

Romantic Relationships and Health

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Abstract

Drawing from epidemiological, laboratory, and natural environment (e.g., daily diary) studies, this chapter begins with discussion of the impact romantic relationship status (e.g., married vs. single vs. separated/divorced) and quality have on self-reported health, morbidity, and mortality. The shift from negative (e.g., conflict discussions) to positive (e.g., support discussions) romantic relationship features and contexts is noted and identified as one of several important shifts in focus over the past decade. The second half of the chapter identifies recent trends in the field (many of which build off the first half of the chapter). Specifically, four emerging themes and future directions are summarized: (a) increasing generalizability, (b) identifying underlying mechanisms via application of theory and attention to variables worthy of greater scrutiny, (c) acknowledging the significance of nonmarital romantic relationships (e.g., dating), and (d) expanding health outcomes and contexts studied.

Key words: marriage, dating, health, physiology, health outcomes, morbidity, mortality, relationship quality

Romantic Relationships and Health

Two people are not in a *relationship* unless the behaviors and outcomes of one affect the behaviors and outcomes of the other (Kelley et al., 1983). It is this interdependence, which occurs repeatedly across time and contexts, that grants relationship partners powerful influence over one another. Perhaps nowhere is the effect of this influence more apparent than when considering the link between romantic relationships and health: individuals' physical health and health-relevant biological outcomes are profoundly influenced by their partners (Meyler, Stimpson, & Peek, 2007). It should come as no surprise then that the explosive growth in the field of psychoneuroimmunology since the 1970s has been accompanied by a concomitant growth in the study of mind-body interactions in the context of personal relationships (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Loving & Campbell, 2011). Dating back to House, Landis, and Umberson's (1988) seminal paper on the link between social ties and mortality, researchers have called for greater understanding of the *mechanisms* that underlie the link between personal relationships and physical health outcomes. Close relationships researchers, who are well-suited to clarify those mechanisms, are providing a deeper understanding of many of the common findings in the relationships-health literature (Smith et al., 2011).

In fact, the volume of knowledge regarding the relationships-health link has grown considerably since writing the first handbook chapter devoted to reviewing the impact close, personal relationships have on health and health-relevant biological outcomes (and vice versa; (Loving, Heffner, & Kiecolt-Glaser, 2006). At that time, we provided a general summary of key biological systems and biomarkers, an overview of the work on social isolation, loneliness, and social support, as well as a review of the extant work on marital interaction and physiology. The literature has grown at such a rapid rate that a similar scope is not possible today (at least not

within publisher-enforced page limitations). Thus, in this chapter we limit ourselves to reviewing evidence for the connection between *romantic relationships and health*. This narrower focus is required for two reasons. First, on a practical level, focusing on romantic relationships allows us to highlight some of the more seminal and/or interesting studies to have been published over the past several decades. Second, we feel strongly that close relationships researchers, in particular, have laid the foundation for promoting a more nuanced understanding of exactly how it is that personal relationships affect health. Specifically, the application of close relationships theories, methods, and statistical tools has allowed researchers to test a range of theoretically-derived mechanisms that might underlie how social relationships and social interactions influence health (Loving & Campbell, 2011). This is not to say that we do not present data on how global features or characteristics of relationships (e.g., marital status) are associated with health outcomes. Such work is important in its own right, and ultimately invites application of theoretical frameworks and methodologies that will better elucidate micro-level explanations for such effects.

Our review begins with key findings, past and present. We then extend this summary and highlight what are, in our view, some of the more important and novel emerging themes in the literature, including methodological innovations and applications, theoretical applications that have proven or should prove especially fruitful for identifying underlying mechanisms that account for the romantic relationships-health link. Finally, we outline some of the more exciting directions the field is taking, including an expanded range in contexts and physical health outcomes being assessed.

Our scope necessitates our glossing over or otherwise ignoring lines of work that are relevant to the broad topic of interpersonal relationships and health (vs. romantic relationships and health), and we recognize that what we view as seminal work may be viewed differently by

others. For example, the continuing burgeoning literature on social support and support processes and that on social isolation and loneliness are transparently absent from this review (but see Lakey, this volume). We recognize the limitations of such a focus. Ultimately, any ‘grand theory’ regarding the link between personal relationships and physical health will have to take into account all forms of relationships, regardless of the type, level, and frequency of contact that defines the social milieu. Finally, we do not provide much in the way of discussing the clinical role of the broad swath of biomarkers that have been employed to date. We refer readers to the primary articles for such information (which often provide in-depth discussion of the physiological measures used).

Key Findings

In this section we review research that examines the link between romantic relationships and physical health. This section is grouped into three broad categories: 1) marital status and health, 2) romantic relationship conflict and health, and 3) positive aspects of romantic relationships and health.

Marital Status and Health

A large body of empirical evidence supports the contention that those who are married are healthier than those who are unmarried, especially those whose marriages dissolve. Below we describe findings pertaining to the effects of marital status on self-rated health, objective health indicators, and mortality.

Marital status and self-rated health. The links between marital status and self-rated health are robust; married individuals generally report better health than non-married individuals report (Bennett, 2006; Rohrer, Bernard, Zhang, Rasmussen, & Woroncow, 2008; Umberson, 1992). This association is especially strong when comparing married individuals to those

widowed or divorced, with continuously unmarried individuals often looking quite similar to continuously married individuals (Rook & Zettel, 2005). For example, in a random sample of 27,757 individuals in Sweden, married individuals reported significantly better health than did those divorced or widowed, but the married did not differ from those never married. Other analyses have documented similar findings, with transitions out of marriage regularly associated with the worst self-reported physical health (Williams & Umberson, 2004).

Marital status and objective health indicators. Married individuals also fare better on objective indicators of health. One commonly used health indicator is hospitalizations. Those who are married tend to stay in the hospital for shorter periods of time than unmarried patients (Gordon & Rosenthal, 1995; Iwashyna & Christakis, 2003), and differences among unmarried patients have been reported to be greater for patients who were never married than for patients who were widowed, divorced, or separated (Gordon & Rosenthal, 1995). Further, being married is linked to lower re-admission rates for chronic health conditions (Wong, Gan, Burns, Sin, & van Eeden, 2008), and the married use higher quality hospitals (Iwashyna & Christakis, 2003), most likely reflecting the greater economic resources available to married couples.

Researchers have also examined the links between marital status and sleep using both self-report outcomes (e.g., quality of sleep, hours slept) and objective sleep measures (e.g., recording of brain waves, measuring gross motor movement via actigraphy to estimate sleep/wake patterns; Troxel, 2010). Sleep plays a critical role in morbidity and mortality outcomes (e.g., Kronholm, Laatikainen, Peltonen, Sippola, & Partonen, 2011; Miller, 2011), and offers a unique opportunity for relationships researchers to take advantage of one of the unique features of cohabiting relationships – the fact that couple members consistently share a bed (Troxel, 2010; Troxel, Robles, Hall, & Buysse, 2007). Epidemiological research indicates that

divorced individuals, especially women, have greater sleep disturbances than those who are married (Hale, 2005). One recent longitudinal study of middle-aged women indicated that the long-term stability of romantic relationships may be a key predictor of sleep quality (Troxel et al., 2010). In that study, women who were consistently partnered (married or cohabitating) over a 6-8 year period slept better (assessed subjectively and objectively) compared to women who were either unpartnered or who had lost or gained a partner during the interval. Consistently paired women may show relative advantages in sleep because of the enduring nature of the relationship; longer-term relationships also allow people to acclimate to sleeping with another.

Cardiovascular outcomes are one of the most widely-investigated and health-relevant group of health indicators examined with regard to marital status. Overall, those who are married are cardiovascularly healthier than those who are unmarried (Holt-Lunstad, Birmingham, & Jones, 2008; Maselko, Bates, Avendaño, & Glymour, 2009). For example, compared to the unmarried, those who are married have decreased risk for ischemic heart disease (Malcolm & Dobson, 1989) and stroke incidence (Maselko et al., 2009). These effects likely reflect, in part, differences in health behaviors—both in terms of preventative behaviors (e.g., exercising, eating well, not smoking; Yannakoulia, Panagiotakos, Pitsavos, Skoumas, & Stefanadis, 2008) but also in terms of disease treatment-related behaviors. For example, a meta-analysis of patients with coronary heart disease (CHD) showed that those who were married or cohabitating were almost twice as likely as their non-married counterparts to attend outpatient cardiac rehabilitation sessions (Molloy, Hamer, Randall, & Chida, 2008).

Other objective indicators of health have been linked to marital status as well, including diabetes. For example, in a 10-year prospective study, women remaining single throughout the study period were at increased risk of developing diabetes relative to those who married

(Schwandt, Coresh, & Hindin, 2010). For men, the negative impact of hostility and Type-A behaviors on health is attenuated by marriage. This was demonstrated in a recent 9-year longitudinal study that examined the predictors of fasting glucose levels (Shen, Countryman, Spiro, & Niaura, 2008); impaired glucose metabolism—a precursor of both type 2 diabetes and coronary artery disease (Coutinho, Gerstein, Wang, & Yusuf, 1999)—was prospectively associated with hostility-related characteristics in unmarried men, who may be less likely to monitor their health and more likely to engage in unhealthy habits such as overeating and smoking, putting them at higher risk for illness. Married men, on the other hand, may benefit from their spouses, who can help them maintain a healthier lifestyle and curb poor health habits.

Increasingly, researchers have focused on the effect marriage has on the immune system. One immune parameter that is particularly relevant for health is C-reactive protein (CRP), a marker of systemic inflammation in the body. CRP has garnered a lot of attention from health psychologists in the past decade because of its associations with chronic stress (Miller et al., 2008) and because it is a clinically meaningful predictor of onset of cardiovascular disease (Ridker, 2009). Marriage appears beneficial to men in terms of low CRP production. For example, in one recent study married men were 44% less likely to be classified in a high-risk CRP group relative to all other participants (Sbarra, 2009). This effect held after adjusting for demographic characteristics, subjective and objective health measures, and self-reported psychological distress. Strikingly, the effect of being married for men was roughly equivalent to that of being a nonsmoker and having blood pressure and a BMI within normal ranges. Additional studies are needed to assess whether marriage is uniquely protective for men—or similarly benefits women—in its protection against high CRP levels.

Marital status and mortality. The most compelling evidence suggesting a health advantage conferred by marriage comes from studies that include mortality as an outcome measure. Over a quarter century of research has established that being married is associated with lower mortality risk, making this pattern “one of the most established associations in the scientific literature” (Dupre, Beck, & Meadows, 2009). Compared to those not married, those who are married are at lower risk for cardiovascular disease-related mortality (Nilsson, Engström, & Hedblad, 2008), cancer-related mortality (Datta, Neville, Kawachi, Datta, & Earle, 2009), and all-cause mortality (Dupre et al., 2009; Manzoli, Villari, Pironec, & Boccia, 2007). A recent meta-analysis of more than 250,000 participants across 53 studies indicated that the associations between marriage and longevity may be especially pronounced among the elderly (Manzoli et al., 2007). Interestingly, although it has been postulated that marriage benefits husbands’ health more so than wives’ health (Kiecolt-Glaser & Newton, 2001), this meta-analysis showed that, among the aged at least, gender does not moderate the links between marriage and mortality.

Three theoretical models have been offered to explain why married people generally live longer than their non-married counterparts (Liu, 2009). The first is the *marital resource model*. According to this model, marriage promotes longevity through its provision of economic, social and psychological resources (Waite & Gallagher, 2000). There are a number of economic benefits associated with being married (e.g., tax benefits) that are not available to singles, and spouses can care for each other in times of sickness and encourage healthy behaviors and can provide emotional support when needed. The second explanation is the so-called *stress model*. This model emphasizes the detrimental effects of marital dissolution on health among those who divorce, separate, or are widowed (Lillard & Waite, 1995; Williams & Umberson, 2004). In

contrast with the marital resource model, the stress model focuses on the stress of marital dissolution rather than protective benefits of being married. Finally, the *selection model* proposes that married people live longer than the unmarried because healthy people with lower mortality risks (e.g., higher SES, better health behaviors) are more likely to get married (Goldman, 1993).

In recent years, researchers have begun to investigate whether the health benefits conferred by marriage have decreased over time (Liu, 2009). This is a hotly-debated question, not just within the walls of social scientists' laboratories, but by politicians and laypeople as well. On the one hand are those who argue that marriage should be encouraged because it promotes well-being (Waite & Gallagher, 2000). On the other hand are those who claim that marriage is not as critical to people's happiness as it once was and that alternatives to marriage such as cohabitation and same-sex unions may provide similar benefits to traditional marriage (Musick & Bumpass, 2006). Although the link between marital status and longevity are well-established in the literature, this link is not necessarily static, given the rapid demographic changes in structure and make-up of families in the U.S. Some have suggested that the marital status health gap may be decreasing as: (a) singlehood, cohabitation and same-sex relationships become more prevalent, (b) opportunities for social connections and interactions increase for non-married individuals, and (c) divorce, separation and being never married become more normative, less stigmatized, and therefore less stressful. Indeed, recent work shows an improvement in self-rated health among the never married (Liu & Umberson, 2008). However, large-scale studies are needed to assess whether the marital status health gap is declining over time or remains wide.

As described above, an extensive body of research has demonstrated that being married confers health benefits. However, not all marriages necessarily promote good physical health. An

unhappy relationship with a spouse or long-term partner may actually lead to poorer health outcomes compared to never married, divorced, widowed or the happily married. In recent years, researchers have gone beyond asking whether being married is good for one's health to asking *when and under what conditions* marriage is health-promoting.

Relationship Conflict and Health

Much of the initial research on relationship quality and physical health emphasized the negative aspects of marital interactions. Borrowing laboratory observational methods developed mainly by social and clinical psychologists, these studies investigated how negative behaviors during problem-solving discussions were linked to “unhealthy” physiology (e.g., Gottman & Levenson, 1992). The work that has been done in this area suggests that relationship conflict has potent and wide-ranging negative effects on physical health (Wright & Loving, 2011).

Relationship conflict and self-rated health. Relationship conflict is associated with poorer self-rated health (Choi & Marks, 2008; Levenstein, Kaplan, & Smith, 1995; Medalie et al., 1973). For example, in a prospective study of 10,000 men over the age of 40, reports of marital problems and conflicts in the family at baseline were correlated $r = .22$ with self-reported angina incidence (Medalie et al., 1973). In another prospective study of almost 7,000 adults in the Alameda County Study, marital strain (assessed from an 8-item questionnaire developed for the study) was linked to self-reported peptic ulcer incidence at an 8-year follow-up (Levenstein et al., 1995). Those reporting marital conflict are also more likely to indicate having functional impairment (e.g., difficulties bathing or dressing oneself). For example, a recent analysis of the National Survey of Families and Households showed marital conflict at baseline was associated with functional impairments 6 years later, which in turn predicted greater depression at the 15-year wave 3 follow-up (Choi & Marks, 2008). Marital conflict also impacts the self-rated health

of expectant mothers (Brown, 1994), suggesting that marital discord can potentially lead to adverse health consequences for offspring both prenatally and postnatally.

Relationship conflict and morbidity and mortality. A fairly small but growing number of studies have shown that relationship conflict and other negative aspects of marriage are linked to early indicators of disease and are associated prospectively with morbidity and mortality. For example, in a sample of 300 married couples, spouse ratings of anger and antagonism significantly predicted coronary artery calcification severity (Smith et al. 2007). In a large prospective sample of women clinically diagnosed with coronary heart disease (CHD), marital stress was associated with a 2.9-fold increase in the risk of a recurrent cardiac event above and beyond the detrimental effects of other types of stressors (e.g., work stressors; Orth-Gomér et al., 2000). Interestingly, emotional inhibition in the context of marriage—which has well-known deleterious consequences for relationship intimacy (Reis & Shaver, 1988)—may especially undermine physical health. For example, in a large sample of women from the Framingham Heart Study, those who inhibited their emotions during disagreements with their husbands (termed “self-silencing” by the authors) had a mortality rate over the following 10-year period that was four times as high as those women who did not self-silence (Eaker, Sullivan, Kelly-Hayes, D'Agostino, Sr., & Benjamin, 2007).

Relationship conflict and biological health markers. The most compelling evidence that romantic relationship conflict affects physical health comes from studies documenting an association between relationship conflict and cardiovascular functioning (e.g., high blood pressure, heart rate and decreased heart rate variability), endocrine (e.g., cortisol) and immune function. Several studies—many conducted in the 1990s—have shown negative behaviors in laboratory marital interactions to be associated with cardiovascular reactivity (Brown, Smith, &

Benjamin, 1998; Newton & Sanford, 2003; Smith & Brown, 1991). Compared to laboratory problem-solving tasks, marital conflict evokes greater increases in blood pressure, cardiac output and cardiac sympathetic activation in older and middle-aged married couples (Smith et al., 2009). Among women, relationship conflict is associated with greater nocturnal diastolic blood pressure dipping (Holt-Lunstad, Jones, & Birmingham, 2009). One measure of cardiovascular activity that shows promise for assessing the parasympathetic control of the heart is high-frequency heart rate variability (HF-HRV). Resting HF-HRV is thought to indicate self-regulatory capacity and increased HF-HRV is associated with better cardiovascular health (Berntson et al., 1997). New findings indicate that resting HF-HRV is positively correlated with relationship quality in married couples, suggesting that capacity for self-regulation is associated with adaptive functioning in marital relationships. Negative marital interactions may reduce women's resting HF-HRV, with potentially adverse health consequences (Smith et al., 2010).

Probably the largest amount of growth in studies investigating the links between relationship conflict and health has been in studies examining how marital stress alters immune and endocrine function (Barnett, Steptoe, & Gareis, 2005; Gouin et al., 2009; Kiecolt-Glaser et al., 2005; Loving, Heffner, Kiecolt-Glaser, Glaser, & Malarkey, 2004; Miller, Dopp, Myers, Stevens, & Fahey, 1999). Early work, led by Kiecolt-Glaser and colleagues, found that hostility displayed during marital interactions was associated with immune dysregulation over the 24-hours following the discussion, as indicated by declines in natural killer (NK) cell lysis and proliferative responses and reductions in the percentage of macrophages (Kiecolt-Glaser et al., 1993). In another study, men who displayed high levels of anger during a laboratory marital conflict discussion showed short-term elevations in systolic and diastolic blood pressure and

cortisol as well as increases in NK cell numbers and cytotoxicity, especially if the husbands were also high in trait hostility (Miller et al., 1999).

More recently, researchers have turned to investigating relationship-level and individual-level mediators and moderators of the links between relationship conflict and stress biology. One line of work has examined whether cognitive engagement during marital conflict discussions—as indicated by the use of cognitive processing words, e.g., *because*, *think*, *realize*, *consider*—attenuates the effects of marital conflict on immune dysregulation. When couples use these types of cognitive words during conflict, they show smaller increases in serum interleukin-6 (IL-6) and tumor necrosis factor- α (TNF- α)—immune markers of inflammation—over the 24 hours after the discussion (Graham et al., 2009). In another study, more emotionally-invested newlywed wives (relative to their husbands) showed greater adrenocorticotrophic hormone (ACTH) levels in response to conflict, likely because they found the discussion more threatening to the future of their marriage (Loving et al., 2004). Adult attachment has also been investigated as a moderator of how the immune system responds to couples' conflictual vs. supportive interactions. In one study, married couples had two separate lab visits: in the first, they engaged in a conflict resolution task, whereas they engaged in an interaction designed to elicit support in the second visit (Gouin et al., 2009). Attachment avoidance was positively associated with IL-6 production during the conflict visit but not during the social support visit. Further, greater attachment avoidance predicted a higher frequency of negative behaviors and a lower frequency of positive behaviors during the marital interaction, hinting at a mechanism through which attachment avoidance may influence immune responses to relationship conflict. Importantly, the connections observed between attachment and physiology during conflict may not exist solely within the romantic context. For example, evidence from studies of parent-child interactions suggests

similar patterns might be observed within other close relationships (Chaplin et al., 2012; Feeney & Cassidy, 2003).

Positive Aspects of Relationships and Health

Although much of the romantic relationships and health research has focused on conflict, more recent work delves into positive aspects of relationships. The focus on negative aspects of relationships in early research stems in part from the wide use of the conflict, or problem-solving discussion paradigm that was common in most marriage studies. This paradigm, although very useful and informative, promotes negativity and provides relatively few opportunities for positive behaviors to surface. It is thus not surprising that the first marriage and health studies that used this paradigm found that, compared to positive behaviors, negative behaviors were more strongly linked to biological stress responses (Ewart, Taylor, Kraemer, & Agras, 1991; Kiecolt-Glaser et al., 1996). In attempt to provide a more complete picture of how romantic relationships affects health, researchers are now utilizing other types of laboratory discussion paradigms that are better suited for eliciting positive relationship behaviors (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007).

Positive aspects of relationships and self-rated health. A variety of what would be considered “positive” relationship behaviors are associated with good self-reported health. For example, in a study of married women recovering from breast cancer treatment who were at least 6-months post-mastectomy, subjects showed lower body-image distress and pain impact when they reported their husbands being more supportive (Kudel, Edwards, Raja, Haythornthwaite, & Heinberg, 2008). Among couples in which one member suffers from chronic pain, emotional disclosure and validating responses may attenuate pain responses (Cano & de C. Williams, 2010). Positive relationship experiences also appear to buffer the association between cynical

hostility and health. In a study of African-Americans in married or long-term “marriagelike” relationships, hostility at baseline was associated with poorer-health outcomes at two later assessments approximately 5 and 7 years post baseline assessment. However, those in relationships that showed warmth, support and good communication skills—as rated from couples’ videotaped discussions—were protected against the negative health effects of high hostility (Guyll, Cutrona, Burzette, & Russell, 2010).

Thinking more interdependently about one’s relationship also has health benefits. In a study of patients with heart failure (HF), patients who used greater “we talk” (use of the words *we*, *us* and *our*) during a videotaped discussion with their spouses of how they coped with HF health issues reported fewer HF symptoms and better overall health at a six-month follow-up (Rohrbaugh, Mehl, Shoham, Reilly, & Ewy, 2008). Among older couples, happily married husbands and wives are more likely to use health care services. In contrast, spouses in distressed marriage are less likely to seek medical care (Sandberg, Miller, Harper, Robila, & Davey, 2009).

Positive aspects of relationships and morbidity and mortality. An important gap in the literature relates to how positive aspects of romantic relationships are associated with objective health outcomes and mortality. In one study of 87 post-myocardial infarction patients, those in more self-disclosing marriages were much less likely to be re-hospitalized or report chest pains at a 1-year follow-up relative to those in low-disclosure marriages (Helgeson, 1991). This research area remains ripe for in-depth exploration.

No studies to our knowledge have focused specifically on how positive relationship behaviors are linked to mortality. However, many studies have investigated how self-report measures of marital adjustment—comprised of items tapping into both positive and negative aspects of marital relationships, roughly akin to satisfaction measures for dating couples—are

associated with morbidity and mortality. Current evidence points toward robust links between marital adjustment and objective physical health outcomes, especially for cardiovascular disease (Baker et al., 2000; Janicki, Kamarck, Shiffman, Sutton-Tyrrell, & Gwaltney, 2005). For instance, a longitudinal study of 103 married and cohabitating couples showed that those who were most satisfied with their relationships at baseline had lower indexed left ventricular mass three years later (Baker, et al., 2000).

Several studies have also examined the links between marital quality and mortality (Baker, et al., 2000; Eaker et al., 2007; Rohrbaugh, Shoham, & Coyne, 2006). The mortality evidence appears to be somewhat mixed, suggesting stronger effects for women than for men. For example, in a large study of individuals who belonged to the same health maintenance, or health insurance, organization (i.e., HMO), equality in decision making and companionship in marriage were predictive of lower mortality for women, but not for men (Hibbard & Pope, 1993). And in a study of patients admitted for congestive heart failure, marital quality showed much stronger links with lower mortality for women than for men (Rohrbaugh et al., 2006). Exactly why this gender difference appears so strong for this outcome is unclear.

Positive aspects of relationships and biological health markers. Preliminary evidence suggests that those in happier and more well-adjusted relationships show “healthier” biological profiles. With regard to cardiovascular health markers, those in satisfying marriages have lower ambulatory blood pressure (measured naturalistically) than those in less satisfying marriages (Holt-Lunstad et al., 2008). In another recent study, the experimenter manipulated relationship positivity prior to a stressful speech task (Birmingham, Uchino, Smith, Light, & Sanbonmatsu, 2009). Positivity was associated with lower systolic blood pressure reactivity to the speech task

for both men and women, suggesting that positive aspects of relationships may be important moderators of cardiovascular reactivity to stress.

A handful of studies have examined the links between positive relationship experiences and cortisol. These links appear to begin quite early on in one's relationship. A recent study recruited women in dating relationships who all reported currently experiencing high levels of passionate love. Women asked to think deeply about their partners showed increases in cortisol relative to women in a control condition who were asked to think about a same-sex friendship (Loving, Crockett, & Paxson, 2009). Further, women who reported thinking about their relationship a lot in their everyday lives showed especially pronounced cortisol increases when asked to think about their partners. Outside of the lab, studies have shown that positive marital experiences are associated with diurnal cortisol patterns (the natural circadian rhythm of cortisol). Couples reporting higher levels of intimacy showed decreased cortisol levels in everyday life (Ditzen, Hoppmann, & Klumb, 2008). Among women, marital adjustment is associated with steeper diurnal cortisol slopes (Saxbe, Repetti, & Nishina, 2008), which is associated with decreased mortality risk (Kumari, Shipley, Stafford, & Kivimaki, in press). Women's positive relationship experiences also appear to buffer the effects of outside stressors (e.g., work stress) on cortisol production (Slatcher, Robles, Repetti, & Fellows, 2010). On the surface, the acute cortisol increases associated with passion (Loving et al., 2009) versus the apparent stress buffering effects (i.e., reduced cortisol) of positive relationship functioning seen in studies of diurnal cortisol patterns appear contradictory. However, there is growing evidence that short-term stress may have salubrious effects (e.g., Dhabar, Saul, Daugherty, Holmes, Bouley, & Oberszyn, 2010). Whether acute increases in cortisol in the passion context contribute to positive health outcomes, however, is still unknown.

Evidence suggests that positive aspects of relationships are positively associated with better immune functioning. In an early study of healthy married women, those in satisfying marriages had better cellular immune responses to latent Epstein-Barr virus and greater proliferative response of lymphocytes to antigens in vitro (Kiecolt-Glaser et al., 1987). Happy relationships also appear to buffer the deleterious effects of stress on the immune system. For example, in a 12-week daily diary study of married women with rheumatoid arthritis, increases in interpersonal stress were positively associated with increases in circulating T-cells and soluble IL-2 receptor over the course of the study (Zautra et al., 1998).

Finally, building on recent experimental evidence linking exogenously administered oxytocin to pro-inflammatory cytokine activity (Clodi et al., 2008), investigators have begun to examine the role of oxytocin in the links between close relationships and health. New evidence suggests that positive couple behaviors displayed during a laboratory-based social support interaction are linked to higher circulating plasma oxytocin levels. Further, those in the upper quartile of oxytocin showed faster healing of small blister wounds that were created in participants' forearms prior to the social support task (Gouin et al., 2010). Although previous data suggest links between oxytocin and positive relationship behaviors (Holt-Lunstad, Birmingham, & Light, 2008), this is the first study to our knowledge to provide evidence that these links may have relevance for couples' physical health.

Summary

Collectively, the research reviewed thus far clearly indicates that romantic relationships influence health and health-related outcomes and leads to several broad conclusions. First, the extent to which continuous involvement in a marriage or other long-term committed relationship procures health benefits relative to continuous single status is questionable for self-report

outcomes, but more objective indicators, including mortality, provide a far stronger basis to suggest some degree of a ‘marriage’ advantage. Second, relationship transitions, especially transitions out of long-term relationships, are particularly detrimental to individuals’ health (but such detriments are diminished if not reversed when exiting a highly distressed relationship context). Third, studies employing conflict interactions as well as some longitudinal field designs highlight the importance of well-functioning romances for positive health outcomes. Finally, shifting away from a sole focus on conflict interaction paradigms has allowed the positive, or health-promoting, aspects of romantic relationships to receive much needed empirical attention.

This last line of work underscores a critical new direction in the romantic relationships and health literature: moving beyond status indicators and conflict interactions to provide a more holistic understanding of how romantic relationships influence health. Indeed, the focus on positive aspects of romantic relationships represents one of several emerging themes in the field. In addition to the recent focus on positive features of relationships, researchers have also begun to increase the generalizability of study findings via employment of daily-diary designs, a more concerted effort to uncover mechanisms that underlie many of the effects reviewed thus far, and an increased use of more diverse study samples.

Emerging Themes

Increasing Generalizability

The two most utilized methods for drawing conclusions regarding the interplay of romantic relationships and health processes and outcomes are analysis of existing large-scale epidemiological datasets and laboratory interaction paradigms. The benefits of such designs are straight-forward. The analysis of large datasets increases statistical power to identify important relationship-level predictors of health outcomes; laboratory interaction paradigms allow for

Careful observation and coding of couple members' behaviors and make it easier to control for extraneous environmental variables. Use of these empirical methods has proven invaluable and generally set the research agenda for years to come. These methods are not, however, without limitations. The use of large datasets, for example, often requires reliance on broad variables (e.g., marital status) that shed little light on the underlying mechanisms that account for any effects of romantic relationships on health. The use of laboratory paradigms, although helpful for isolating or otherwise promoting careful scrutiny of underlying mechanisms, necessarily take couple members out of their natural contexts where, for example, discussions seldom happen without other variables being at play. It is often difficult to know, therefore, whether obtained effects truly mimic what would be seen in real-world settings, especially in light of the fact that (a) laboratory settings, and the accompanying novelty of the experimental settings, serve as stressors in their own right, and (b) individuals often habituate to repeated exposure to stressful situations (Gerra et al., 2001; Jönsson et al., 2010; Wirth, Scherer, Hoks, & Abercrombie, 2011). In other words, physiological responses to conflict discussions, for example, may at least in part be influenced by the novel setting in which the discussions occur.

To address these limitations, studying individuals and couples in their natural environments and with more precise measures is critical. Notably, the experience of stressors in naturalistic contexts affects both mood and neuroendocrine responses (Smyth et al., 1998). Further, there is some evidence that interpersonal conflicts may be immune to the habituation observed for other life stressors (Bolger, DeLongis, Kessler, & Schilling, 1989), suggesting we don't need to remove couples from their natural environments to detect mind-body interactions. As a result, over the past decade there's been a significant increase in the use of daily diaries or

momentary assessments within the context of romantic relationships for the express purpose of studying health outcomes (Saxbe & Repetti, 2010; Slatcher et al., 2010).

A series of studies by Holt-Lunstad and colleagues supports the utility of studying couples in their natural environments (Holt-Lunstad et al., 2008; Holt-Lunstad et al., 2009). For example, in research noted previously, individuals in lower quality marriages show unhealthy reductions in blood pressure dipping overnight (Holt-Lunstad et al., 2008), whereas individuals in marriages characterized as having less conflict, more support, and more depth (Pierce, Sarason, & Sarason, 1991) show greater, or more healthy, blood pressure dipping (Holt-Lunstad et al., 2009). These studies are important because they provide evidence of one mechanism through which romantic relationships affect morbidity and mortality (i.e., blood pressure dipping). This work is also noteworthy because of the clinical implications of ambulatory blood pressure monitoring relative to measurements taken in laboratories (Perloff, Sokolow, Cowan, & Juster, 1989), and because it investigates important, clinically-significant phenomena not studied easily in the laboratory (i.e., blood pressure dipping assessed via ambulatory blood pressure monitors worn by study participants).

Whereas the research by Holt-Lunstad demonstrates the benefits of measuring important biomarkers in natural contexts, recent work by Diamond, Hicks, and colleagues underscores the benefits of daily-diary methods for illuminating mechanisms underlying the relationships-health link (Diamond, Hicks, & Otter-Henderson, 2008; Hicks & Diamond, 2011). In one study of 42 married or cohabitating couples, both members of each couple maintained daily diaries of affect, stress, partner contact, and sleep quality for 21 days during which one of the couple members would be leaving town for a brief trip. The non-traveling partner, or 'homebound' partner, also provided a series of five saliva samples each day for later determination of salivary cortisol

diurnal rhythms (Kirschbaum & Hellhammer, 1994; Smyth et al., 1997) before, during, and after the separation. Physical separation resulted in increased cortisol secretion and decreased sleep quality for high anxious homebound partners. In another daily-diary study (Hicks & Diamond, 2011), anxiously-attached women's cortisol awakening responses (Fries, Dettenborn, & Kirschbaum, 2009) were attenuated following more couple conflict the day prior. Such findings may signal a hypersensitivity on the part of anxiously attached women to social situations (Engert, Efanov, Dedovic, Dagher, & Pruessner, 2011), although more work is needed before the relevance of an increased versus decreased CAR for health outcomes is fully understood (Clow, Hucklebridge, Stalder, Evans, & Thorn, 2009; Fries et al., 2009).

Searching for Underlying Mechanisms

We now turn our attention to some new and promising directions in the study of romantic relationships and health. We noted above that being married or involved in a long-term relationship is associated with reduced morbidity and mortality, and being in a high quality relationship is most beneficial, with involvement in a low quality relationship often proving more detrimental than not being in a relationship at all. Such findings are useful, but offer little in the way of underlying mechanisms that may account for such patterns. We next review several theoretical perspectives and lines of work, some of which are already widely adopted, and others that are ripe for application, that we feel help fill in the black box that connects relationship status and/or quality to health outcomes. To be clear, this is by no means an exhaustive list or review; rather, it is our goal to simply draw attention to some areas we suspect will (or should) motivate research programs in the years to come and to highlight how mainstream social psychological and close relationships theories can be utilized effectively in this domain.

Adult attachment. One of the more significant advances in the romantic relationships-health field over recent years is the application of a wider set of theoretical approaches. Adult attachment theory leads the charge and provides perhaps the highest-quality, theoretically-driven research on the topic to date (see Shaver & Mikulincer, this volume). Direct applications of adult attachment theory to psychophysiological processes date back to at least the mid-1990s (Carpenter & Kirkpatrick, 1996; Feeney & Kirkpatrick, 1996; Reite & Boccia, 1994). Subsequently, adult attachment insecurity has been linked to self-reported health (Sadava, Busseri, Molnar, Perrier, & DeCourville, 2009), cardiovascular function (Carpenter & Kirkpatrick, 1996; Feeney & Kirkpatrick, 1996; Roisman, 2007), cortisol reactivity to relationship and nonrelationship based stressors (Brooks, Robles, & Schetter, 2011; Kidd, Hamer, & Steptoe, 2011; Laurent & Powers, 2007) as well as cortisol production in natural environments (Diamond et al., 2008; Quirin, Pruessner, & Kuhl, 2008), plasma oxytocin levels (Kiss, Levy-Gigi, & Kéri, 2011; Marazziti et al., 2006), and immune function, including inflammation (Gouin et al., 2009; Picardi et al., 2007). The range of findings linked to romantic attachment is noteworthy given the large extant empirical base regarding attachment influences on affect, behavior, and cognition. As a result, few theoretical approaches are in better position to provide a micro- and macro-level explanation for how romantic relationships regulate and dysregulate physical functioning. Indeed, a number of models and frameworks have been offered to explain how and why adult attachment influences health and physiology (Diamond, 2001; Sbarra & Hazan, 2008). The work being done in this area could and should serve as a model, or ‘how-to guide’, for those who adopt different theoretical approaches.

Social ostracism. Within the marital interaction literature, the link between withdrawal and negative physical outcomes is clear: people do not like it when their partners withdraw or

disengage from them during discussion of important relationship issues (Denton, Burleson, Hobbs, Von Stein, & Rodriguez, 2001; Kiecolt-Glaser et al., 1996). The specific psychological reasons underlying this effect, however, remain less clear. Social ostracism provides a likely explanatory candidate for this and many other romantic relationship dynamics (e.g., responses to dissolution; Loving, Le, & Crockett, 2009). Specifically, the neurological overlap between physical and social pain (Eisenberger & Lieberman, 2005) and the similar physiological responses that characterize reactions to withdrawal and threats to the self (Dickerson & Kemeny, 2004; Loving et al., 2009), suggest that the physical reactions associated with withdrawal may be best understood in the context of social ostracism and the need-threat model (Williams & Nida, 2011).

For example, consider the finding that ostracized individuals direct attention to the specific situation in which the ostracism occurred (Williams, 2007). This finding, and the accompanying theoretical explanations for it, has direct application to the relationships and health literature. Specifically, men tend to withdraw more from their female partners during conflict than vice-versa (Christensen & Heavey, 1990), and greater likelihood of rumination after marital conflict has been identified as a likely candidate for why women are particularly influenced by negative marital interactions (Kiecolt-Glaser & Newton, 2001). The similarities between these marital interaction dynamics and what is known about the consequences of social ostracism are striking, yet we are not aware of any cross-talk, so to speak, between these literatures. Romantic relationships and health researchers have much to gain from such cross-pollination given the large body of basic work already conducted on the causes and consequences of social ostracism.

Interdependence. Although basic ideas from interdependence theory (Kelley & Thibaut, 1978) are apparent in the romantic relationships and health literature (Gregorio et al., 2012; Leonard & Mudar, 2004), it is surprising that there have not been more efforts to draw from interdependence theory more directly. After all, the very idea that romantic relationships affect health necessitates at least a basic admission that the two people involved in a given romantic relationship have influence over one another. Yet, attempts to understand how this influence develops and plays out are remarkably rare. One area that has recognized the relevance of the theory is research on health behaviors in the romantic couple context (Helgeson, Novak, Lepore, & Eton, 2004; Leonard & Mudar, 2004; Lewis & Butterfield, 2007; Molloy, Perkins-Porras, Strike, & Steptoe, 2008; Rempel & Rempel, 2004). This line of work generally considers the ways in which one partner's behaviors, attitudes, and influence attempts affect the other partners' health behaviors. For example, Novak and Webster (Novak & Webster, 2011) investigated whether spouses are capable of influencing the outcomes of their partners' attempts to lose weight via three types of 'social control'. Both instrumental (doing things directly to assist the partners' weight loss attempts) and reinforcing (i.e., providing positive feedback during the partners' weight loss attempts) social control behaviors promoted, and monitoring (i.e., overly pushing or drawing attention to the partners' need to lose weight) interfered with, partners' diet adherence, with partners' BMI moderating some of the associations. This is an example of a domain where one partners' behaviors and outcomes (e.g., dieting and weight loss vs. weight gain) is connected to the other partners' outcomes. For example, if one partner begins to eat healthily, for example, we would suspect that the 'supporting' partner is more likely to do the same and adopt the same behaviors to the extent that the individual feels a sense of reward through his or her partner's successful weight-loss efforts. This dynamic taps into very basic

interdependence theory principles (e.g., transformation of motivation; see Arriaga, this volume). Recognizing the utility of interdependence theory, Lewis and colleagues (Lewis et al., 2006), drew on the health behavior literature and proposed an interdependence-based integrative model to explain the process of health behavior change among couples. Such efforts to either theoretically-integrate extant work or use existing theory to guide new work are critical and make it far easier to illuminate the basic mechanisms that account for links between romantic relationships and health.

Touch/physical contact. In addition to these broad frameworks, greater attention to physical contact is also needed. Affectionate behaviors are one of the defining features of high-quality relationships (Call, Sprecher, & Schwartz, 1995), and there is growing evidence that physical contact itself promotes physiologic functioning; greater physical intimacy predicts decreased blood pressure (Light, Grewen, & Amico, 2005) and daily cortisol output (Ditzen et al., 2008). For the latter, levels of physical intimacy not only reduced cortisol throughout the seven days samples were provided, but it also buffered individuals who experienced high work stress in a given day. Further, physical contact ameliorates acute stress responses. For example, Ditzen and colleagues (Ditzen et al., 2007) randomly assigned 67 married and cohabiting women to one of three groups prior to their undergoing a standardized speech task: a no partner control group, a partner verbal support group, or a partner physical touch group (during which the partner provided a standardized neck and shoulder massage). Women in the touch condition experienced lower cortisol and heart rate increases in response to the speech compared to the control and verbal support conditions. In a similar study (Grewen, Anderson, Girdler, & Light, 2003), 183 men and women engaged in either a no-touch/rest condition or a 10 minute partner hand-holding condition followed by a 20 second hug. Both groups then gave a speech. Those in

the physical contact condition had lower blood pressure and heart rate increases in response to the public speaking task.

Importantly, touch, or ‘warm contact,’ can be promoted. Holt-Lunstad, Birmingham, and Light (Holt-Lunstad et al., 2008) assigned couple members to a control condition or a “Couple Contact Enhancement” intervention, which involved warm touch and/or massage over the course of 4 weeks. Salivary oxytocin increased, and alpha amylase, a marker of sympathetic nervous system activity (Granger, Kivlighan, El-Sheikh, Gordis, & Stroud, 2006), decreased post treatment for husband and wives. These studies are promising because they highlight a feature of high-quality relationships that may directly influence health outcomes, and the mechanism (physical contact) appears capable of being promoted within couples.

The Importance of Nonmarital Romantic Relationships

Another important trend observed in the literature of the past decade is the decrease in reliance on marital samples when investigating health outcomes of relationships. It has become far more common for researchers to study exclusively or include samples of individuals in nonmarital romantic relationships. Such a focus isn’t solely a matter of convenience. Rather, nonmarital romances constitute significant relationships for individuals across the lifespan (Kelley, 1979). Americans are also less likely to be married today than they were in previous decades (Mather, Rivers, & Jacobsen, 2005), are more likely to cohabitate (Simmons & O’Connell, 2003), and many Americans are not allowed to legally marry (e.g., gay and lesbian relationship partners). Importantly, the prior focus on marital samples and occasional inclusion of cohabiting couples, has led to the conclusion that social attachment and relationship harmony, and not marriage per se, impacts individuals’ mental and physical health (Ross, 1995).

One line of work that extends the research on marital interaction is being conducted by Sally Powers and her colleagues (Gunlicks-Stoessel & Powers, 2009; Laurent & Powers, 2007; Powers, Pietromonaco, Gunlicks, & Sayer, 2006). This work generally focuses on emerging adulthood, during which individuals are not technically adolescents, but not quite yet fully independent adults; thus, emerging adulthood captures the time period in life during which individuals gain a high level of autonomy from their parents, increasing the role of romantic partners in overall well-being. In one study of 124 heterosexual dating couples (Powers et al., 2006), couple members provided a series of 7 saliva samples before, during, and after a standardized conflict discussion task. Attachment insecurity affected cortisol reactivity to, and recovery from, the conflict discussion, but different types of insecure attachment mattered for women (attachment avoidance) and men (attachment anxiety). Interestingly, men with insecure partners showed increased reactivity and delayed recovery to the task; women's responses were not influenced by their partners' attachment. In an additional study (Laurent & Powers, 2007), men's temperament (i.e., emotionality) and attachment avoidance interacted to moderate his and his partner's cortisol responses to a conflict discussion.

A striking feature of this work and other studies using nonmarital romantic couples is the consistent effects observed for men, who are generally not as physiologically reactive to conflict discussions in marital interaction studies (Kiecolt-Glaser & Newton, 2001). Whether such effects reflect something unique about emerging adult samples, nonmarital romantic relationship samples, or reflect some form of a cohort effect is unclear. Additionally, studies such as these will need to employ a broader range of biomarkers to clarify whether effects are specific to some biological systems (e.g., hypothalamic-pituitary-adrenocortical (HPA) axis) but not others (e.g.,

sympathetic adrenomedullary (SAM) axis). Answering these types of questions will provide critical information about how different types of relationships affect health.

Another area where studying nonmarital romantic couples is proving fruitful is in the health behaviors domain. Many of the leading causes of death are influenced by health behavior choices, and many of the health habits individuals develop and carry with them throughout life are developed in adolescence and emerging adulthood. We have already noted the profound impact romantic partners can have on one another, and that impact is also seen in ‘younger’ relationships. For example, Etcheverry and Agnew (2008) investigated the influence friends and romantic partners have on college freshmen’s smoking behavior. Participants completed a weekly survey for 35 weeks during which they reported on smoking behavior (at each assessment) and their friends’ and partners’ smoking behavior and attitudes about smoking (roughly every 4 weeks). Romantic partners’ smoking behaviors and attitudes (or ‘injunctive norms’) predicted subjects’ smoking behavior above and beyond friends’ behaviors and attitudes (which were also significant predictors). Studies such as these highlight the powerful influence romantic partners (not just spouses) have on individuals’ health and health behaviors. Further, studying younger romantic couples provides important information about when key healthy or unhealthy patterns *develop*, which ultimately creates better opportunities for intervention efforts.

Expanded Health Outcomes Studied

There has also been a much needed expansion in the types of health outcomes studied. Early work in the field primarily assessed shifts in cardiovascular, endocrine, and immune parameters, and used the observed shifts to draw inferences about what long-term objective health outcomes would be associated with such shifts. Such inferences were grounded in the larger epidemiological work demonstrating romantic relationship effects on morbidity and

mortality, but more immediate health outcomes (vs. health-relevant biological processes) were less widely the focus. As a result, the exact biological pathways by which romantic relationships and psychological factors lead to changes in observable medical conditions received far more supposition than empirical evidence (Miller, Chen, & Cole, 2009). However, this is beginning to change. One notable example comes from the marital interaction literature reviewed earlier. Specifically, Kiecolt-Glaser and colleagues (2005) demonstrated that negative marital interactions result in delayed wound healing, and also provided preliminary evidence for the specific biological mechanisms (dysregulation of proinflammatory cytokine production, such as Interleukin-6 (IL-6)) that may underlie the delays. This work may have direct relevance to other medical conditions, including, for example, psoriasis (Koch & Nusrat, 2012). Importantly, IL-6 affects production of C-reactive protein (CRP), an immune marker mentioned above that has clinical significance for a wide range of age-related conditions, including hypertension and obesity (Hamer & Stamatakis, 2008; Sesso, Wang, Buring, Ridker, & Gaziano, 2007). Below, we discuss two additional health conditions that are worthy of additional empirical attention.

Upper respiratory-tract infections. Because they are by far the most prevalent class of infectious diseases, upper respiratory-tract infections (URIs) have been adopted as the primary model for studying how stress influences illness susceptibility (Cohen, Tyrrell, Smith, & Miller, 1997). URIs are a heterogeneous group of diseases that are caused by numerous viruses that belong to several different families, are usually self-limited in duration, and are typically confined to the upper respiratory tract. However, in some individuals, the viral infection spreads to nearby organs, resulting in a variety of clinical manifestations (e.g., ear and sinus infections), occasionally predisposing them to bacterial complications (Heikkinen & Järvinen, 2003).

Importantly, URIs are a clinically relevant health outcome, with symptoms that can change over days and weeks and can be assessed non-invasively.

Psychological stress in particular is an important factor in susceptibility to URIs (Cohen, 2005; Cohen, Tyrrel, & Smith, 1991; Cohen & Williamson, 1991). In retrospective studies, high numbers of self-reported stressors (McClelland, Alexander, & Marks, 1982) and greater psychological distress (Wilson, Rosenthal, & Austin, 2005) are associated with increased URI severity. Prospective studies have shown links between stress and URIs as well. For example, in a 12-week study of healthy college students, stress and diversity of social contacts interacted to predict clinically-verified URIs; diversity was associated with more illnesses among those with more stressful life events and slightly fewer illnesses among those with fewer stressful life events. A number of elegant viral challenge studies by Cohen and colleagues provide compelling evidence for connections between psychological stress and URI onset (Cohen et al., 1998; Cohen et al., 1991). Most importantly, the stressors most strongly linked to greater URI symptom severity in these studies were enduring (1-month or longer) interpersonal problems with family and friends (Cohen et al., 1998).

Asthma. Asthma is a chronic inflammatory disease of the respiratory tract that stems from a complex interaction of environmental, psychological, and genetic factors (Howard, Meyers, & Bleecker, 2003). Although extant research is mostly limited to questionnaire and lab studies, the available evidence links asthma morbidity to variations in social relationships. For instance, self-reported parenting difficulties assessed when infants were 3 weeks old predicted asthma onset (Klinnert, Mrazek, & Mrazek, 1994) and continued to be associated with asthma persistence when these children reached 6 to 8 years of age (Klinnert et al., 2001). In late childhood and adolescence, children whose parents report high levels of negative affect and

conflict at home experience greater lifetime hospitalizations due to asthma (Chen, Bloomberg, Fisher, & Strunk, 2003). Family relationships also appear to impact asthma mortality: health care provider reports of conflict between children with asthma, their parents and hospital staff differentiated those children who later died of asthma from a control group matched for asthma severity (Strunk, Mrazek, Fuhrmann, & LaBrecque, 1985). Although asthma prevalence and first incidence is higher amongst children, it remains a significant health issue for adults, responsible for millions of missed work days per year and disproportionately affecting women and blacks (Akinbami, Moorman, & Liu, 2011). Thus, asthma, like URIs, offers an excellent model for studying the effects of relationship factors on chronic health problems.

Expanded Contexts

In addition to efforts and a continued need to expand the health outcomes studied, researches have also begun to attend to more relationship and social contexts. For example, above we highlighted the benefits that have come from studying individuals in nonmarital romantic relationships. Such work has allowed researchers to identify important similarities and differences between health outcomes for those in marital versus nonmarital romantic relationships, and provided critical information on the developmental nature of health behavior formation. Further, studying more relationship types not only increases generalizability of study findings, but such a focus allows creates an opportunity to look at the health of romantic relationships in a developmental context, which is important because of growing evidence that it is the cumulative impact of relationships (McEwen, 1998, 2001; Power, Li, Atherton, & Hertzman, 2011) that undermine (or promote) health. Below, we highlight four aspects of relationships and their contexts that are or should see an increased focus in coming years.

Relationship transitions. The notion that romantic relationship transitions are stressful has a long history in the social sciences. For example, 7 of the 15 most stressful life events in the classic Social Readjustment Rating Scale (Holmes & Rahe, 1967) involve transitions in interpersonal relationships. Transitions require individuals to adapt to a changing environment (Wheaton, 1990), and the need for adaptation is a key predictor of stress and physiological reactivity (Selye, 1978). Within the context of romantic relationships, both changes in the state (e.g., dating vs. married) and fate (i.e., intact vs. dissolved) of a romance require individuals to adapt affectively (Nieder & Sieffge-Krenke, 2001; Sbarra, 2006), behaviorally (Kelley & Thibaut, 1978), and cognitively (Agnew, Van Lange, Rusbult, & Langston, 1998).

One transition receiving increased attention is the process of falling in love (or ‘passionate love’). Passionate love is associated with changes in circulating levels of neurotrophins and stress hormones. Individuals who score high on a self-report measure of passionate love show increased levels of the neurotrophin nerve growth factor (NGF) relative to the unattached or those in long-term established romances (Emanuele et al., 2005). Further, blood samples drawn from individuals experiencing passionate love reveal significantly greater circulating levels of cortisol relative to control groups (Marazziti & Canale, 2004). The differences (NGF and cortisol) are not detectable when participants are retested after a year or more. Additionally, as noted previously, the mere act of reflecting on falling in love results in acute increases in cortisol for women (men were not tested; Loving et al., 2009). Ultimately, whether or not these increases in cortisol are associated with objective health outcomes is unclear, but such work has the potential to provide important information about how positive events affect health-relevant processes salubriously (Loving & Wright, in press).

On the other end of the spectrum, transitions out of romantic relationships also have

health consequences. Not all relationships will last indefinitely. Breakup is a key theme of life in adulthood (Monroe, Rohde, Seeley, & Lewinsohn, 1999) and the vast majority of romantic relationships will eventually terminate (Fletcher, Simpson, & Thomas, 2000; Kreider & Fields, 2002). In terms of nonmarital breakup, loss of a romance is predictive of an increased risk of upper respiratory illness symptoms (Lepore & Greenberg, 2002). For marriage, in addition to the epidemiological work on the link between marital status and health, laboratory-based studies provide important insights into the possible underlying mechanisms. For example, in one recent study, divorced adults were asked to mentally reflect on their separation while their blood pressure was continuously assessed. Once again highlighting the importance of attachment and language expression, more anxious participants whose language demonstrated a strong sense of emotional engagement with the separation had higher BP ratings at the start of the reflection task (Lee, Sbarra, Mason, & Law, 2011). In an additional study using a similar reflection paradigm, recently separated or divorced participants, especially men, who reported greater levels of ‘emotional intrusion’ when reminded of their separations had higher baseline blood pressure (Sbarra, Law, Lee, & Mason, 2009). Collectively, these lines of work are important for two reasons. First, they provide evidence of the powerful role relationship transitions have on health and physiology. Second, on a more practical level, both the work on falling in love and divorce/separation make use of mental reflection paradigms to study phenomena that are often difficult to capture in real time as subjects are experiencing them. Such methods provide researchers with significant flexibility in the range of relationship transition contexts they can scrutinize (see also Loving, Gleason, & Pope, 2009).

Age. Studies that employ samples of adults in mid- to later life argue for more attention to be given to this demographic variable (Phillips et al., 2006), which is often statistically

controlled in studies. Age of couples affects how they respond to romantic relationship events (Smith et al., 2009). For example, older adults tend to experience less distress from interpersonal tensions for shorter periods of time than do younger adults and adolescents (Birditt & Fingerman, 2003; Birditt, Fingerman, & Almeida, 2005), but may be prone to more negative health consequences resulting from marital strain and conflict (Umberson, Williams, Powers, Liu, & Needham, 2006). Older adults, who have a longer history of interacting with their romantic partners, may also be more susceptible to their perceptions of behaviors rather than actual behaviors during conflict (e.g., Heffner et al., 2006). Despite these differences, there is a paucity of work on older couples relative to younger or middle-age couples.

Ethnicity/Culture. Another set of variables worthy of greater attention is ethnicity and culture (see also Eastwick, as well as Gaines & Hardin, this volume). A number of studies point to marked differences in the links between social relationships and health as a function of ethnic or cultural factors. For example, social integration does not appear to be as strongly linked to overall physiological function (i.e., allostatic load) in more collectivistic cultures relative to what is seen in individualistic societies (Seeman et al., 2004). Additionally, within American culture, there is some preliminary evidence that the link between marital status and mortality/morbidity is not as strong for blacks as it is for whites (Schwandt et al., 2010), and the link between marital quality and sleep quality is stronger for white women than it is for black women (Troxel, Buysse, Hall, & Matthews, 2009). Although cross-cultural and/or multi-ethnic samples are rare in the romantic relationships and health literature (for a notable exception, see Gyll et al., 2010), these studies make a strong case that they should be more widely employed.

Social networks. Finally, we think it is also important to more carefully consider the broader social milieu in which romantic couples exist. Although individuals often turn to their

romantic partners during stressful periods (Bodenmann, 2005), individuals also rely on nonromantic partners during times of stress, especially prior to marriage (Gunlicks-Stoessel & Powers, 2009). This reliance can prove problematic and physiologically taxing when, for example, couples experience romantic relationship conflict and are not able to tap their customary support sources, who are capable of buffering individuals from poor romantic relationship functioning (Manne et al., 2003). Moreover, the support network members provide for one's romantic relationship may play a central role in promoting romantic relationship quality, which ultimately promotes physical health (Blair & Holmberg, 2008). Thus, couples' social environments are more causally implicated in the link between romantic relationships and health to justify greater empirical attention.

Conclusions

Involvement in a psychologically healthy romance procures health benefits for both men and women, whereas dissolution of romantic relationships or involvement in distressing relationships increases morbidity and mortality rates. The literature documenting these effects has grown considerably over the past three decades, so much so that it has become almost cliché to say that romantic relationships “get under the skin.” Focus is shifting increasingly to exactly how (i.e., mechanisms) romantic relationships exert their effects on health and health-relevant physiological outcomes. Recent efforts to broaden our understanding of these mechanisms highlight the important role couples' contexts have on a broad range of important biomarkers, many of which have clinically significant cutoffs. The coming years should witness continued efforts to apply and borrow mainstream psychological and relationship theories to further clarify how individuals' physical health is affected by their romantic relationships.

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