.

By contrast, warm, supportive, and soothing social relationships promote many of the opposite effects. Warm and friendly relations act as signals that the environment is a benign one. The slow-acting or modest stress responses that are associated with this support may well be appropriate for environments marked by sufficient resources to meet the needs of all group members. Among other functions, they appear to promote exploratory and novelty-seeking behavior. In benign environments, there would be few, if any, costs to having a shorter-term, better-modulated stress response with rapid recovery. But the quality of a relationship may become an especially powerful predictor of long-term health during times of stress. For example, although an inconsistent or harsh parent will calibrate a child's stress response to a difficult rearing environment, a parent who remains consistent and sensitive in caring for their offspring under stressful circumstances will help a child develop more flexible resources to deal with stressors, possibly leading to better long-term health outcomes (see Maunder & Hunter, 2001). In romantic relationships, those who have secure attachment styles are better able to use a partner's support and allocate support to a partner in the face of a stressor. In same-sex ties, those who are best able to promote smooth social functioning in the face of conflict or stress reap the most social and health benefits. While under dire circumstances, having a bad relationship may be better than having no relationships at all, the balance of the data suggests that stressful circumstances, for the most part, bring the importance of the quality of a relationship for long-term health and well-being into sharp relief.

In our current lives, which are often busy and marked by chronic stressors, the maladaptive nature of overactive and recurring stress responses is abundantly clear. We no longer need to make use of the rapid and dramatic physiological, neuroendocrine, and emotional changes that result from the perception of threat, because most of our chronic stressors are psychological in nature, rather than the physical threats with which our ancestors needed to cope. Consequently, these systems that were so adaptive in our prehistory are now associated with the deleterious health consequences that ultimately kill most of us. As such, the beneficial side of social bonds, whether the parent–child relation, the pair-bond, or friendship, remain the most health-protective resource that humans possess.

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