

Emotion, Social Relationships, and Physical Health: Concepts, Methods, and Evidence for an Integrative Perspective

Timothy W. Smith, PhD, and Karen Weihs, MD

ABSTRACT

Emotional characteristics and processes are robust predictors of the development and course of major medical illnesses and premature mortality, as are a variety of indicators of the presence and quality of personal relationships. Despite clear evidence of close interconnection between these two domains of risk and protection, affective characteristics and relationships have largely been studied separately as influences on health. After a recent conference on integrative perspectives on emotions, relationships and health co-sponsored by the American Psychosomatic Society and the Society for Affective Science, the present review builds on prior calls for integration, related theory, and current research to outline what is known about the interconnection of these domains as it specifically relates to their overlapping influences on health. Areas of interest include the following: their interconnected roles over the course of development, which may inform current efforts to understand the influence of early life events on adult health; the parallel positive and negative factors in both domains that could have distinct influences on health; the role of emotion regulation in relationship contexts; and measurement, design, and analysis approaches to capture the dyadic and dynamic aspects of these interconnected influences on health. We conclude with a discussion of an emerging research agenda that includes the following: common biological foundations of affective and relationship processes, the cultural embeddedness of affective and relationship processes, the potential contribution of affective-relational processes to health disparities, and implications for intervention research.

Key words: emotion, relationships, marriage, health, stress, social support, emotion regulation.

INTRODUCTION

Throughout the history of psychosomatic medicine and related biobehavioral sciences, emotional processes and social relationships have been central topics in theory and research on the development, course, and impact of physical illness (1). Typically, the effects of emotions and relationships are studied separately. However, these two domains of human experience are obviously deeply intertwined. Periodically, there have been well-reasoned calls for integration in efforts to understand their effects on health, in the form of edited volumes (2), reviews (3–5), and research conferences (6). In October 2017, the American Psychosomatic Society and the Society for Affective Science co-sponsored a meeting in Berkeley, California, to revisit this fertile ground (7). A primary emphasis in all of these efforts has been the mutual and interacting influence of emotional processes and social relationships on disease through psychobiological mechanisms, but also similar joint roles in health behavior and adjustment to chronic illness.

Our purpose here is to use topics from the Berkeley conference, related conceptual models, and recent research to provide an update on integrative evidence, perspectives, and opportunities for future research. We begin with an overview of emotional processes and social relationships as influences on health and then turn to points of integration, emphasizing recent empirical findings. We discuss methodological developments in integrative research and conclude

with a discussion of future research directions. On balance, it is clear that the future of research on emotions and health requires attention to the central context of interpersonal relationships, just as the future of research on relationships and health requires attention to emotional processes. Focusing on the interconnection of these domains of risk and resilience has great potential to deepen our understanding of psychosomatic processes (3–5).

PERSONAL RELATIONSHIPS AND EMOTIONS AS INTERCONNECTED INFLUENCES ON HEALTH

Current relationship science includes a variety of constructs related to the presence and quality of personal relationships (8), which predict the development and course of physical illness (9). Broad patterns such as low social support, social isolation, and loneliness predict earlier mortality (10,11), as do more specific aspects of intimate relationships, such as marital status, multiple indications of relationship quality (i.e., satisfaction, conflict), and relationship disruption (i.e., divorce, widowhood) (12–14). These aspects of relationships predict longevity and all-cause mortality, and the development and course of specific sources of morbidity and mortality, such as cardiovascular disease (15,16) and cancer (17). Both the broader and more specific relationship factors are associated with physiological mechanisms that are plausible links with the development and course of disease (12,18).

From the Department of Psychology, University of Utah (Smith), Salt Lake City, Utah; and Department of Psychiatry, University of Arizona (Weihs), Tucson, Arizona.

Address correspondence to Timothy W. Smith, PhD, Department of Psychology, University of Utah, Salt Lake City, UT 84112. E-mail: tim.smith@psych.utah.edu

Received for publication June 14, 2019; revision received July 20, 2019.

DOI: 10.1097/PSY.0000000000000739

Copyright © 2019 by the American Psychosomatic Society

Affective science includes a similarly wide variety of constructs, ranging from short-term moods and time-limited episodes of specific emotions to more enduring affective characteristics within normal personality and emotional disorders (19). Brief emotional episodes have been implicated as precipitants of major health outcomes such as cardiovascular events, sudden death, and underlying pathogenic mechanisms (20–24). However, effects of emotions on the development and course of the major chronic diseases presumably accrue over longer periods, and studies of more enduring emotional characteristics are consistent with this view. A large body of research indicates that personality traits closely related to enduring emotional processes such as trait negative affectivity or neuroticism predict adverse health outcomes, whereas positive affectivity predicts reduced risk of serious illness and premature mortality (25–27). Furthermore, symptoms and diagnoses related to emotional dysfunction (e.g., anxiety, depression, anger, and stress) have robust associations with the development and course of cardiovascular disease (28–34), cancer (35,36), and diabetes (37), as well as with premature mortality from these and other medical conditions (38). The various negative emotional symptoms, disorders, and traits related to adverse health outcomes also predict more frequent, pronounced, and prolonged physiological stress responses (i.e., cardiovascular and neuroendocrine responses, inflammation and other immunologic processes) that potentially contribute to their associations with disease, whereas positive emotional traits related to health outcomes predict lower levels of physiological stress indicators (25,27,39,40). Hence, in a parallel to the health consequences of positive and negative aspects of social relationships, negative emotional traits, symptoms, and disorders confer increased risk of a variety of illness and earlier mortality, whereas individual differences in positive emotionality confer protection.

There is abundant evidence that these emotional and relationship domains of risk and resilience are related. Negative affective symptoms, disorders, and personality characteristics (e.g., neuroticism and negative affectivity) that predict adverse health outcomes are also associated with lower levels of relationship quality and greater risk of relationship disruption (e.g., divorce and separation), whereas positive affective characteristics that predict better health are associated with better relationship functioning (5). These associations occur across a wide range of general social relationship characteristics (e.g., social support and isolation) and specific processes (e.g., marital quality). For example, an extensive literature documents strong concurrent associations of depressive symptoms and related mood disorders with low marital quality (41,42). Anxiety symptoms and disorders are similarly associated with lower-quality intimate relationships (43,44). The broad trait domain of negative affectivity or neuroticism is also associated with loneliness (45,46) and lower-quality intimate relationships (47,48), as are the related personality traits of anger and hostility (47–49). These associations are evident when relationship quality is indexed through self-reports, but also when represented as observed behavior during marital interaction (50–53) and as marital disruption (48). Importantly, interpersonal difficulties associated with negative affective characteristics are evident across a range of relationship contexts (e.g., intimate partners, family, and friends) and reflect a variety of dysfunctional processes (e.g., excessive reassurance seeking and reciprocated negativity) (41,54,55).

Some evidence suggests that the associations between emotional characteristics and difficulties in close relationships reflect

reciprocal influences over time (56,57). Social isolation and conflict foster dysphoric emotions, which in turn promote continuing or even increasing interpersonal difficulties. In contrast to these negative reciprocal patterns, positive affective characteristics and related traits such as life satisfaction, optimism, and conscientiousness predict better relationship quality and outcomes (47,48,58–60), and positive experiences in relationships, in turn, contribute to stable or increasing levels of positive affective characteristics, comprising positive reciprocal processes (i.e., virtuous cycles) across the life-span (61).

These consistent and substantial associations underscore the possibility that emotional factors and personal relationships influence health jointly. Reciprocal associations between emotional adjustment and personal relationships suggest that typical analytic approaches (e.g., adjusting for one domain as a potential confound when testing independent effects of the other) might be misleading, forcing statistical independence of inherently interconnected domains, raising important questions about how best to represent their effects in quantitative models.

THE SOCIAL CONTEXT AND FUNCTION OF EMOTION

Evidence that emotional characteristics are consistently associated with the presence and quality of social relationships represents an important development in many areas of basic and applied behavioral science. However, from some perspectives, it is not surprising. At least since the publication of Darwin's landmark work, *The Expression of Emotions in Man and Animals* (62), it has been widely understood that emotional and social processes are deeply interconnected; emotional expressions etched on the face and embedded in vocalizations are powerful and rich social communications. Theory and research on the *function* of emotion provide a foundation for understanding this inherent interconnection (63). Emotions *do* things, and many of those things are social in nature, such as focusing social cognition and motivating and directing social behavior. Furthermore, it is well established that emotional dynamics are an integral component of close relationships (64), and interpersonal experiences are a central influence on affective responses (65). For example, negative interpersonal experiences are a common precipitant of depressive mood states in everyday life (66), and as noted previously, interpersonal processes generally and within the specific context of marital and family relationships are closely related to the development and course of depression (41,55).

Emotional processes and characteristics inherently convey specific social information, and social processes are systematically related to emotional responses and characteristics. In one conceptual approach to this interconnection, the characteristics of relationships related to health vary along two broad dimensions—affiliation (i.e., warmth and connection vs. hostility and distance) and control (i.e., dominance vs. deference)—and often reflect various combinations or blends of these broader interpersonal qualities, such as trust (warm deference) or criticism (hostile dominance) (67). Expressions of specific emotions and a wide variety of affective individual differences, including personality traits and symptoms of emotional distress and disorder, are related to these two broad dimensions. Sadness, depression, and anxiety convey interpersonal hostility and distance (i.e., low warmth), blended with submission or deference toward others. Anger also conveys hostility toward others

and interpersonal distance, blended with dominance and aggressive intent. In contrast, various positive emotions and related traits (e.g., optimism) communicate warmth (59,68–70). Overall, emotional expressions convey information on social motives and likely interpersonal behavior, and social behavior has emotional correlates for both the source and recipient or focus of those actions.

Consistent with functional perspectives on emotion, links between relationships and affective processes that influence physical health can also be reflected in active *transactional* processes in which interaction partners mutually influence one another's emotional responses and behavior over time (3–5). Transactional models highlight active or dynamic processes as opposed to more static emotional characteristics and aspects of relationship quality. One example is the examination of specific emotional behaviors occurring during couple interaction as predictors of disease (71,72). Furthermore, when the emotional and relationship domains are sampled with sufficient frequency and detail, coding of specific affective-behavioral interaction patterns and use of evolving quantitative models discussed below (73–75) can capture specific transactional features or processes (e.g., negative or positive reciprocity and demand-withdrawal exchanges) and their physiological correlates as predictors of health endpoints.

INTERWOVEN DEVELOPMENT AND CHANGE ACROSS THE LIFE-SPAN

The interconnection of emotional and relationship processes is apparent early in development and continues across the life course, in ways that are likely central in their health consequences. Even during pregnancy, expectant mothers' emotions and features of their close relationships are interconnected, and evidence suggests that the resulting levels of mothers' stress, social support, and emotional adjustment predict pregnancy outcomes (e.g., gestational age and birth weight) with consequences for later child health and well-being (76–79).

For the developing child, the quality of parent-child relationships is linked to emotional processes, with implications for later child adjustment, experiences in close relationships, and physical health. Bowlby's (80) model of parent-child attachment is perhaps the most influential in guiding research on the interplay of emotion and relationships in early development. In this general perspective, adaptive and responsive parent-child interaction patterns promote the development of positive internal working models of the self, others, and relationships, with beneficial carry-forward effects on child emotional and social adjustment. In contrast, neglectful or punishing parent-child patterns promote negative working models with adverse consequences.

Research supports the basic premise that the quality of parent-child attachment patterns predicts children's later emotional experience and regulation (81), as well as emotional adjustment and social functioning later in childhood (82). Parent-child attachment patterns also predict parallel patterns of children's attachment in peer relationships (83), which in turn are related to childhood emotional adjustment (84). Regardless of their developmental origins, the quality of peer relationships and social status with peers (e.g., acceptance vs. rejection) are associated with aspects of personality and emotional adjustment that resemble features of individual adjustment that confer risk or protection for major illness later in adulthood (85,86).

Some evidence suggests that early parent-child attachment patterns predict the grown child's attachment style in intimate relationships in early adulthood (87), which in turn predict emotion regulation strategies and other processes in the context of those adult relationships (88). However, the strength of associations between parent-child and adult attachment patterns decreases with the length of the interval between assessments (87), and some of this weakening association over time reflects the influence of experiences in close relationships (89).

Although the signal may weaken with the passage of time, the reciprocal interplay of emotions and close relationships based in early attachment patterns may reflect interactional patterns or transactional trajectories across large sections of the life course (67). That is, the developmental trajectories of emotional adjustment and social functioning are likely closely interwoven over time. Parent-child attachment patterns even show some continuity across generations (90). As research increasingly focuses on the childhood origins of psychosocial and biobehavioral risk for serious disease in adulthood, these continuous dynamic interconnections between emotional and relationship processes may be a useful focus in future efforts.

Recent behavioral genetics research has raised important qualifications to the social or interpersonal learning premise of the attachment perspective in which the quality of parent-child interaction shapes the child's subsequent emotional and social development. Measures of environmental characteristics such as family climate and parenting styles display significant heritability (91). Hence, in biological parent-child dyads, correlations of parenting styles and qualities of parent-child relationships including attachment with characteristics of children (e.g., emotional adjustment and peer relationships) could reflect common genetic factors. Mechanisms through which genetically based aspects of child adjustment come to be correlated with what are traditionally presumed to be environmental influences on child development include both passive gene-environment correlations in which parent behavior and child functioning both reflect their shared genetic factors but are otherwise causally unrelated, and active or evocative gene-environment correlations in which genetically based aspects of the child evoke or intentionally produce specific parental responses. Both active and passive gene-environment correlations could contribute to associations of parent behavior and parent-child interaction patterns such as attachment with later child functioning (92).

For example, there is a robust association between maladaptive parenting (e.g., low warmth and harsh control) and child emotional adjustment (93,94). Importantly, these associations are bidirectional; in longitudinal studies, maladaptive parenting predicts greater internalizing (e.g., anxiety and depression) and externalizing (e.g., aggressiveness) symptoms, and these child adjustment difficulties predict higher levels of subsequent maladaptive parenting. These findings demonstrate once again the interwoven nature of emotional and relationship processes over development. However, they also demonstrate that emotional characteristics of children not only are consequences of qualities of the relationship with parents but also include genetically based influences on those relationships in a dynamic transactional process over time (95).

Regardless of its genetic versus interpersonal foundations, the beneficial effects of secure attachment for subsequent emotional and relationship processes are relevant to recent theory and research on the psychobiological correlates of felt safety versus

threat and uncertainty. For example, in the Generalized Uncertainty Theory of Stress model, the sympathetic nervous system is conceptualized as a prepotent default physiological response, as opposed to a situationally activated response to perceived threat or challenge (96). When individuals perceive the environment to be safe and predictable, the sympathetic system is under parasympathetic inhibition. In response to decreases in perceived safety and security, this inhibition is withdrawn, permitting emergence of potentially unhealthy physiological stress responses. In the attachment framework, internal working models are an important source of such perceptions, subjective experiences, and expectations of safety (80). Another recent conceptual model describes social support figures as prepared safety stimuli, moderating emotional, social, and physiological responding (97). Evidence suggests that children lacking secure attachment representations have less adaptive parasympathetic response to relevant stressors (98,99). Of course, associations of attachment patterns with the child's physiological responses could reflect the interpersonally transmitted influence of parent-child attachment quality, shared genetic factors that influence both parent interpersonal behavior and child physiology independently, evocative effects of genetically based child characteristics on parental behavior, or a combination of these pathways.

The impact of parent-child interaction on children's physiology is beginning to be understood as the means through which these interactions get "under the skin" to influence children's health and behavioral outcomes over time. For example, early family factors such as parental depression and insecure parent-child attachment predict epigenetic indications of aging (100) and neurohormones (e.g., circulating oxytocin) later in childhood (101).

The association of family relationship quality with child emotional functioning extends beyond the parent-child relationship. Childhood exposure to interparental conflict has far-reaching effects on children's emotional and social functioning, in part through its role in undermining the child's sense of security (102,103). Exposure to conflict and disruption (i.e., separation, divorce) in the parents' relationship can have long-term health consequences for the child (104). Exposure to interparental conflict and parental relationship disruption, as well as harsh parenting, neglect, and abuse in parent-child relationships, are included in measures of adverse childhood experiences (105), which in turn predict the development of cardiometabolic disease in adulthood (106,107). Importantly, risks conferred through the interplay of emotion and parent-child relationships and those conferred by emotionally evocative exposure to interparental conflict are correlated (108,109), and here again, some of these continuities in exposure to psychosocial risks may reflect genetic factors as well as interpersonal learning and other social processes. For example, correlations of parent-child relationship quality with the offspring's romantic relationship quality in adulthood contain common genetic variance (110).

Although mechanisms underlying the association of adverse childhood experiences and adult disease are not well known, there are a variety of behavioral and biobehavioral possibilities (111). The carry-forward effects of interparental conflict and maladaptive and abusive aspects of parent-child relationships on the child's emotional and social functioning are obvious candidates. For example, childhood psychological distress may contribute to the association of early-life disadvantage with adult health (112), and retrospective reports of early life family conflict are associated with preclinical indications of atherosclerosis through the indirect

effects of reduced frequency of positive interactions and more frequent interpersonal conflicts in adulthood (113). Through epigenetic and related neurodevelopmental processes, adverse childhood experiences could shape more reactive brain-based stress responses (111,114–116). This biobehavioral upregulation or *tuning* of stress systems would likely be accompanied by a suite of emotional and social response styles that increase the frequency, severity, and duration of stress exposures through transactional or evocative mechanisms, compounding the vulnerability of individuals exposed to adverse early environments (92). That is, developmental experiences that promote individual differences in higher stress reactivity also promote psychosocial mechanisms that increase stress exposures for these more reactive individuals.

Some of the key relationship and emotional markers of healthy versus unhealthy psychosocial trajectories during childhood and adolescence may remain constant over the course of development, such as comfort and warmth in family relationships, low conflict, appropriate parental monitoring, and the child's related security and low distress. Other relationship and emotional markers likely change. For example, close family involvement in which children maintain proximity to caregivers is clearly important early in childhood. However, in later childhood and adolescence, a sense of parental availability is sufficient, and optimally shared power and flexibility that promote the adolescent's emerging autonomy progressively replace earlier patterns of consistent parental authority (117). More coercive family interaction patterns can exacerbate conflict and undermine support in the family, and contribute to the development of anger and aggressive behavior. In contrast, parents' use of more autonomy supporting emotional socialization (i.e., discussion and coaching regarding negative emotions) can minimize such risks (118). Thus, the particular issues that are sources of risk and resilience in family interaction patterns may change with development, but the interconnected emotional and interpersonal patterns they shape are likely to continue to influence health over time (119,120), transitioning into the parallel patterns evident in adult intimate relationships described previously (67,121). Recent studies demonstrate that preventive interventions can effectively modify parenting practices that influence child outcomes, underscoring a malleability of the parent-child interaction system that could provide valuable intervention opportunities (100,122,123).

The interconnection of emotional and relationship domains is also relevant later in life. Aging is associated with increasing satisfaction with social ties and efforts to avoid negativity and maximize positivity in relationships, perhaps due to a greater emphasis on relationship quality given a limited time horizon (124). Older adults display a greater emphasis on positive information generally (125) and display more positive and prosocial emotions both in general social situations and in their intimate relationships, with beneficial consequences for those relationships (126,127). However older adults also experience greater potential for emotionally distressing interpersonal difficulties stemming from loss, isolation, and conflict with others about illness, disability, and limitations in functioning, and such interpersonal difficulties have negative affective consequences (124). The increased value placed on positive relationships and emotional experiences with age can promote more adaptive emotional regulation in social contexts (128), but aging may also be associated with greater levels of some dysfunctional patterns, such as low warmth and greater negative emotional reciprocity during couple conflicts (129,130).

Although loss of relationships through widowhood is not limited to older adults, it is more common. In this regard, it is worthwhile to recall that Bowlby's seminal multivolume work was titled, "Attachment and Loss" (emphasis added), with the third volume devoted to emotional consequences of various types of loss and their developmental context (131). As noted previously, widowhood is associated with an increased risk of morbidity and mortality (14), and much of the effect of bereavement on health may involve maladaptive or complicated versions of the normative emotional response of grief (132). Importantly, the dyadic interdependence of partners' physical health, cognitive functioning, and quality of life evident in older couples (133) persists after a spouse has passed away (134). That is, a deceased partner's quality of life before death predicts the surviving spouse's quality of life after bereavement, even when adjusting for the surviving partners' prior quality of life. Hence, the intertwining of emotional and relationship processes later in life includes unique adaptive opportunities as well as risks.

FOR BETTER AND FOR WORSE: POSITIVE AND NEGATIVE CONSTRUCTS IN EMOTIONAL AND RELATIONSHIP PROCESSES

Recent theory and research in both the emotion and relationship domains has produced more fine-grained descriptions of their structure and specific elements that may be valuable in explicating their interrelated influences on health. Structural or dimensional models of emotion and related affective constructs posit at least two higher-order dimensions, although the dimensions vary across conceptualizations. In a widely used two-dimensional model, affective constructs vary in valence (positive vs. negative) and arousal or intensity (high vs. low) (135). A second widely used model posits separate negative and positive affect dimensions (136).

There are direct parallels with structural models of relationship quality and processes. For example, couple interactional behaviors have been organized according to a two-dimensional valence and intensity model (137). High-intensity negative behaviors (i.e., hostility) are strongly related to lower relationship quality, whereas lower-intensity negative behavior (i.e., withdrawal, expression of distress) are significantly but less strongly associated. High-intensity (i.e., intimacy) and low-intensity (i.e., problem solving) positive behaviors are strongly associated with relationship quality (137). Two-dimensional models comprising distinct positive and negative aspects of relationship quality are emerging as particularly important in current relationship science (138). The positive dimension of couple behavior and relationship quality includes several processes that predict health, including support, warmth, affection, self-disclosure, partner responsiveness, capitalization, intimacy, and relationship flourishing, as do the negative characteristics of hostility, conflict, criticism, blame, negativity, demand-withdraw, ostracism, and rejection (139–141). Although these broad positive and negative relationship dimensions are inversely related, they are independent correlates of overall relationship quality (138,142) and may have independent associations with health outcomes (5), similar to the inverse association and independent consequences of positive and negative affective characteristics.

Thinking about intimate relationships activates related positive and negative implicit dimensions automatically, even for relationships that are generally viewed explicitly as positive (143), suggesting that two-dimensional models of relationships and their affective correlates are inherent in the domain. Conceptualization

and measurement of separate positive and negative dimensions permit analysis of their separate effects (72), but also examination of specific combinations of these dimensions, such as ambivalence (144). Positive and negative aspects of intimate relationships may influence health through distinct psychobiological mechanisms, perhaps because of their distinct affective correlates (139,145).

The enhanced specificity within relationship and affective domains inherent in broad two-dimensional models is accompanied by even greater specificity within both the positive and negative categories, as described previously. Some of these more specific relational-affective processes are infrequently examined in psychosomatic research, such as empathy (146), adaptive and maladaptive forms of envy and pride (147), jealousy (148), and pleasure taken in the misfortune of others or pain experienced in response to others' success (149). Yearning after loss is common across a variety of types of relationship dissolution (150). Personality dimensions that have robust predictive associations with physical health also predict infidelity (151), such that unhealthy traits are also associated with greater likelihood of betrayal of relationship partners. A sense of betrayal is typically an affectively charged response to discovery of a partner affair, and this extreme but not uncommon relationship stressor poses a significant risk for the development of depression (152). Positive sexual relationships not only are an indication of physical health but also may have beneficial effects on health, perhaps because of their strong positive affective correlates (153). Thus, a variety of specific constructs at the interface of relationships and emotions warrant additional research in terms of their health consequences.

EMOTION REGULATION AS AN INTERPERSONAL PROCESS

Theory and research on emotion regulation have a wide-ranging impact across a variety of areas of behavioral and biobehavioral sciences (154), and emotion regulation is emerging as a central process in the health consequences of affective characteristics (4,155). For example, various aspects of emotion regulation are broadly implicated in dysfunctional emotion-related characteristics that are well-established risk factors for adverse health outcomes, such as depression, anxiety, and anger (156–159). That is, these affective characteristics are associated not only with increased frequency, intensity, and duration of negative emotion but also with maladaptive regulation processes. Furthermore, dysfunctional emotion regulation may extend to deficits in the regulation of positive emotions, as well (160). That is, individuals experiencing prolonged and severe negative affect may not only fail to regulate those emotions adaptively but also fail to regulate positive emotions (e.g., savoring positive events and experiences) that could otherwise lessen their negative emotions.

Given that interpersonal events are common precipitants and foci of emotions, it is not surprising that emotion regulation often occurs in the context of close relationships. We use these relationships in regulating our own emotions, we often regulate our emotions to produce specific relational outcomes, and we attempt to regulate the emotions of our partners (161–163). Much of this socially embedded emotion regulation occurs in the context of romantic couples, and it has important consequences for the quality and stability of those relationships (164,165). Thus, continued development of theory and research on emotion and relationships

as intertwined influences on health must include a focus on emotion regulation.

Efforts to regulate the emotions of others can facilitate the individual's own emotional adjustment over time, through the mechanism of utilization of more adaptive self-directed emotion regulation strategies (166). Recently developed measures of the tendency to engage in interpersonal forms of emotion regulation will likely facilitate research into related health consequences (162,167). Emotion regulation processes may contribute to the ways in which aspects of close relationships influence depression (168), and individual differences in emotion regulation strategies (e.g., cognitive reappraisal and emotional suppression) have adaptive and maladaptive correlates in relationship functioning (169).

Embedding emotion regulation in its relational context has the potential to shed new light on some classic psychosomatic hypotheses. For example, emotional suppression and related constructs (e.g., repressive coping) have a rich history in psychosomatic medicine, and evidence suggests that they are associated with increased health risks (170,171). Although typically construed as an intrapersonal process, emotional suppression has clear interpersonal consequences, such as disrupted social interaction quality and lower-quality relationships (172–176). Within couples, one partner's worry predicts the other's efforts to calm that partner, a potentially beneficial between-person emotion regulation process that is attenuated by emotional suppression (177). That is, engaging in emotional suppression may disrupt an otherwise adaptive interpersonal response to a romantic partner's worry, a form of dysphoric cognitive experience that is associated with increased health risks (178). Matches versus mismatches in partners' suppressive versus expressive style in emotion regulation may also have effects on health (176,179). Alexithymia is a severe and highly dysfunctional form of limited affective expression, and this trait is also associated with substantial interpersonal difficulties, both generally and in the specific context of intimate relationships (180–182). Hence, although *intrapersonal* processes have historically been emphasized in accounts of the adverse health effects of emotional suppression and related constructs, their *interpersonal* consequences may be equally important. The health consequences of adaptive and maladaptive emotion regulation may be due in part to their effects on relationships, and the health consequences of risky and protective relationships may involve aspects of emotion regulation.

CHALLENGES, OPPORTUNITIES, AND INNOVATIONS IN METHODOLOGY

An integrative approach to studying the effects of affective and relationship characteristics and processes on health requires change in the usual approach to research on these domains, in which they are studied separately and measured as static influences on health, most commonly relying on self-reports of these psychosocial characteristics. Although such studies have produced valuable evidence over several decades, a variety of more recently established and emerging methodological approaches hold considerable promise.

A more integrative approach requires, at a minimum, the measurement and analysis of both the affective and relationship domains. Given the well-documented association between these domains, it will be tempting to use the common analytic strategy for correlated predictor variables in which statistical adjustment of one risk or protective factor is used to examine the “independent” effects of another.

This strategy has well-documented limitations, including the under-correction and residual confounding and the uncertain reliability and validity of the “partialled” versions of predictive variables (183,184). In the case of affective and relationship characteristics and processes, their inherent and highly substantive covariation also creates the clear possibility that overlapping variance that is removed in such adjustments is a key aspect of their effects on health (5,185). To examine their joint effects, variable-based (e.g., factor analysis) or case-based (e.g., cluster analysis, latent profile, or latent class analysis) techniques can be used to model natural-occurring aggregations of emotional and relationship risk and resilience factors to be used as predictors of health outcomes, as opposed to separate consideration or use as nuisance variables to be managed via potentially misleading statistical adjustment. Conceptual models can also guide tests of these two general domains as mediators and moderators of one another. Given that both affective and relationship characteristics change, multiple assessments over time can permit tests of the health effects of various affective or relationship trajectories. As in a recent example, change in perceptions of relationship quality may have health effects that are independent of its initial or average levels (186). That is, whether a relationship is getting better or worse, with associated changes in affect, may have health consequences beyond those associated with a single “snapshot” in time.

As noted previously, both the affective and relationship domains comprise broad positive and negative dimensions, which may have distinct effects despite their inverse association (5,138,187). Thus, in an integrative approach, specific positive and negative characteristics within both domains should be assessed. Both relationship science and affective science have traditions of multimethod research (188,189), which provide opportunities to move beyond the common reliance on self-report measures. For example, observational measures of affective behaviors during couple interactions can be used to measure risk and resilience characteristics in the prediction of health outcomes (71,72). Dyadic research methods also include an underused alternative to the typical measurement of individual affective risk and protective factors through self-reports; partner ratings of affective characteristics (e.g., depression and anger) may have better predictive utility in studies of health outcomes (190), perhaps because of reduced impact of response biases that are more problematic threats to validity in self-reports.

Measurement of risk and resilience factors from both members of a relationship presents additional opportunities in the development of a more integrative perspective. For example, in couples, one partner's personality traits or emotional adjustment are quite apparent to the other (70) and therefore are potentially important elements of that other partner's social context. For example, surgical patients' and partners' personality characteristics predict each others' emotional adjustment over time (191). This general process is a central element of the robust association between the individual and relationship domains of risk and resilience. Incorporation of appropriate dyadic measurement and analysis (192) (e.g., actor-partner models) permits tests of the effects of exposure to a partner's personality or emotional characteristics on physiological mechanisms and health outcomes (193). Such dyadic designs and analyses similarly can be used to examine the consequences of giving and getting social support (194,195).

Recent developments in quantitative modeling of affective interactional processes (73–75) can facilitate the development of

more refined understanding of the ways in which affective and relationship processes are reciprocally related over time, across temporal perspectives ranging from moment-to-moment interaction to longer patterns occurring over days, weeks, and months. Such covariation between relationship partners' emotional, behavioral, and related physiological responses can reflect a variety of processes, such as: convergence of partners' responses to external events, emotional reactivity to each other, or efforts to regulate one another's emotions. Each of these processes has the potential to be adaptive or maladaptive (196). Further clarification of the nature and consequences of such patterns of covariation requires additional information beyond the covariation itself. For example, extraction of dyad-level indicators of various patterns of covariation can be used to predict a wide variety of relationship qualities (e.g., conflict, satisfaction, and support) or outcomes (e.g., change in relationship quality over time and relationship dissolution), and emotional adjustment and physical health (197,198). As noted previously, dyadic patterns indicative of negative reciprocity and conflict escalation, positive reciprocity and capitalization, and demand-withdrawal sequences may capture affectively relevant relationship processes that predict health outcomes (199).

These dyadic interaction patterns are most commonly studied in laboratory-based couple interactions. Assessment of similar processes outside the laboratory can be achieved through daily experience sampling and ecological momentary assessment methods (200). Momentary assessments may provide more accurate assessment of stable individual differences in affective risk factors as compared with the usual global retrospective self-reports (201), and some evidence suggests that similar assessment of relationship risk and protective factors has better predictive utility than global self-report measures of relationship quality (202). Daily affective experiences have been found to mediate effects of relationship quality on subsequent health (186). Similar assessments could be used to test parallel mediational hypotheses in which daily relationship experiences mediate the effects of individual differences in affective risk and protective factors. Ambulatory audio recording of interactions can provide behavioral assessments outside the laboratory (203), and recent research suggests their utility in studies of adaptation to serious illness and the effects of relationship stressors on psychobiological mechanisms (204,205).

EMERGING ISSUES

Our review thus far illustrates the inherent interconnection between the relationship and affective domains, an interconnection that may have much to do with their influences on physical health. In pursuing a more complete and integrated research agenda, several issues are central.

Parallel Considerations in Biological Underpinnings

In examining health consequences of affective and relationship processes, there have been parallel efforts exploring foundations in basic biological processes, specifically in genetic and neuroscience research. It is well established that individual differences in emotionality and aspects of emotional adjustment associated with health risks demonstrate substantial heritability, as do individual differences in emotion regulation and aspects of relationships, such as parenting and intimate relationship quality (92,206–210). Common genetic processes may contribute to the association of

affective and relational domains of risk and resilience, through a variety of passive and active forms of gene-environment correlation. Although a variety of candidate genes have been identified, affective and relationship factors related to health are likely influenced by complex, multifoci genetic processes. Furthermore, emotional and interpersonal experiences may have interrelated effects on gene expression (92,110,111,209). As noted previously, preventive family interventions (122) have been found to reduce the association of adverse family environments with subsequent epigenetic indicators of accelerated aging (100), suggesting that gene expression represents not only a mechanism of effect of interrelated emotional and relationship processes on health but also an opportunity for intervention.

Not surprising perhaps given their centrality in human experience and well-being, recent neuroscience research indicates that a variety of aspects of close relationships are represented in the brain, and these neural underpinnings overlap with those supporting related affective processes (211–214). Examples include attachment processes (215), social pain (216), grief (217), giving and receiving social support (218), and the development of emotion regulation (219). Genetic and neuroscience research typically focuses on one of the two domains, but consideration of their mutual influence and common foundations is likely to be useful in elucidating the interrelated influence of affective and interpersonal processes on health.

Reformulating Mechanism Questions

Most models of relationships and health include affective processes as influencing the underlying pathophysiological mechanisms that are the proximal influences on disease (3,5,12,220). The overall physiological burden across multiple stress systems (e.g., cardiovascular, neuroendocrine, and immune) that contribute to disease development comprises four general sources: the frequency, duration, and severity of *exposure* to stressors; the degree of *reactivity* to those stressors; the duration or degree of *recovery* of those physiological responses; and the degree of restoration of those systems, as during sleep (221). Considerable evidence supports the general perspective that negative emotions and difficulties in close relationships can alter each of these sources of overall physiological burden, and do so across several physiological systems relevant to health (3,5,12,220–223). In efforts to further explicate these physiological mechanisms, studies of affective risk and resilience factors should include the role of close relationships, and studies of relationship risk and protective factors should include affective processes. That is, the pathophysiological correlates of affective risk and resilience factors may be particularly evident in relational contexts, and aspects of relationships that confer risk or resilience may do so through affective processes that influence the same physiological responses.

Multiple Contexts of Interrelated Risk and Resilience

From much of the preceding the discussion, it is clear that intimate relationships, parent-child relationships, and relationships with friends and peers are essential contexts for studying affective processes and relationships as interrelated risk and protective factors for health. However, given that experiences at work are well-established influences on health (224), the association of emotional and relationship processes at work may be similarly important.

Positive and negative aspects of the interpersonal environment in the workplace are reciprocally related to emotional functioning (225,226). Furthermore, the experience of stress, negative emotions, and difficult interpersonal relationships at work and at home are related in important ways, such as the spillover from one domain to the other (227). For some individuals and age groups, online social relationships may be a particularly important influence on emotional experience and adjustment (228), and the emotional consequences of negative social experiences online (e.g., cyberbullying) may have health implications (229).

Diversity and Disparities

Although association of affective and relationship processes with physical health and the connections between these two domains of risk and resilience are likely to occur across cultural and ethnic groups, aspects of diversity are important influences on the specific manifestations, functions, and impact of close relationships (230) and affective processes (231). For example, recognition of specific emotions is relatively universal across cultures, whereas understanding those emotions and emotion regulation is more culture specific (232,233). The physiological consequences of emotion regulation and expression also differ across cultures (234) and across racial and ethnic groups (235). Thus, future research on affective and relational processes as interconnected influences on health should consider such cultural differences, and such efforts could be useful in understanding health disparities related to culture, race, and ethnicity. Interrelated affective and relationship processes may similarly contribute to socioeconomic health disparities and the effects of discrimination on health (236–239).

Interventions for Interrelated Emotional and Relationship Risks

One of the longer-term implications of research on affective and relationship risk and protective factors is the possibility that related interventions could reduce risk of disease onset or improve its course among those with existing medical conditions. Preliminary evidence suggests that an integrative perspective could be useful in this agenda, as couple-based interventions for affective aspects of intimate relationships can have beneficial effects on physiological processes (240–242). Couple-based interventions have been found to be useful approaches to the treatment of emotional symptoms and disorders, and such approaches can produce improvements in both emotional adjustment and relationship quality (243). This literature illustrates several potential avenues for intervention research intended to modify health risks and underlying mechanisms associated with correlated aspects of affective and interpersonal functioning.

Other Applications in Psychosomatic Medicine

Thus far, our discussion has emphasized the interconnected effects of affective and relationship processes on health via psychobiological mechanisms related to stress. However, these interconnections are relevant to other issues at the interface of biomedical and behavioral sciences. For example, the modification of health behavior (e.g., physical activity, diet, smoking, and screening utilization) is central in the prevention and management of the most prevalent chronic illnesses (244). Interconnected affective and close relationship processes are related to these health behaviors (245), and a

growing body of research suggests the potential value of related interventions (246). Couple processes are similarly important in emotional adjustment to chronic medical conditions, and some evidence suggests that involvement of family members in patient care can be a useful addition to traditional care (247–250).

Affective-relational processes not only involve families but also interactions of patients and providers. For example, interpersonal processes not only in the context of family and marital relationships but also between patients and health care providers may be essential in understanding the development, maintenance, dysfunction, and management of somatoform disorders such as hypochondriasis (251). Furthermore, interpersonal strain at work can contribute to burnout among health care workers, a potentially important influence on health and emotional well-being among health care providers and the quality of health care (252).

CONCLUSIONS

Although important questions remain, a substantial body of research documents a variety of negative aspects of relationships as robust predictors of the onset and course of serious medical illness, and a variety of positive aspects of relationships as similarly robust sources of protection. A comparably extensive literature identifies a variety of negative affective characteristics as predictors of the incidence and course of the same health conditions and several positive affective characteristics as sources of protection. A third major body of research suggests that the affective and relationship domains are consistently and strongly correlated, yet these two domains of risk and protection are most commonly studied separately.

The accumulating evidence continues to support previous calls for greater integration (2–7), yet much work remains. When attempting to describe mechanisms linking relationships and health, it is useful to follow the emotions, as affective processes animate the interpersonal domain and have strong connections to health-relevant physiology. Also, in attempting to understand how affective characteristics influence health, consideration of the relationship context where so much of our emotional lives occurs is similarly important. Such efforts to integrate relationships and emotions—capturing their nearly constant co-occurrence and interplay—will undoubtedly help to identify, explicate, and perhaps modify psychosocial influences on health. Furthermore, close interconnections between affective and relationship processes extending over time that comprise decades-long trajectories of risk or resilience could be a useful way to conceptualize and quantify mechanisms linking early experience with health in adulthood. Capturing this dynamic and multifaceted interplay directly may maximize accuracy and predictive utility in efforts to understand the effects of emotion and relationships on physical health, and this more complete and precise depiction, in turn, may facilitate intervention efforts at the interface of emotions, relationships, and health.

Source of Funding and Conflicts of Interest: The authors report no conflicts of interest and no support for the preparation of this article.

REFERENCES

1. Herrmann-Lingen C, Melzer J, von Boetticher D. Emotions, bodily changes, and the social environment: how did early psychosomatic medicine consider the social dimension in health and disease? *Psychosom Med* 2019;81:694–703.
2. Ryff CD, Singer BH, editors. *Emotion, Social Relationships, and Health*. New York: Oxford University Press; 2001.

3. Sbarra DA, Coan JA. Relationships and health: the critical role of affective science. *Emot Rev* 2018;10:40–54.
4. Farrell AK, Imami L, Stanton SCE, Slatcher RB. Affective processes as mediators of links between close relationships and physical health. *Soc Pers Psychol Compass* 2018;12:e12408.
5. Smith TW, Baucom BRW. Intimate relationships, individual adjustment, and coronary heart disease: implications of overlapping associations in psychosocial risk. *Am Psychol* 2017;72:578–89.
6. Butler EA, Sbarra DA. Health, emotion, and relationships. *J Soc Pers Relat* 2013;30:151–4.
7. Lane RD, Segerstrom S, Herrmann-Lingen C, Lovallo WR, Ochsner K, Smith TW. Emotions in Social Relationships: Implications for Health and Disease. Berkeley, CA; 2017.
8. Finkel EJ, Simpson JA, Eastwick PW. The psychology of close relationships: Fourteen core principles. *Annu Rev Psychol* 2017;68:383–411.
9. Holt-Lunstad J, Robles TF, Sbarra DA. Advancing social connection as a public health priority in the United States. *Am Psychol* 2017;72:517–30.
10. Holt-Lunstad J, Smith TB, Layton JB. Social relationships and mortality risk: a meta-analytic review. *PLoS Med* 2010;7:e1000316.
11. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci* 2015;10:227–37.
12. Robles TF, Slatcher RB, Trombello JM, McGinn MM. Marital quality and health: a meta-analytic review. *Psychol Bull* 2014;140:140–87.
13. Sbarra DA. Divorce and health: current trends and future directions. *Psychosom Med* 2015;77:227–36.
14. Shor E, Roelfs DJ, Curreli M, Clemow L, Burg MM, Schwartz JE. Widowhood and mortality: a meta-analysis and meta-regression. *Demography* 2012;49:575–606.
15. Barth J, Schneider S, von Kanel R. Lack of social support in the etiology and the prognosis of coronary heart disease: a systematic review and meta-analysis. *Psychosom Med* 2010;72:229–38.
16. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observation studies. *Heart* 2016;102:1009–16.
17. Pinquart M, Duberstein PR. Associations of social networks with cancer mortality: a meta-analysis. *Crit Rev Oncol Hematol* 2010;75:122–37.
18. Uchino BN. Social support and health: a review of physiological processes potentially underlying links to disease outcomes. *J Behav Med* 2006;29:377–87.
19. Barrett LF, Mesquita B, Ochsner KN, Gross JJ. The experience of emotion. *Annu Rev Psychol* 2007;58:373–403.
20. Mostofsky E, Penner EA, Mittleman MA. Outbursts of anger as a trigger of acute cardiovascular events: a systematic review and meta-analysis. *Eur Heart J* 2014;35:1404–10.
21. Strike PC, Steptoe A. Behavioral and emotional triggers of acute coronary syndromes: a systematic review and critique. *Psychosom Med* 2005;67:179–86.
22. Pelliccia F, Kaski JC, Crea F, Camici PG. Pathophysiology of Takotsubo syndrome. *Circulation* 2017;135:2426–41.
23. Wei J, Rooks C, Ramadan R, Shah AJ, Bremner JD, Quyyumi AA, Kutner M, Vaccarino V. Meta-analysis of mental stress-induced myocardial ischemia and subsequent cardiac events in patients with coronary artery disease. *Am J Cardiol* 2014;114:187–92.
24. Piira OP, Miettinen JA, Hautala AJ, Huikuri HV, Tulppo MP. Physiological responses to emotional excitement in healthy subjects and patients with coronary artery disease. *Auton Neurosci* 2013;177:280–5.
25. Smith TW, Williams PG, Segerstrom SC. Personality and physical health. In: Shave PR, Mikulincer M, Cooper ML, Larsen RJ, editors. *APA Handbook of Personality and Social Psychology: Vol. 4. Personality Processes and Individual Differences*. Washington, DC: American Psychological Association; 2015: 639–61.
26. Boehm JK, Kubzansky LD. The heart's content: the association between positive psychological well-being and cardiovascular health. *Psychol Bull* 2012; 138:655–91.
27. Pressman SD, Jenkins B, Moskowitz J. Positive affect and health: what do we know and where next should we go? *Annu Rev Psychol* 2019;70:627–50.
28. Gan Y, Gong Y, Tong X, Sun H, Cong Y, Dong X, Wang Y, Xu X, Yin X, Deng J, Li L, Cao S, Lu Z. Depression and the risk of coronary heart disease: a meta-analysis of prospective cohort studies. *BMC Psychiatry* 2014;14:371.
29. Meijer A, Conradi HJ, Bos EH, Anselmino M, Carney RM, Denollet J, Doyle F, Freedland KE, Grace SL, Hosseini SH, Lane DA, Pilote L, Parakh K, Rafanelli C, Sato H, Steeds RP, Welin C, De Jonge P. Adjusted prognostic association of depression following myocardial infarction with mortality and cardiovascular events: individual patient data meta-analysis. *Br J Psychiatry* 2013;203:90–102.
30. Richardson S, Shaffer JA, Falzon L, Krupka D, Davidson KW, Edmondson D. Meta-analysis of perceived stress and its association with incident coronary heart disease. *Am J Cardiol* 2012;110:1711–6.
31. Edmondson D, Kronish IM, Shaffer JA, Falzon L, Burg MM. Posttraumatic stress disorder and risk for coronary heart disease: a meta-analytic review. *Am Heart J* 2013;166:806–14.
32. Roest AM, Martens EJ, de Jonge P, Denollet J. Anxiety and risk of incident coronary heart disease: a meta-analysis. *J Am Coll Cardiol* 2010;56:38–46.
33. Celano CM, Millstein RA, Bedoya CA, Healey BC, Roest AM, Huffman JC. Association between anxiety and mortality in patients with coronary artery disease: a meta-analysis. *Am Heart J* 2015;170:1105–15.
34. Chida Y, Steptoe A. The association of anger and hostility with future coronary heart disease: a meta-analytic review of prospective evidence. *J Am Coll Cardiol* 2009;53:936–46.
35. Jia Y, Li F, Liu YF, Zhao JP, Leng MM, Chen L. Depression and cancer risk: a systematic review and meta-analysis. *Public Health* 2017;149:138–48.
36. Pinquart M, Duberstein PR. Depression and cancer mortality: a meta-analysis. *Psychol Med* 2010;40:1797–810.
37. Rotella F, Mannucci E. Depression as a risk factor for diabetes: a meta-analysis of longitudinal studies. *J Clin Psychiatry* 2013;74:31–7.
38. Cuijpers P, Vogelzangs N, Twisk J, Kleiboer A, Li J, Penninx BW. Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. *Am J Psychiatry* 2014;171:453–62.
39. Dockray S, Steptoe A. Positive affect and psychobiological processes. *Neurosci Biobehav Rev* 2010;35:69–75.
40. Strickhouser JE, Zell E, Krizan Z. Does personality predict health and well-being? A metasynthesis. *Health Psychol* 2017;36:797–810.
41. Beach SRH. The couple and family discord model of depression: updates and future directions. In: Agnew CR, South SC, editors. *Interpersonal Relationships and Health: Social and Clinical Psychological Mechanisms*. New York: Oxford Press; 2014:113–55.
42. Proulx C, Helms H, Buehler C. Marital quality and personal well-being: a meta-analysis. *J Marriage Fam* 2007;69:576–93.
43. Pankiewicz P, Majkovicz M, Krzykowski G. Anxiety disorders in intimate partners and the quality of their relationship. *J Affect Disord* 2012;140:176–80.
44. Lambert JE, Engh R, Hasbun A, Holzer J. Impact of posttraumatic stress disorder on the relationship quality and psychological distress of intimate partners: a meta-analytic review. *J Fam Psychol* 2012;26:729–37.
45. Cacioppo JT, Hawkey LC, Ernst JM, Burleson M, Berntson GG, Nouriani B, Spiegel D. Loneliness within a nomological net: an evolutionary perspective. *J Res Pers* 2006;40:1054–85.
46. Wang B, Dong X. The association between personality and loneliness: findings from a community-dwelling Chinese aging population. *Gerontol Geriatr Med* 2018;4:2333721418778181.
47. Malouff JM, Thorsteinsson EB, Schutte NS, Bhullar N, Rooke SE. The five-factor model of personality and relationship satisfaction of intimate partners: a meta-analysis. *J Res Pers* 2010;44:124–7.
48. Roberts BW, Kuncel NR, Shiner R, Caspi A, Goldberg LR. The power of personality: the comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspect Psychol Sci* 2007;2:313–45.
49. Baron KG, Smith TW, Butner J, Nealey-Moore J, Hawkins MW, Uchino BN. Hostility, anger, and marital adjustment: concurrent and prospective associations with psychosocial vulnerability. *J Behav Med* 2007;30:1–10.
50. Cundiff JM, Smith TW, Frandsen CA. Incremental validity of spouse ratings versus self-reports of personality as predictors of marital quality and behavior during marital conflict. *Psychol Assess* 2012;24:676–84.
51. Knobloch-Fedders LM, Caska-Wallace C, Smith TW, Renshaw K. Battling on the home front: posttraumatic stress disorder and conflict behavior among military couples. *Behav Ther* 2017;48:247–61.
52. Smith TW, Sanders JD, Alexander JF. What does the Cook and Medley Hostility Scale measure? Affect, behavior, and attributions in the marital context. *J Pers Soc Psychol* 1990;58:699–708.
53. Robbins ML, Mehl MR, Smith HL, Weihs KL. Linguistic indicators of patient, couple, and family adjustment following breast cancer. *Psychooncology* 2013; 22:1501–8.
54. Whisman MA, Beach SRH. Models for understanding interpersonal processes and relationships in anxiety disorders. In: Beck JG, editor. *Interpersonal Processes in the Anxiety Disorders: Implications for Understanding Psychopathology and Treatment*. Washington, DC: American Psychological Association; 2010:9–35.
55. Hames JL, Hagan CR, Joiner TE. Interpersonal processes in depression. *Annu Rev Clin Psychol* 2013;9:355–77.
56. O'Meara MS, South SC. Big five personality domains and relationship satisfaction: direct effects and correlated change over time. *J Pers* 2019. doi: 10.1111/jopy.12468.
57. Whisman MA. Psychopathology and couple and family functioning. In: Fiese B, Celano M, Deater-Deckard K, Jouriles E, Whisman M, editors. *APA Handbook of Contemporary Family Psychology: Vol. 2: Applications and Broad Impact of Family Psychology*. Washington, DC: American Psychological Association; 2019:3–20.
58. Assad KK, Donnellan MB, Conger RD. Optimism: an enduring resource for romantic relationships. *J Pers Soc Psychol* 2007;93:285–97.
59. Smith TW, Ruiz JM, Cundiff JM, Baron KG, Nealey-Moore JB. Optimism and pessimism in social context: an interpersonal perspective on resilience and risk. *J Res Pers* 2013;47:553–62.
60. Heller D, Watson D, Lilies P. The role of person vs. situation in life satisfaction: a critical examination. *Psychol Bull* 2004;130:574–600.
61. Ramsey MA, Gentzler AL. An upward spiral: bidirectional associations between positive affect and positive aspects of close relationships across the lifespan. *Dev Rev* 2015;36:58–104.

62. Darwin C. *The Expression of Emotions in Man and Animals*. Chicago, IL: University of Chicago Press; 1872/1965.
63. Niedenthal PM, Brauer M. Social functionality of human emotion. *Annu Rev Psychol* 2012;63:259–85.
64. Schoebi D, Randall AK. Emotional dynamics in intimate relationships. *Emot Rev* 2015;7:342–8.
65. Liu H, Xie QW, Lou VWQ. Everyday social interactions and intra-individual variability in affect: a systematic review and meta-analysis of ecological momentary assessment studies. *Motiv Emot* 2018.
66. Pemberton R, Fuller Tyszkiewicz MD. Factors contributing to depressive mood states in everyday life: a systematic review. *J Affect Disord* 2016;200:103–10.
67. Smith TW, Baron CE, Grove JL. Personality, emotional adjustment, and cardiovascular risk: marriage as a mechanism. *J Pers* 2014;82:502–14.
68. Knutson B. Facial expression of emotion influence interpersonal trait inferences. *J Nonverbal Behav* 1996;20:165–82.
69. Aan het Rot M, Enea V, Dafinoiu I, Iancu S, Taftă SA, Bărbuşel M. Behavioural responses to facial and postural expressions of emotion: an interpersonal circumplex approach. *Br J Psychol* 2017;108:797–811.
70. Smith TW, Traupman EK, Uchino BN, Berg CA. Interpersonal circumplex descriptions of psychosocial risk factors for physical illness: application to hostility, neuroticism, and marital adjustment. *J Pers* 2010;78:1011–36.
71. Haase CM, Holley SR, Bloch L, Verstaen A, Levenson RW. Interpersonal emotional behaviors and physical health: a 20-year longitudinal study of long-term married couples. *Emotion* 2016;16:965–77.
72. Smith TW, Uchino BN, Florsheim P, Berg CA, Butner J, Hawkins M, Henry NJ, Beveridge RM, Pearce G, Hopkins PN, Yoon HC. Affiliation and control during marital disagreement, history of divorce, and asymptomatic coronary artery calcification in older couples. *Psychosom Med* 2011;73:350–7.
73. Butler EA. Interpersonal affect dynamics: it takes two (and time) to tango. *Emot Rev* 2015;7:336–41.
74. Butler EA. Emotions are temporal interpersonal systems. *Curr Opin Psychol* 2017;17:129–34.
75. Thorson KR, West TV, Mendes WB. Measuring physiological influence in dyads: a guide to designing, implementing, and analyzing dyadic physiological studies. *Psychol Methods* 2018;23:595–616.
76. Dunkel Schetter C. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol* 2011;62:531–58.
77. Accortt EE, Cheadle ACD, Dunkel Schetter C. Prenatal depression and adverse birth outcomes: an updated systematic review. *Matern Child Health J* 2015;19:1306–37.
78. Westdahl C, Milan S, Magriples U, Kershaw TS, Rising SS, Ickovics JR. Social support and social conflict as predictors of prenatal depression. *Obstet Gynecol* 2007;110:134–40.
79. Sutherland S, Brunwasser SM. Sex differences in vulnerability to prenatal stress: a review of recent literature. *Curr Psychiatry Rep* 2018;20:102.
80. Bowlby J. *Attachment and Loss*. Vol. 1. Attachment. 2nd ed. New York: Basic Books; 1982.
81. Cooke JE, Kochendorfer LB, Stuart-Parrigon KL, Koehn AJ, Kerns KA. Parent-child attachment and children's experience and regulation of emotion: a meta-analytic review. *Emotion* 2019;19:1003–26.
82. Groh AM, Pasco Fearon R, Van IJzendoorn MH, Bakermans-Kranenburg MJ, Roisman GI. Attachment in the early life course: meta-analytic evidence for its role in socioemotional development. *Child Dev Perspect* 2017;11:70–6.
83. Gorrese A, Ruggieri R. Peer attachment: a meta-analytic review of gender and age differences and associations with parent attachment. *J Youth Adolescence* 2012;41:650–72.
84. Gorrese A. Peer attachment and youth internalizing problems: a meta-analysis. *Child Youth Care Forum* 2016;45:177–204.
85. van Aken MAG, Asendorpf JB. Personality and peer relationships. In: Bukowski WM, Laursen B, Rubin KH, editors. *Handbook of Peer Interactions, Relationships, and Groups*. 2nd ed. New York: Guilford Press; 2018:159–76.
86. Prinstein MJ, Rancourt D, Adelman CB, Ahlich E, Smith J, Guerry JD. Peer status and psychopathology. In: Bukowski WM, Laursen B, Rubin KH, editors. *Handbook of Peer Interactions, Relationships, and Groups*. 2nd ed. New York: Guilford Press; 2018:617–36.
87. Pinquart M, Feussner C, Ahnert L. Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attach Hum Dev* 2013;15:189–218.
88. Winterheld HA. Calibrating use of emotion regulation strategies to the relationship context: an attachment perspective. *J Pers* 2016;84:369–80.
89. Arriaga XB, Kamashiro M, Simpson JA. Revising working models across time: relationship situations that enhance attachment security. *Pers Soc Psychol Rev* 2018;22:71–96.
90. Verhage ML, Schueugel C, Madigan S, Fearon RM, Oosterman M, Cassibba R, Bakermans-Kranenburg MJ, van IJzendoorn MH. Narrowing the transmission gap: a synthesis of three decades of research on intergenerational transmission of attachment. *Psychol Bull* 2016;142:337–66.
91. Kendler KS, Baker JH. Genetic influences on measures of the environment. *Psychol Med* 2007;37:615–26.
92. Shewark EA, Neiderhiser JM. How family relationships shape children's extrafamilial relationships: gene-environment interplay. In: Fies BH, Celano M, Deater-Deckard K, Jouriles EN, Whisman MA, editors. *APA Handbook of Contemporary Family Psychology: Foundations, Methods, and Contemporary Issues Across the Lifespan*. Washington, DC: American Psychological Association; 2019:205–22.
93. Pinquart M. Associations of parenting dimensions and styles with externalizing problems of children and adolescents: an updated meta-analysis. *Dev Psychol* 2017;53:873–932.
94. Pinquart M. Associations of parenting dimensions and styles with internalizing symptoms in children and adolescents: a meta-analysis. *Marriage Fam Rev* 2017;53:613–40.
95. Klahr AM, Burt SA. Elucidating the etiology of individual differences in parenting: a meta-analysis of behavioral genetic research. *Psychol Bull* 2014;140:544–86.
96. Brosschot JF, Verkuil B, Thayer JF. Exposed to events that never happen: generalized unsafety, the default stress response, and prolonged autonomic activity. *Neurosci Biobehav Rev* 2017;74:287–96.
97. Hornstein EA, Eisenberger NI. A social safety net: developing a model of social-support figures as prepared safety stimuli. *Curr Dir Psychol Sci* 2018;27:25–31.
98. Smith JD, Woodhouse SS, Clark CAC, Skowron EA. Attachment status and mother-preschooler parasympathetic response to the strange situation. *Biol Psychol* 2016;114:39–48.
99. Groh AM, Narayan AJ. Infant attachment insecurity and baseline physiological activity and physiological reactivity to interpersonal stress: a meta-analytic review. *Child Dev* 2019;90:679–93.
100. Brody GH, Yu T, Chen E, Beach SR, Miller GE. Family-centered prevention ameliorates the longitudinal association between risky family processes and epigenetic aging. *J Child Psychol Psychiatry* 2016;57:566–74.
101. Pratt M, Zeev-Wolf M, Goldstein A, Feldman R. Exposure to early and persistent maternal depression impairs the neural basis of attachment in preadolescence. *Prog Neuropsychopharmacol Biol Psychiatry* 2019;93:21–30.
102. Davies PT, Martin MJ, Cummings EM. Interparental conflict and children's social problems: Insecurity and friendship affiliation as cascading mediators. *Dev Psychol* 2018;54:83–97.
103. Davies PT, Martin MJ, Coe JL, Cummings EM. Transactional cascades of destructive interparental conflict, children's emotional insecurity, and psychological problems across childhood and adolescence. *Dev Psychopathol* 2016;28:653–71.
104. Troxel WM, Matthews KA. What are the costs of marital conflict and dissolution to children's physical health? *Clin Child Fam Psychol Rev* 2004;7:29–57.
105. Appleton AA, Holdsworth E, Ryan M, Tracy M. Measuring childhood adversity in lifecourse cardiovascular research: a systematic review. *Psychosom Med* 2017;79:434–40.
106. Jakubowski KP, Cundiff JM, Matthews KA. Cumulative childhood adversity and adult cardiometabolic disease: a meta-analysis. *Health Psychol* 2018;37:701–15.
107. Suglia SF, Koenen KC, Boynton-Jarrett R, Chan PS, Clark CJ, Danese A, Faith MS, Goldstein BI, Hayman LL, Isasi CR, Pratt CA, Slopen N, Sumner JA, Turer A, Turer CB, Zachariah JP, American Heart Association Council on Epidemiology and Prevention; Council on Cardiovascular Disease in the Young; Council on Functional Genomics and Translational Biology; Council on Cardiovascular and Stroke Nursing; and Council on Quality of Care and Outcomes Research. Childhood and adolescent adversity and cardiometabolic outcomes: a scientific statement from the American Heart Association. *Circulation* 2018;137:e15–28.
108. Stapleton LT, Bradbury TN. Marital interaction prior to parenthood predicts parent-child interaction 9 years later. *J Fam Psychol* 2012;26:479–87.
109. Krishnakumar A, Buehler C. Interparental conflict and parenting behaviors: a meta-analytic review. *Fam Relat* 2000;49:25–44.
110. Picci G, Griffin AM, Reiss D, Neiderhiser JM. Parent-adolescent conflict and young adult romantic relationship negativity: genetic and environmental influences. *J Fam Psychol* 2019;33:34–43.
111. Bush NR, Lane RD, McLaughlin KA. Mechanisms underlying the association between early-life adversity and physical health: charting a course for the future. *Psychosom Med* 2016;78:1114–9.
112. Winning A, Glymour MM, McCormick MC, Gilsanz P, Kubzansky KD. Childhood psychological distress as a mediator in the relationship between early-life social disadvantage and adult cardiometabolic risk: evidence from the 1958 British Birth Cohort. *Psychosom Med* 2016;78:1019–30.
113. John-Henderson NA, Kamarck TW, Muldoon MF, Manuck SB. Early life conflict, social interactions, and carotid artery intima-media thickness in adulthood. *Psychosom Med* 2016;78:319–26.
114. Callaghan BL, Tottenham N. The stress acceleration hypothesis: effects of early-life adversity on emotion circuits and behavior. *Curr Opin Behav Sci* 2016;7:76–81.
115. Champagne FA. Epigenetic legacy of parental experiences: dynamic and interactive pathways to inheritance. *Dev Psychopathol* 2016;28(4 Pt 2):1219–28.
116. Tost H, Champagne FA, Meyer-Lindenberg A. Environmental influence in the brain, human welfare and mental health. *Nat Neurosci* 2015;18:4121–31.
117. Chen E, Brody GH, Miller GE. Childhood close family relationships and health. *Am Psychol* 2017;72:555–66.
118. Johnson AM, Hawes DJ, Eisenberg N, Kohlhoff J, Dudeney J. Emotion socialization and child conduct problems: a comprehensive review and meta-analysis. *Clin Psychol Rev* 2017;54:65–80.

119. Repetti RL, Taylor SE, Seeman TE. Risky families: family social environments and the mental and physical health of offspring. *Psychol Bull* 2002;128:330–6.
120. Lueken LJ, Roubinov DS, Tanaka R. Childhood family environment, social competence, and health across the lifespan. *J Soc Pers Relat* 2013;30:171–8.
121. Repetti RL, Saxbe DE. The influence of chronic family stressors on adult health. In: Fiese BH, Celano M, Deater-Deckard K, Jouriles EN, Whisman MA, editors. *APA Handbook of Contemporary Family Psychology: Vol. 2. Applications and Broad Impact of Family Psychology*. Washington, DC: American Psychological Association; 2019:121–36.
122. Barton AW, Beach SRH, Wells AC, Ingels JB, Corso PS, Sperr MC, Anderson TN, Brody GH. The Protecting Strong African American Families Program: a randomized controlled trial with rural African American couples. *Prev Sci* 2018;19:904–13.
123. McCart MR, Sheidow AJ. Evidence-based psychosocial treatments for adolescents with disruptive behavior. *J Clin Child Adolesc Psychol* 2016;45:529–63.
124. Rook KS, Charles ST. Close social ties and health in later life: strengths and vulnerabilities. *Am Psychol* 2017;72:567–77.
125. Reed AE, Chan L, Mikels JA. Meta-analysis of the age-related positivity effect: age differences in preferences for positive over negative information. *Psychol Aging* 2014;29:1–15.
126. Lwi SJ, Haase CM, Shiota MN, Newton SL, Levenson RW. Responding to the emotions of others: age differences in facial expressions and age-specific associations with relational connectedness. *Emotion* 2019. doi:10.1037/emo0000534.
127. Verstaen A, Haase CM, Lwi S, Levenson RW. Age-related changes in emotional behavior: evidence from a 13-year longitudinal study of long-term married couples. *Emotion* 2018. doi:10.1037/emo0000551.
128. Charles ST, Carstensen LL. Social and emotional aging. *Annu Rev Psychol* 2009;61:383–409.
129. Smith TW, Baron CE. Marital discord in the later years. In: Bookwala J, editor. *Couple Relationships in Mid and Later Life: Their Nature, Complexity, and Role in Health and Illness*. Washington, DC: APA Books; 2016:37–56.
130. Smith TW, Berg CA, Florsheim P, Uchino BN, Pearce G, Hawkins M, Henry N, Beveridge RM, Skinner M, Olsen-Cerny C. Conflict and collaboration in middle-aged and older couples: I. Age differences in agency and communion during marital interaction. *Psychol Aging* 2009;24:259–73.
131. Bowlby J. *Attachment and Loss*. Vol. 3. Loss, Sadness, and Depression. 2nd ed. New York: Basic Books; 1982.
132. O'Connor M-F. Grief: a brief history of research on how body, mind, and brain adapt. *Psychosom Med* 2019;81:731–8.
133. Bourassa KJ, Memel M, Woolverton C, Sbarra DA. A dyadic approach to health, cognition, and quality of life in again adults. *Psychol Aging* 2015;30:449–61.
134. Bourassa K, Knowles LM, Sbarra DA, O'Connor MF. Absent but not gone: interdependence in couples' quality of life persists after a partner's death. *Psychol Sci* 2016;27:270–81.
135. Kuppens P, Tuerlinckx F, Russell JA, Barrett LF. The relation between valence and arousal in subjective experience. *Psychol Bull* 2013;139:917–40.
136. Watson D, Wiese D, Vaidya J, Tellegen A. The two general activation systems of affect: structural findings, evolutionary considerations, and psychobiological evidence. *J Pers Soc Psychol* 1999;76:820–38.
137. Woodin EM. A two-dimensional approach to relationship conflict: meta-analytic findings. *J Fam Psychol* 2011;25:325–35.
138. Fincham FD, Rogge R. Understanding relationship quality: theoretical challenges and new tools for assessment. *J Fam Theory Rev* 2010;2:227–42.
139. Pietromonaco PR, Collins NL. Interpersonal mechanisms linking close relationships to health. *Am Psychol* 2017;72:531–42.
140. Slatcher RB, Selcuk E. A social psychological perspective on links between close relationships and health. *Curr Dir Psychol Sci* 2017;26:16–21.
141. Flowers BJ, Laurenceau J-P, Penfield RD, Cohen LM, Lang SF, Owenz MB, Pasipandoya E. Enhancing relationship quality measurement: the development of the Relationship Flourishing Scale. *J Fam Psychol* 2016;30:997–1007.
142. Zayas V, Surenkok G, Pandey G. Implicit ambivalence of significant others: significant others trigger positive and negative evaluations. *Soc Pers Psychol Compass* 2017;11:1–16.
143. Rivers AS, Sanford K. Negative relationship behavior is more important than positive: correlates of outcomes during stressful life events. *J Fam Psychol* 2018;32:375–84.
144. Uchino BN, Smith TW, Berg CA. Spousal relationship quality and cardiovascular risk: dyadic perceptions of relationship ambivalence are associated with coronary artery calcification. *Psychol Sci* 2014;25:1037–42.
145. Slatcher RB, Schoebi D. Protective processes underlying the links between marital quality and physical health. *Curr Opin Psychol* 2017;13:148–52.
146. Zaki J. Empathy: a motivated account. *Psychol Bull* 2014;140:1608–47.
147. Lange J, Crusius J. The tango of two deadly sins: the social-functional relation of envy and pride. *J Pers Soc Psychol* 2015;109:453–72.
148. Chung M, Harris CR. Jealousy as a specific emotion: the dynamic functional model. *Emot Rev* 2018;10:272–87.
149. Smith RH, van Dijk WW. Schadenfreude and gluckschmerz. *Emot Rev* 2018;10:293–304.
150. O'Connor MF, Sussman TJ. Developing the Yearning in Situations of Loss Scale: convergent and discriminant validity for bereavement, romantic breakup, and homesickness. *Death Stud* 2014;38:450–8.
151. Allen MS, Walter EE. Linking big five personality traits to sexuality and sexual health: a meta-analytic review. *Psychol Bull* 2018;144:1081–110.
152. Whisman MA. Discovery of a partner affair and major depressive episodes in a probability sample of married or cohabiting adults. *Fam Process* 2016;55:713–23.
153. Diamond LM, Huebner DM. Is good sex good for you? Rethinking sexuality and health. *Soc Pers Psychol Compass* 2012;6:1:54–69.
154. Gross JJ. Emotion regulation: current status and future prospects. *Psychol Inq* 2015;26:1–26.
155. De Steno D, Gross JJ, Kubzansky L. Affective science and health: the importance of emotion and emotion regulation. *Health Psychol* 2013;32:474–86.
156. Dryman MT, Heimberg RG. Emotion regulation in social anxiety and depression: a systematic review of expressive suppression and cognitive reappraisal. *Clin Psychol Rev* 2018;65:17–42.
157. Hofmann SG. Interpersonal emotion regulation model of mood and anxiety disorders. *Cognit Ther Res* 2014;38:483–92.
158. Sloan E, Hall K, Moulding R, Bryce S, Mildred H, Staiger PK. Emotion regulation as a transdiagnostic treatment construct across anxiety, depression, substance, eating, and borderline personality disorders. *Clin Psychol Rev* 2017;57:141–63.
159. Wilkowski BM, Robinson MD. The anatomy of anger: an integrative cognitive model of trait anger and reactive aggression. *J Pers* 2010;78:9–38.
160. Carl JR, Soskin DP, Kerns C, Barlow DH. Positive emotion regulation in emotional disorders: a theoretical review. *Clin Psychol Rev* 2013;33:343–60.
161. Reeck C, Ames D, Ochsner KN. The social regulation of emotion: an integrative, cross-disciplinary model. *Trends Cog Sci* 2016;20:47–63.
162. Williams WC, Morelli SA, Ong DC, Zaki J. Interpersonal emotion regulation: implications for affiliation, perceived support, relationships, and well-being. *J Pers Soc Psychol* 2018;115:224–54.
163. Zaki J, Williams WC. Interpersonal emotion regulation. *Emotion* 2013;13:803–10.
164. Levenson RW, Haase CM, Bloch L, Holley SR, Seider JJ. Emotion regulation in couples. In: Gross JJ, editor. *Handbook of Emotion Regulation*. 2nd ed. New York: Guilford Press; 2007:267–83.
165. Bloch L, Haase CM, Levenson RW. Emotion regulation predicts marital satisfaction: more than a wives' tale. *Emotion* 2014;14:130–44.
166. Dore BP, Morris RR, Burr DA, Piccard RW, Ochsner KN. Helping others regulate emotion predicts increased regulation of one's own emotion and decreased symptoms of depression. *Pers Soc Psychol Bull* 2017;43:729–39.
167. Hofmann SG, Carpenter JK, Curtiss J. Interpersonal Emotion Regulation Questionnaire (IERQ): scale development and psychometric characteristics. *Cognit Ther Res* 2016;40:341–56.
168. Marroquin B, Nolen-Hoeksema S. Emotion regulation and depressive symptoms: close relationships as a social context and influence. *J Pers Soc Psychol* 2015;109:836–55.
169. Klein SR, Renshaw KD, Curby TW. Emotion regulation and perceptions of hostile and constructive criticism in romantic relationships. *Behav Ther* 2016;47:143–54.
170. Mund M, Mitte K. The costs of repression: a meta-analysis on the relation between repressive coping and somatic diseases. *Health Psychol* 2012;31:640–9.
171. Appleton AA, Loucks EB, Buka SL, Kubzansky LD. Divergent associations of antecedent- and response-focused emotion regulation strategies with midlife cardiovascular disease risk. *Ann Behav Med* 2014;48:246–55.
172. Butler EA, Egloff B, Wilhelm FH, Smith NC, Erickson EA, Gross JJ. The social consequences of emotional suppression. *Emotion* 2003;3:48–57.
173. Gross JJ, John OP. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *J Pers Soc Psychol* 2003;85:348–62.
174. Srivastava S, Tamir M, McGonigal KM, John OP, Gross JJ. The social costs of emotional suppression: a prospective study of the transition to college. *J Pers Soc Psychol* 2009;96:883–97.
175. Impett EA, Kogan A, English T, John OP, Oveis C, Gordon AM, Keltner D. Suppression sours sacrifice: emotional and relational costs of suppressing emotions in romantic relationships. *Pers Soc Psychol Bull* 2012;38:707–20.
176. Velotti P, Balzarotti S, Tagliabue S, English T, Zavattini GC, Gross JJ. Emotional suppression in early marriage: actor, partner, and similarity effects on marital quality. *J Soc Pers Relat* 2016;33:277–302.
177. Parkinson B, Simons G, Niven K. Sharing concerns: interpersonal worry regulation in romantic couples. *Emotion* 2016;16:449–58.
178. Ottaviani C, Thayer JF, Verkuil B, Lonigro A, Medea B, Couyoumdjian A, Brosschot JF. Physiological concomitants of perseverative cognition: a systematic review and meta-analysis. *Psychol Bull* 2016;142:231–59.
179. Bourassa KJ, Sbarra DA, Ruiz JM, Kaciroti N, Harburg E. Mismatch in spouses' anger-coping response styles and risk of early mortality: a 32-year follow-up study. *Psychosom Med* 2019;81:26–33.
180. Jordan KD, Smith TW. The interpersonal domain of alexithymia. *Pers Individ Diff* 2017;110:65–9.
181. Foran HM, O'Leary KD. The role of relationships in understanding the alexithymia-depression link. *Eur J Pers* 2013;27:470–80.
182. Frye-Cox NE, Hesse CR. Alexithymia and marital quality: the mediating roles of loneliness and intimate communication. *J Fam Psychol* 2013;27:203–11.

183. Christenfeld NJ, Sloan RP, Carroll D, Greenland S. Risk factors, confounding, and the illusion of statistical control. *Psychosom Med* 2004;66:868–75.
184. Lynnam DR, Hoyle RH, Newman JP. The perils of partialing: cautionary tales from aggression and psychopathy. *Assessment* 2006;12:328–41.
185. Smith TW. Relationships matter: progress and challenges in research on the health effects of intimate relationships. *Psychosom Med* 2019;81:2–6.
186. Stanton SCE, Selcuk E, Farrell AK, Slatcher RB, Ong AD. Perceived partner responsiveness, daily negative affect reactivity, and all-cause mortality: a 20-year longitudinal study. *Psychosom Med* 2019;81:7–15.
187. Fincham FD, Beach SRH. Of memes and marriage: toward a positive relationship science. *J Fam Theory Rev* 2010;2:4–24.
188. Snyder DK, Heyman RE, Haynes SN. Evidence-based approaches to assessing couple distress. *Psychol Assess* 2005;17:288–307.
189. Loughheed JP, Hollenstein T. Methodological approaches to studying interpersonal emotion dynamics. In: Randall AK, Schoebi D, editors. *Interpersonal Emotion Dynamics in Close Relationships*. New York: Cambridge University Press; 2018:75–92.
190. Smith TW, Uchino BN, Berg CA, Florsheim P, Pearce G, Hawkins M, Henry NJ, Beveridge RM, Skinner MA, Hopkins PN, Yoon HC. Associations of self-reports versus spouse ratings of negative affectivity, dominance, and affiliation with coronary artery disease: where should we look and who should we ask when studying personality and health? *Health Psychol* 2008;27:676–84.
191. Ruiz JM, Matthews KA, Scheier MF, Schulz R. Does who you marry matter for your health? Influence of patients' and spouses' personality on their partners' psychological well-being following coronary artery bypass surgery. *J Pers Soc Psychol* 2006;91:255–67.
192. Kenny D, Kashy D, Cook W. *Dyadic Data Analysis*. New York: Guilford Press; 2006.
193. Smith TW, Uchino BN, Bosch JA, Kent RG. Trait hostility is associated with systemic inflammation in married couples: an actor-partner analysis. *Biol Psychol* 2014;102:51–3.
194. Inagaki TK, Orehek E. On the benefits of giving social support: when, why, and how support providers gain by caring for others. *Curr Dir Psychol Sci* 2017;26:109–13.
195. Moieni M, Irwin MR, Byrne KE, Haltom B, Jevtic I, Meyere ML, Breen EC, Cole SW, Eisenberger NI. Exploring the role of gratitude and support-giving on inflammatory outcomes. *Emotion* 2018.
196. Timmons AC, Margolin G, Saxbe DE. Physiological linkage in couples and its implications for individual and interpersonal functioning: a literature review. *J Fam Psychol* 2015;29:720–31.
197. Randall AK, Schoebi D. Lean on me: susceptibility to partner affect attenuates psychological distress over a 12-month period. *Emotion* 2015;15:201–10.
198. Reed RG, Barnard K, Butler EA. Distinguishing emotional coregulation from codysregulation: an investigation of emotional dynamics and body weight in romantic couples. *Emotion* 2015;15:45–60.
199. Randall AK, Schoebi D, editors. *Interpersonal Emotion Dynamics in Close Relationships*. New York: Cambridge University Press; 2018.
200. Heron KE, Everhart RS, Smyth JM. Ecological momentary assessment and related intensive longitudinal designs in family and couples research. In: Fiese BH, Celano M, Deater-Deckard K, Jouriles EN, Whisman MA, editors. *APA Handbook of Contemporary Family Psychology: Foundations, Methods, and Contemporary Issues Across the Lifespan (Vol. 1)*. Washington, DC: American Psychological Association; 369–85.
201. Edmondson D, Shaffer J, Chaplin W, Burg M, Stone A, Schwartz J. Trait anxiety and trait anger measured by ecological momentary assessment and their correspondence with traditional trait questionnaires. *J Res Pers* 2013;47:843–52.
202. Joseph NT, Kamarck TW, Muldoon MF, Manuck SB. Daily marital interaction quality and carotid artery intima medial thickness in healthy middle-aged adults. *Psychosom Med* 2014;76:347–54.
203. Mehl MR. The Electronically Activated Recorder (EAR): a method for the naturalistic observation of daily social behavior. *Curr Dir Psychol Sci* 2017;26:184–90.
204. Robbins ML, Lopez AM, Weihs KL, Mehl MR. Cancer conversations in context: a naturalistic observation of couples coping with breast cancer. *J Fam Psychol* 2014;28:380–90.
205. Hasselmo K, Mehl MR, Tackman AM, Carey AL, Wertheimer AM, Stowe RP, Sbarra DA. Objectively measured social integration is associated with an immune risk phenotype following marital separation. *Ann Behav Med* 2018;52:130–45.
206. Sanchez-Roige S, Gray JC, MacKillop J, Chen CH, Palmer AA. The genetics of human personality. *Genes Brain Behav* 2018;17:e12439.
207. McRae K, Rhee SH, Gatt JM, Godinez D, Williams LM, Gross JJ. Genetic and environmental influences on emotion regulation: a twin study of cognitive reappraisal and expressive suppression. *Emotion* 2017;17:772–7.
208. Hawn SE, Overstreet C, Stewart KE, Amstadter AB. Recent advances in the genetics of emotion regulation: a review. *Curr Opin Psychol* 2015;3:108–16.
209. Whisman MA, South SC. Gene-environment interplay in the context of romantic relationships. *Curr Opin Psychol* 2017;13:136–41.
210. South SC, Hamdi NR, Krueger RF. Biometric modeling of gene-environment interplay: the intersection of theory and method and applications for social inequality. *J Pers* 2017;85:22–37.
211. Beckes L, Coan JA. Relationship neuroscience. In: Mikulincer M, Shaver PR, Simpson JA, Dovidio JF, editors. *APA Handbook of Personality and Social Psychology: Vol. 3: Interpersonal Relations*. Washington, DC: American Psychological Association; 2015:119–49.
212. Gilam G, Hendler T. With love, from me to you: embedding social interactions in affective neuroscience. *Neurosci Biobehav Rev* 2016;68:590–601.
213. Lieberman MD. Social cognitive neuroscience: a review of core processes. *Annu Rev Psychol* 2007;259–89.
214. Tomlinson JM, Aron A. Relationship neuroscience: where we are and where we might be going. In: Gillath O, Adams G, Kunkel A, editors. *Relationship Science: Integrating Evolutionary, Neuroscience, and Sociocultural Approaches*. Washington, DC: American Psychological Association; 2012:13–26.
215. Coan JA. Towards a neuroscience of attachment. In: Cassidy J, Shaver PR, editors. *Handbook of Attachment: Theory, Research, and Clinical Applications*. 3rd ed. New York: Guilford Press; 2016.
216. Eisenberger NI. Social pain and the brain: controversies, questions, and where we go from here. *Annu Rev Psychol* 2015;601–29.
217. Arizmendi B, Kaszniak AW, O'Connor MF. Disrupted prefrontal activity during emotion processing in complicated grief: an fMRI investigation. *Neuroimage* 2016;124:968–76.
218. Eisenberger NI. An empirical review of the neural underpinnings of receiving and giving social support: implications for health. *Psychosom Med* 2013;75:545–56.
219. Martin RE, Ochsner KN. The neuroscience of emotion regulation development: implications for education. *Curr Opin Behav Sci* 2016;10:142–8.
220. Kiecolt-Glaser JK, Wilson SJ. Lovesick: how couples' relationships influence health. *Annu Rev Clin Psychol* 2017;13:421–43.
221. Williams PW, Smith TW, Gunn HE, Uchino BN. Personality and stress: individual differences in exposure, reactivity, recovery, and restoration. In: Contrada R, Baum A, editors. *Handbook of Stress Science: Biology, Psychology, and Health*. New York: Springer; 2011:231–45.
222. Troxel WM. It's more than sex: exploring the dyadic nature of sleep and implications for health. *Psychosom Med* 2010;72:578–86.
223. Hall MH, Brindle RC, Buysee DJ. Sleep and cardiovascular disease: emerging opportunities for psychology. *Am Psychol* 2018;73:994–1006.
224. Kivimäki M, Nyberg ST, Batty GD, Fransson EI, Heikkilä K, Alfredsson L, Bjorner JB, Borritz M, Burr H, Casini A, Clays E, De Bacquer D, Dragano N, Ferrie JE, Geuskens GA, Goldberg M, Hamer M, Hooftman WE, Houtman IL, Joensuu M, Jokela M, Kittel F, Knutsson A, Koskenvuo M, Koskinen A, Kouvonen A, Kumari M, Madsen IE, Marmot MG, Nielsen ML, Nordin M, Oksanen T, Pentti J, Rugulies R, Salo P, Siegrist J, Singh-Manoux A, Suominen SB, Väänänen A, Vahtera J, Virtanen M, Westerholm JP, Westerlund H, Zins M, Steptoe A, Theorell T, IPD-Work Consortium. Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data. *Lancet* 2013;380:1491–7.
225. Schilpzand P, De Pater IE, Erez A. Workplace incivility: a review of the literature and agenda for future research. *J Organ Behav* 2016;37:S57–88.
226. Lesener T, Gusy B, Wolter C. The job demands-resources model: a meta-analytic review of longitudinal studies. *Work Stress* 2018. doi:10.1080/02678373.2018.1529065.
227. Sears MS, Repetti RL, Robles TF, Reynolds BM. I just want to be left alone: daily overload and marital behavior. *J Fam Psychol* 2016;30:569–79.
228. Selkie EM, Fales JL, Moreno MA. Cyberbullying prevalence among US middle and high school-aged adolescents: a systematic review and quality assessment. *J Adolesc Health* 2016;58:125–33.
229. Field T. Cyberbullying: a narrative review. *J Addict Ther Res* 2018;2:10–27.
230. Campos B, Kim HS. Incorporating the cultural diversity of family and close relationships into the study of health. *Am Psychol* 2017;72:543–54.
231. Matsumoto D, Hwang HS. Culture and emotion: the integration of biological and cultural contributions. *J Cross-Cultural Psychol* 2012;43:91–118.
232. Butler EA, Lee TL, Gross JJ. Does expressing your emotions raise or lower your blood pressure? The answer depends on cultural context. *J Cross-Cultural Psychol* 2009;40:510–7.
233. Shao B, Doucet L, Caruso DR. Universality versus cultural specificity of three emotion domains: some evidence based on the cascading model of emotional intelligence. *J Cross-Cultural Psychol* 2015;46:229–51.
234. Butler EA, Lee TL, Gross JJ. Emotional regulation and culture: are the social consequences of emotion suppression culture-specific? *Emotion* 2007;7:30–48.
235. Park J, Flores AJ, Aschbacher K, Mendes WB. When anger expression might be beneficial for African Americans: the moderating role of chronic discrimination. *Cult Divers Ethnic Minor Psychol* 2018;24:303–18.
236. Adler NE. Health disparities through a psychological lens. *Am Psychol* 2009;64:663–73.
237. Cundiff JM, Smith TW. Social status, everyday interpersonal processes, and coronary heart disease: a social psychophysiological view. *Soc Pers Psychol Compass* 2017;11:e12310.
238. Lewis TT, Van Dyke ME. Discrimination and the health of African Americans: the potential importance of intersectionalities. *Curr Dir Psychol Sci* 2018;17:6–82.
239. Mendes WB, Muscatell KA. Affective reactions as mediators of the relationship between stigma and health. In: Major B, Dovidio JF, Link BG, editors. *The Oxford Handbook of Stigma, Discrimination, and Health*. Oxford University Press: 265–83.

240. Ditzen B, Hahlweg K, Fehm-Wolfsdorf G, Baucom D. Assisting couples to develop healthy relationships: effects of couples relationship education on cortisol. *Psychoneuroendocrinology* 2011;36:597–607.
241. Ewart CK, Taylor CB, Kraemer HC, Agras SW. Reducing blood pressure reactivity during interpersonal conflict: effects of marital communication training. *Behav Ther* 1894;15:473–84.
242. Holt-Lunstad J, Birmingham WA, Light KC. Influence of a “warm touch” support enhancement intervention among married couples on ambulatory blood pressure, oxytocin, alpha amylase, and cortisol. *Psychosom Med* 2008;70:976–85.
243. Carr A. The evidence base for couple therapy, family therapy and systemic interventions for adult-focused problems. *J Fam Ther* 2014;36:158–94.
244. Fisher EB, Fitzgibbon ML, Glasgow RE, Haire-Joshu D, Hayman LL, Kaplan RM, Nanney MS, Okene JK. Behavior matters. *Am J Prev Med* 2011;40:e15–30.
245. Roberson PNE, Shorter RL, Woods S, Priest J. How health behaviors link romantic relationship dysfunction and physical health across 20 years for middle-aged and older adults. *Soc Sci Med* 2018;201:18–26.
246. Arden-Close E, McGrath N. Health behaviour change interventions for couples: a systematic review. *Br J Health Psychol* 2017;22:215–37.
247. Tankha H, Kerns RD, Cano A. Treating adults with chronic pain and their families: application of an enhanced cognitive-behavioral transactional model. In: Turk DC, Gatchel RJ, editors. *Psychological Approaches to Pain Management: A Practitioner’s Handbook*. 3rd ed. New York: Guilford Press:230–49.
248. Fisher L, Weihs KL. Can addressing family relationships improve outcomes in chronic disease? *J Fam Pract* 2000;49:561–6.
249. Martire LM, Helgeson VS. Close relationships and the management of chronic illness: associations and interventions. *Am Psychol* 2017;72:601–12.
250. Weihs K, Fisher L, Baird M. Families, health, and behavior. *Fam Syst Health* 2002;20:7–46.
251. Jordan KD, Williams PG, Smith TW. Interpersonal distinctions among hypochondriacal trait components: styles, goals, vulnerabilities, and perceptions of health care providers. *J Soc Clin Psychol* 2015;34:459–75.
252. Consiglio C. Interpersonal strain at work: a new burnout facet relevant for the health of hospital staff. *Burnout Res* 2014;1:69–75.