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Divorce and Death: A Case Study for Health Psychology

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Abstract

Marital separation and divorce are associated with increased risk for early death, and the magnitude of this association rivals that of many well-established public health factors. In the case of divorce, however, the mechanisms explaining precisely why and how some people are at risk for early death remain unclear. This paper reviews what is known about the association between divorce and risk for all-cause mortality, then discusses four emerging themes in this area of research: the biological intermediaries linking divorce to pathophysiology and disease onset, moving beyond the statistical mean, focusing research on the diathesis-stress model, and studying how opportunity foreclosures may place people on a trajectory toward poor distal health outcomes. These ideas are grounded in a set of public lay commentaries about the association between divorce and death; in this way, the paper seeks to integrate current research ideas with how the general public thinks about divorce and its correlates. Although this paper focuses on divorce, many of the emerging themes are applicable to the study of psychosocial stress and health more generally. Therefore, the study of divorce and death provides a good case study for health psychology and considers new questions that can be pursued in a variety of research areas.

Keywords

Divorce; marital separation; mortality; meta-analysis; mechanisms; health

The study of marital separation and divorce provides an ideal vantage point for understanding the association between psychological stress and health.¹ First, divorce is a major interpersonal stressor that has the *potential* to increase risk for a range of negative health outcomes, including increased risk for early death (Amato, 2010; Sbarra, Law, & Portley, 2011). Thus, in and of itself, divorce is a significant public health risk, and studying the factors that contribute to good or poor adjustment is an important and timely endeavor. Second, the prevalence, demographics, and range of psychosocial responses to divorce make it a life event that can shed light on stress, coping, and health more generally. Nearly 40% of first marriages end in divorce (Bramlett & Mosher, 2002; Kreider & Ellis, 2011) and two million adults are newly impacted by the end of marriage each year. For almost everyone involved, divorce often involves moving, dividing financial assets and, when kids are involved, negotiating visitation and custody arrangements. Despite these logistical challenges, *most* people cope well and report either minimal disruptions to their psychological wellbeing (Mancini, Bonanno, & Clark, 2011) or a pattern of common grief defined by a period of acute distress that dissipates steadily over time (Hetherington & Kelly, 2002). However, some people—perhaps between 10–20% of all divorcees (Mancini et al., 2011)—suffer quite substantially when their marriage ends; in these situations,

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¹For simplicity, we refer to separated and divorced adults as divorced throughout this proposal. When distinctions between marital separation and legal divorce are meaningful, we use more precise terminology.

divorce becomes a chronic stressor that is associated with lasting decrements in psychological wellbeing and physical health (e.g., Lucas, 2005). Identifying exactly who these people are and what processes unfold (prior to and after their separation) to place them at greatest risk are the key questions for the next generation of research on divorce and health.

This paper reviews what is known about the association between divorce and risk for all-cause mortality. In doing so, our primary goal is to outline four emerging themes that can advance the field. Although our discussion is specific to divorce, we believe the topics discussed here are germane to understanding the association between negative life events, psychosocial stress and distal health outcomes in general. For these reasons, the study of divorce and health is a useful case study for health psychology.

The emerging themes we discuss in this paper are based on a strong foundation of research, but one additional way to illustrate the topics of interest is to consider how lay people discuss the association between divorce and death. Lay conceptions of the self, intention, causality, and meaning provide an excellent counterbalance to psychological science's pursuit of universal principles of human behavior (Molden & Dweck, 2006). Related to divorce and death, a recent Huffington Post blog entry on the topic presents a unique opportunity to look carefully at how people outside of the research enterprise view this topic. In late 2011, Robert Hughes posted a column on his Huffington Post blog entitled, *Will Divorce increase your Chances of Early Death?* This post generated nearly 700 comments from The Huffington Post readership. To illustrate our emerging themes and, importantly, to underscore how people outside the research community think about these topics, we have chosen a small group of the comments to serve as jumping-off points for discussing the relevant research. As shown in Figure 1, the comments remind us that nomothetic approaches to human behavior often fail to capture the richness of idiographic data (cf. Beck, 1953; Nesselrode & Ram, 2004). It is our view that a complete scientific analysis of divorce and death must integrate *what people think* about why this association exists with data generated from empirical (and largely nomothetic) studies. We discuss these comments in detail as we address each emerging theme.

Divorce and Death: What is known?

Integrating research in psychology, sociology, and epidemiology, Sbarra and colleagues (Sbarra et al., 2011) recently published a meta-analysis on the association between divorce and death that synthesized data from 32 prospective studies (involving more than 6.5 million people, 160,000 deaths, and over 755,000 divorces in 11 different countries). The overall hazard ratio (HR) linking divorce and risk for early death was 1.23, which indicates that relative to married adults divorced adults evidenced, on average and across all the studies in the review, a 23% greater risk of being dead each successive follow-up period. Although both men and women are at increased risk for early death following divorce, the meta-analysis revealed that divorced men evidenced greater risk for early death (HR = 1.31) than divorced women (HR = 1.13). More recently, Shor, Roelfs, Bugyi, and Schwartz (2012) have taken a broader look at the potential association between divorce and death by studying every published report on this topic, including cross-sectional studies from very large census samples. Their final sample included *600 million people* from more than 24 countries. Consistent with the results of the more narrowly focused meta-analysis, Shor et al. (2012) observed a significant average RH of 1.30, as well as significant differences between men (HR = 1.37) and women (HR = 1.22).

The fact that divorce is associated with increased risk for early death raises a very interesting set of questions. Does marital separation play a causal role in hastening one's time to death

among people who are not otherwise at risk? Alternatively, is the association between divorce and death epiphenomenal and due to third variable confounds that increase risk for both divorce and death individually? Sbarra et al. (2011) addresses these types of questions by considering four potential pathways linking marital separation and subsequent health outcomes.

First, as mentioned, any serious consideration of this topic must contend with the fact that divorce is non-random and heritable (Jocklin, McGue, & Lykken, 1996), and the factors selecting people out of marriage also predict poor health outcomes (e.g., Fu & Goldman, 2000). Although it appears that at least some of the association between divorce and death is due to third variable confounds, the best evidence for a potential causal association between relationship transitions and health comes from a study of co-twin control designs, which allow investigators to examine risk associated with the experience of a life event in one twin (proband) relative to his/her identical twin. Because monozygotic twins share 100% of their genotypes, discordant life events that result in increased risk for a negative outcome can be presumed to be causally associated with the outcome. Osler and colleagues (Osler, McGue, Lund, & Christensen, 2008) recently used a co-twin control design to investigate rates of health outcomes between twins who were discordant for widowhood or divorce. The results indicated that depression and rates of smoking may be consequences of ending a marriage, but differences in many other health outcomes (e.g., self-rated health, alcohol use, BMI) may be due to underlying genetic explanations, not the stress of a relationship transition.

Using a similar co-twin design in a sample of over 1,900 pairs of twins discordant for spousal bereavement, Lichtenstein, Gatz, and Berg (1998) found evidence for a causal effect of bereavement on mortality. Of course, divorce is an entirely different life event, but the results of this work suggest that it is possible for the experience of social loss to causally increase risk for early mortality. A co-twin control study focused on divorce and mortality has yet to be conducted, and research of this nature will be a major advance in the study of divorce and health outcomes.

Assuming that at least a small portion of the association between divorce and death is causal or spurred by the stress of divorce itself, Sbarra et al. (2011) outlined three additional pathways of action. First, divorce has a negative impact on financial and social resources; these changes, in turn, can make the acute stress of marital separation much more chronic (Lorenz, Wickrama, Conger, & Elder, 2006). Second, divorce is associated with a variety of poor health behaviors, including, for example, substantially elevated risk for severe insomnia and problems of sleep maintenance (Doi, Minowa, Okawa, & Uchiyama, 2000; Hajak, 2001), cannabis initiation among previous abstainers (Agrawal & Lynskey, 2009), increased risk for non-abstinent recovery among adults diagnosed with prior alcohol dependence (Dawson, Grant, Stinson, & Chou, 2006), and increases in alcohol consumption immediately prior to a marital separation (Mastekaasa, 1997). Finally, Sbarra et al. (2011) reviewed evidence that the psychosocial stress of divorce is associated with biological responses (e.g., blood pressure reactivity; Sbarra, Law, Lee, & Mason, 2009) that, if sustained over time, have direct relevance for negative health outcomes.

Together, these four pathways (selection, social and financial resource change, health behaviors, and psychosocial stress) are ripe for future research. Indeed, one of the central points raised by the Sbarra et al. (2011) review of potential mechanisms is that the available data on this topic are *severely impoverished*. Consider the following example: If most people cope well with a divorce in terms of their psychological adjustment, how can this life event be associated with such a large increase in the risk for poor health? These observations do not comport well, but the field has few studies that are in a position, for example, to determine whether remaining in a poor quality marriage is as potentially deleterious as a

stressful separation experience. In the remaining sections, we address four emerging themes that have the potential to shed new light on this and many other questions of interest.

We Die from Illness, Not Divorce (Theme 1)

As the comments associated with Theme 1 (Figure 1) suggest, responses to marital separation can range from relief to complete exhaustion. For some people, the prospect of a difficult divorce seems much easier than staying in a torturous marriage. With respect to health outcomes, few people would argue that divorce itself hastens disease; rather, if divorce exerts a causal effect on increased risk for early death, this life experience sets in motion a series of processes that contribute to the development and progression of disease pathophysiology. What are these processes?

This question is not unique to the divorce literature. One of the primary challenges facing health psychology is to identify biologically plausible pathways from psychosocial variables to disease outcomes (Miller, Chen, & Cole, 2009). Miller et al. (2009) have advanced a conceptual approach to studying how biobehavioral responses to life events are associated with and may regulate (and be regulated by) molecular and cellular responses that are disease-relevant. This approach highlights the role of biological intermediaries, or, as Miller et al. (2009) state, "Once a robust linkage between a psychosocial factor and a clinical health outcome is identified, the next step is to determine what biological processes convey those effects into the physical environment of disease pathogenesis" (p. 504).

Related to divorce, Miller et al.'s (2009) first criterion is satisfied. Beyond the meta-analytic findings we described above (Sbarra et al., 2011), other studies have demonstrated that divorce can result in a "proliferation of stress" that mediates the association between the end of marriage and poor self-rated health up to a decade later (Lorenz et al., 2006). We do not yet know, however, the biological intermediaries that translate the psychosocial stress of divorce into poor physical health. We have some hints as to how these effects might operate, but lack clear-cut, disease-relevant pathways. For example, Sbarra et al. (2009) demonstrated that high levels of divorce-related emotional intrusion are associated with elevated blood pressure, and that men who find thinking about their separation especially difficult evidence substantial blood pressure increases when asked to do so. Similarly, Kiecolt-Glaser and colleagues (Kiecolt-Glaser et al., 1987) demonstrated that relative to married adults, divorced adults had significantly higher antibody titers to the Epstein Barr Virus and lower percentage of Natural Killer cell activity, both of which indicate compromised immune functioning. Among the divorced group, a shorter separation period and continued attachment to a former spouse were associated with poorer physiological outcomes, suggesting that psychological variables specific to divorce adjustment (e.g. continued attachment to a former spouse) are associated with impaired immune functioning.

Conceptually, the notion of allostatic load (McEwen, 1998, 2000) provides a compelling model for understanding the cumulative wear-and-tear on the body associated with divorce. Allostasis describes a physiological or behavioral adaptation to environmental changes in order to restore normality, or homeostasis (McEwen, 2000). Excessive cardiovascular, neuroendocrine, and immune activations in response to stress can promote vascular remodeling, initiate atherosclerotic plaque growth, and alter gene expression in a manner that contributes to disease pathogenesis (Cole, 2009; Cole et al., 2007; Libby, 2002; Miller, et al., 2009; Miller, Cohen, & Ritchey, 2002).

When seeking to understand this cumulative wear-and-tear in the case of divorce, we must contend with two important processes: equifinality and multifinality (Cicchetti & Rogosch, 1996). Equifinality refers to the idea that multiple starting points can converge on a single outcome; conversely, multifinality refers to the idea that a single starting point can yield

multiple distinct end points. For example, non-acceptance of divorce (often thought of as a longing for reunion with one's ex-partner), loneliness, and emotional inhibition may all increase risk for depression in the aftermath of a separation. Depression, in turn, can promote cardiovascular and inflammatory responding that potentiates the development of atherosclerosis and cardiovascular disease (Miller & Blackwell, 2006). Alternatively, through the same biological mechanism, inflammation can increase risk for a range of different disease outcomes.

To untangle this complex web of associations, Miller et al. (2009) suggest researchers "reverse engineer" adverse health outcomes into their disease precursors, then identify the specific psychological or behavioral variables that are associated with the biological intermediaries shaping these molecular and cellular processes. For research on divorce and health to advance, we must heed this advice and identify (a) the specific processes that make divorce a chronic stressor (see Lorenz et al., 2006), and (b) why, exactly, divorce increases risk for a major depressive episode (see Kendler, Hettema, Butera, Gardner, & Prescott, 2003) or other forms of persistent psychological distress. Although it is likely that chronic stress and mood disturbances represent the major pathways that drive divorce "under the skin," the divorce-specific tributaries that feed into these pathways remain to be identified.

What Does the "Statistical Mean" Mean? (Theme 2)

Any consideration of the meta-analytically derived association between divorce and risk for early mortality must contend with the fact that the overall effect size represents the *statistical mean* across all the studies in question. The statistical mean is highly susceptible to the influence of outliers and, as a stand-alone indicator, masks substantial variability. We see from the comments associated with Theme 2 (Figure 1) that many people report *improved* functioning following their divorce. If a large percentage of people are relieved—and even happy—to be free of the weight of a bad marriage, how can divorce also increase risk for poor health?

The answer to this question rests in moving beyond the statistical mean when studying divorce and health. As an illustration of the central problem in this literature, consider two studies that rely on data from the German Socio-Economic Panel Study (Lucas, 2005; Mancini et al., 2011). Lucas (2005) used multilevel modeling to examine mean trajectories of life satisfaction prior to and following divorce. The primary findings from this report were that life satisfaction steadily decreases prior to divorce and that people do not return to their initial set-point after the divorce (Lucas, 2005). Using data from the same sample, Mancini et al. (2011) applied a series of latent growth mixture models to identify potential sub-samples, or classes, of how people respond to divorce. This study revealed that nearly 72% of adults reported high levels of life satisfaction prior to and following their divorce; 9% reported low levels of satisfaction that increased substantially following the divorce; and 19% reported a moderate decline in satisfaction over the study period (Mancini et al., 2011). The difference between the main findings in these studies, which use almost entirely overlapping data, is substantial. The illustration serves as an important reminder that, in many instances, the statistical mean may be essentially meaningless for drawing veridical conclusions about the psychosocial and health sequelae of divorce.

With respect to health outcomes, this problem is magnified because the available data are extremely impoverished. The primary explanation for the so-called "impoverished data situation" is that representative epidemiological studies rarely measure psychosocial variables with any degree of complexity (see Sbarra & Mason, in press). Consequently, prospective studies that can speak to the long-term health correlates of divorce do not typically assess key moderators such as whether a person initiated the separation or was left

by their partner, or whether distal health outcomes are a function of participants' longing for their ex-partner.

Given these concerns, we suggest moving forward to examine two distinct avenues. First, epidemiological evidence indicates that specific aspects of adults' "marital biographies" may be associated with differential outcomes. Amato and Hohmann-Marriott (2007), for example, found that adults in high-conflict marriages reported an *increase* in life happiness following divorce, whereas adults in low-conflict marriages reported a *decrease*. An obvious implication of this study is that responses to divorce are highly dependent on marital quality prior to the separation.

With respect to physical health outcomes, Sbarra and Nietert (2009) found that divorce was associated with significant risk for early mortality among people who separated from their partner and never remarried; in contrast, divorced adults who subsequently remarried showed no elevated risk (for related studies, see Brockmann & Klein, 2004; Hughes & Waite, 2009; Zhang & Hayward, 2006). To the extent that remarriage mitigates risk in some cases, what processes explain this effect? The study of remarriage provides a natural interrupted time series for the study of divorce and health. A detailed study of the extent to which changes in loneliness, social capital, financial resources, and chronic stress explain the potential benefits of remarriage is needed. These variables can be studied as mediators or moderators of recovery from divorce, and doing so may help reveal important variability in average effects across time.

A second avenue of study for improving the impoverished data situation is to collect more detailed *psychological* measures about the experience of divorce, then link these measures to health-relevant or disease endpoints. High-quality, processes-focused research in this area is almost absent. This lack of empirical research on the psychology of divorce is surprising given longstanding observations that divorce can induce shame, longing, loneliness, humiliation, rumination, identity disruptions, and prolonged anger or grief (Weiss, 1975). Presumably, it is these emotional experiences that give rise to, or at least co-vary with, more severe forms of psychopathology (Afifi, Cox, & Enns, 2006), and comorbid psychological disorders also represent important (potential) moderators. An excellent example of this type of work is a study by Kendler and colleagues (Kendler, et al., 2003), which demonstrated that stressful loss events characterized by a high degree of humiliation (e.g. your partner leaving you in a very public way) are associated with a 22% increase in risk for a depressive episode within the month of event occurrence. These findings suggest that the psychological dimensions of a loss event—including humiliation, entrapment, and danger (see Brown, Harris, & Hepworth, 1995), not the events in question—are the most salient predictors of important mental health outcomes. To overcome the problem of impoverished data, work of this nature is greatly needed in the study of divorce and health; deepening our understanding of the psychosocial moderators of the association between divorce and death will surely help the field move beyond the statistical mean.

Back to the Future: Revisiting the Diathesis-Stress Model (Theme 3)

The quote associated with Theme 3 reminds us that it is essential to understand divorce within the broader context of a person's complete set of life experiences. When we do so, it becomes hard to view the stress of divorce as a unique, stand-alone main effect; rather, the essence of Theme 3 is that we look to a person's past experiences to understand how they might respond to their marital separation. In many ways, Theme 3 is an extension of our argument for studying moderators and can be located squarely within the diathesis-stress model.

Figure 2 provides a multilevel model for conceptualizing how distal vulnerabilities may interact with more proximal social, cognitive/affective, and health behavior responses to predict health following a stressful divorce. An obvious criticism of the model is that we suggest an “everything is associated with everything else” process, which, by definition, lacks theoretical and conceptual specificity. We recognize this concern, but note that the model captures much of the complexity inherent in understanding why some people may be at unique risk for divorce, as well as poor outcomes following divorce. Although it is well known that many different variables may serve as underlying vulnerabilities within the diathesis-stress model (Monroe & Simons, 1991), we limit our discussion to two processes that we believe are ripe for investigation related to divorce, both of which have an origin in early childhood experience: life history strategies and deoxyribonucleic acid (DNA) methylation.

Life history strategies

Life History Theory (LHT; Charnov, 1993; Stearns, 1977) is an evolutionary framework for understanding how people allocate resources toward their survival— or, more specifically, the survival of their genes in the population. How people allocate resources toward or away from both reproductive efforts and parenting investments constitutes a fundamental trade-off within LHT; individual differences in life history strategies appear to be a function of both heritable individual differences and early rearing environments (see Ellis, 2004; Figueredo et al., 2006).

Most humans devote their resources to continued survival (vs. reproductive efforts) and to deep parental investments (vs. mating efforts), but within this broad range of functioning, people vary quite substantially. These behavioral and psychological strategies are referred to as differential K strategies (the “K” terminology is derived from basic mathematic models in ecology and evolutionary biology; Rushton, 2004). People at the low end of the differential K-strategy continuum are more likely to evidence risk-taking, low parental investment, and disregard for social conventions; in contrast, people at the high end of the continuum evidence a psychological and behavioral repertoire that appears much more stable and suited for both longevity and parental investment (see Figueredo et al., 2006).

We believe that studying differential K-strategies in the context of divorce holds considerable promise. If people who engage in low-K strategies (as a function of their genetic propensity *and* developmental history) are more likely to be promiscuous in general and, after their marriage ends, to engage in more health-damaging behaviors, and/or to have difficulty maintaining high-quality social relationships, we suspect it is these people who will also evidence the worst health outcomes. Thus, LHT provides an integrative framework for thinking about who will (and will not) engage in a constellation of risk behaviors and be faced with—or perhaps create— chronic stress after divorce. Ultimately, in terms of studying variability in distal health outcomes (see Figure 2), LHT-derived behavioral and psychological profiles may prove especially tractable.

Epigenetic programming

Beyond contributing to behavioral and psychological profiles that may convey health risk, early rearing experiences can program biological responses in a manner that places people at risk for poor health later in life. Early social behaviors can cause molecular changes at the level of the genome that promote or constrain health-relevant biological responses. As a discipline, epigenetics investigates how experience can change gene expression without altering the underlying nucleotide structure, and startling evidence reveals that these changes can alter observable phenotypes across multiple generations (e.g., Singh, Murphy, & O'Reilly, 2002).

The most well-developed animal model for the lasting effect of early care is the rat dam-pup dyad. Maternal rats (dams) show natural variability in two caregiving behaviors, licking and grooming (LG) and arched-back nursing (ABN), and these behaviors lead to changes in pups' hypothalamic-pituitary-adrenal (HPA) responses to stress (Meaney, 2001). Pups of high-LG-ABN dams show less fearful behavioral responding and less HPA responding than pups of low-LG-ABN mothers (Liu et al., 1997). These differences emerge over the first week of life, are a function of changes in the glucocorticoid receptor gene promoter region in the hippocampi, and are maintained into adulthood (Liu et al., 1997). Specifically, these maternal behaviors result in changes in DNA methylation and chromatin structures, which are chemical changes to the genome that result in differences in gene expression (Weaver et al., 2004). In effect, these changes represent a genomic imprinting by maternal behavior that has long-term implications for stress responding as a function of hippocampal glucocorticoid receptor (GR) gene expression (Zhang et al., 2006).

How can epigenetics inform the study of adult relationships and health? Miller, Chen, and Parker (2011) have recently advanced a model of biological embedding that explains how early adverse experiences can alter cellular signals and sculpt biological processes in a manner that results in increased risk for poor health in later life. One view of these biological changes is a "defensive programming hypothesis"—the idea that early stress sensitizes biological systems to be highly responsive in order to promote survival. This sensitization, or programming, has adaptive value in the short-term but can be physiologically destructive over the long-term through exaggerated neuroendocrine and inflammatory responses (Miller et al., 2009; Zhang, et al., 2006).

This idea maps nicely onto the LHT strategies discussed above and can more easily be understood from a behavioral ecology standpoint. Predictive adaptive responses (PARs) are biologically programmed reactions to expected environmental stressors (Gluckman & Hanson, 2004). They serve the purpose of creating a biological set point for reactivity to stressors and ready the organism for the rest of its life based on its current environment. The programming occurs during the critical period of child development, allowing these responses to be functionally embedded in the body's physiology. These responses take diverse forms, involving the cardiovascular, neuroendocrine, and immune systems. The traditional ancestral environment contained dangerous situations relevant to these PARs. If separated from the social group, cuts and scratches from predators and the stresses of living alone would favor an ancestral human with a primed proinflammatory response (Cole, et al., 2007). In conditions of constant fight-or-flight activation, it would behoove our ancestors to develop an efficient system for the rapid delivery of glucocorticoids in service of mobilizing bodily resources for action. What in contemporary times may be considered a hyper-adaptation would, in the ancestral environment, be considered the most efficient strategy for survival. If living beyond a few decades was rare, the wear-and-tear of allostatic load associated with PARs was never an issue. These vestigial adaptations may still function in today's society under specific childhood circumstances, but now result in deterioration of the body's various systems over time.

These ideas have direct applications to studying susceptibility for disease following divorce. We can make a strong moderation hypothesis that the effects of divorce on health outcomes should depend on the extent of DNA methylation in specific gene regions. This gene by environment approach is emerging with increased frequency in the biological psychiatry literature (e.g., Ressler et al., 2011) and can be easily extended to the study of divorce adjustment.

Opportunity Foreclosures and Branching Trees (Theme 4)

Sbarra et al. (2011) suggested that changes in social capital and resources might explain the association between divorce and increased risk for early mortality, but did not articulate a framework for understanding how such processes might unfold. As the quotes associated with Theme 4 suggests, it is obvious and sensible that large movements across the gradient of social resources can impair health (e.g., Adler et al., 1994). We do not yet know specifically how these types of changes combine with other life experiences to canalize a person on a pathway toward good or poor outcomes. From our vantage point, understanding associations between life stress and health can be greatly enhanced by invoking models from the field of developmental psychopathology, which defines pathological outcomes in terms of developmental deviations.

Sroufe (1997) conceptualizes development and pathology using the metaphor of a branching tree: Development begins in the trunk of the tree with many potential endpoints; these endpoints quickly become limited or foreclosed as people experience difficult life events. For example, not completing high school is a deviation from normative development that, on average, forecloses many lifetime opportunities for the accumulation of wealth. Similarly, initiating tobacco use at a young age moves a person from the trunk of good health to a branch with an increased likelihood of cardiovascular disease or cancer; it is not impossible to return to good health, but the likelihood of doing so is diminished and, potentially, foreclosed over time.

The branching tree metaphor provides an excellent framework for understanding how divorce may be associated with distal health outcomes given a person's unique life experiences. In terms of data analysis, classification and regression tree (CART) analysis (Breiman, Friedman, Olshen, & Stone, 1984) can be used to represent the branching limbs toward good or poor health. CART analysis has its roots in machine learning and is a nonparametric modeling approach that uses recursive partitioning procedures to create a series of binary outcomes. A detailed discussion of CART techniques is beyond the scope of this review, but we note that these procedures can use both continuous and binary data for classification in node membership.

To illustrate how this might work in the case of divorce, Figure 3 depicts a fictional CART beginning with someone's propensity to divorce (see Rosenbaum & Rubin, 1983). Propensity score matching is a tool for adjusting "exposure" effects for measured confounds in a non-randomized design (Thoemmes & Kim, 2011). As mentioned above, some people are much more likely than other people to become divorced. Thus, every divorced adult has a propensity to divorce—e.g., people who report considerable marital conflict are more likely to divorce than people with low marital conflict. We can hypothesize that people who report marital conflict (or more depression, hostility, neuroticism, and/or a history of parental divorce) have a greater propensity to divorce than those people who are low on this dimension. Propensity score matching is akin to statistical control, but it allows for a complete quantification of a person's probability for having been exposed to a specific life event. A propensity score, in turn, can serve as an important moderator of divorce adjustment (i.e. who is most vulnerable to the stress of divorce) and thus represents the first node in the classification tree.

As shown in the figure, the tree ends with three negative health outcomes: a cardiovascular event, elevated blood pressure, and elevated C-reactive protein (CRP), an index of systemic inflammation. We have created a fictional tree in which the midpoint nodes are fairly different in each branch of the tree—for some, low social support is highly correlated with smoking initiation, whereas for others high levels of loneliness are linked with sleep

disturbances. To ultimately link the stress of divorce with distal health outcomes will require multi-wave prospective data. Until this data is available, cross-sectional CART models should be explored. The notion of branching trees and opportunity foreclosures are appealing theoretical ideas for the study of psychosocial stress and health, and it will be highly productive if health psychology tackles ideas that have roots in developmental psychopathology (see Sroufe, 1997).

Conclusions

This paper discusses four emerging themes in the study of divorce and health. Our goal was to present a case study for health psychology by illustrating how the emerging themes can shed increased light on exactly why and how some people are at risk for early death following a marital separation. To contextualize the ideas in everyday language, we linked each of our themes to comments on a Huffington Post blog about divorce and death. These selected quotes illustrate many important ideas that have turned the study of divorce into a useful exploration of emerging trends in the field of psychosocial stress and health more generally.

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Themes	Key Elements	Relevant Huffington Post Comment
Theme 1: We die from illness, not divorce.	Key Element 1: Responses to divorce are diverse.	"Divorce can be traumatic... but staying in a bad marriage is torture."
	Key Element 2: Divorce can result in a "proliferation of stress."	"Divorce and/or the death of a spouse puts tremendous strain on one's life - it changes everything. Sure it will impact eating and sleeping and the bills still have to be paid, the kids still need to be fed and the dog still needs to go out. In short, it's exhausting."
Theme 2: What does the statistical mean mean?	Key Element 1: The statistical mean may be <i>meaningless</i> for drawing conclusions about the psychosocial and health sequelae of divorce.	"I am divorced and have never been more healthy and happy. " "Marriage is the secret to a long slow painful death... Ooops, don't tell my wife I said that..."
	Key Element 2: Psychosocial variables must be measured- who initiates the separation, are there children?, high/low conflict, etc.	"I was married to an abusive (physically, emotionally, and verbally) man for 27 years...It's great to be with someone who is kind, loving, and appreciative."
Theme 3: The Stress-Diathesis Model	Key Element 3: More detailed psychological measures must be gathered- shame, humiliation, longing, rumination, etc.	"At times, I feel disillusioned and want to just give up. That happens to everyone, but divorcing has taken it to such an extreme...having to totally reinvent myself at an age where I'd prefer to be comfortable in my skin."
	Key Element 1: It is essential to understand divorce within the broader context of a person's complete set of life experiences.	"At least for me, I don't think I made a good choice when I got married, and after divorce, I'm still not making good choices. If I die younger, it's because of all my actions, not just one."
Theme 4: Opportunity Foreclosure	Key Element 1: Stressful life events both open and foreclose opportunities for material and social resources.	"Poverty certainly plays a major role in health and happiness. So it makes sense that someone who moves down a notch in lifestyle due to finances would be less healthy, and therefore at risk of disease, and disease in turn leads to early death."
	Key Element 2: Some people are much more likely than others to become divorced (propensity analysis).	"... the females will still get eighty percent [of the marriage's possessions] and the male twenty percent. Six marriages ago I found a way to get around that."

Figure 1.

Major themes of the paper and comments from The Huffington Post readership that illustrate these themes. A major challenge for nomothetic research is to fully capture and represent the richness of idiographic accounts of divorce.

Figure 2.

A multilevel framework for depicting how distal vulnerabilities may interact with more proximal social, cognitive/affective, and health behavior responses to predict health following divorce.

Figure 3.

A fictional example of how opportunity foreclosures can be studied using classification and regression tree (CART) analyses following divorce. The key conceptual ideas are that movement from the divorce toward distal health outcomes (pictured at the top of the figure) can be understood in terms of cumulative risk exposures, each of which foreclose opportunities for positive outcomes and increase the probability for poor outcomes in the future. People at low risk (i.e., who have low propensity to be divorced) can realize negative health outcomes, just as people at high risk can realize positive health outcomes. CRP = C-reactive protein; BP = Blood pressure; BMI = Body mass index.