

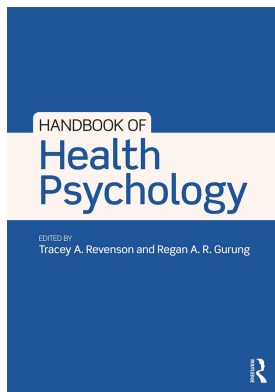
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### **Adjustment to Chronic Illness**

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## 13

ADJUSTMENT TO CHRONIC  
ILLNESS

*Michael A. Hoyt and Annette L. Stanton*

Chronic illness affects most adults, whether directly or through a close other's diagnosis. Noncommunicable disease accounts for 70% of worldwide mortality (World Health Organization [WHO], 2017). Advances in health care and public health allow people diagnosed with the rapidly fatal diseases of past decades to live longer (Centers for Disease Control and Prevention [CDC], 2017). However, prolonged illnesses can disrupt their lives in profound ways. Health psychologists and others have devoted intense empirical and clinical attention to identifying psychosocial and biobehavioral contributors to and consequences of chronic illness and to developing approaches to reduce physical and psychological morbidity.

This review focuses on studies of adults with cancer, cardiovascular disease, diabetes, HIV/AIDS, and rheumatic diseases. These conditions comprise significant morbidity and mortality, and have received substantial empirical attention. Rather than an exhaustive review of the voluminous literature, we focus on recent empirical literature to advance a model of psychological adjustment. The discussion centers on individual adult adjustment; substantial research also is available regarding illness-related adjustment in children, adolescents, couples, caregivers, and families.

### **Conceptualizing Adjustment to Chronic Illness**

#### *Indicators of Adjustment*

There is a wide array of reactions to chronic disease. Researchers have offered conceptualizations of positive adjustment to chronic conditions that incorporate cognitive, emotional, behavioral, social, and physical processes. These interrelated domains include: (1) mastery of illness-related adaptive tasks (including adherence to medical and behavioral prescriptions); (2) absence of psychological disorder; (3) experience of relatively low negative mood and high positive mood and experiences; (4) maintenance of adequate functional status and social roles; and (5) perceptions of high quality of life.

Mastery of tasks associated with meeting the numerous demands of chronic illness signals successful adjustment. Taylor (1983) advanced a model of cognitive adaptation that involves the tasks of self-esteem enhancement, maintenance of perceived mastery, and searching for meaning. The prevalence of diagnosable psychological disorders is documented in samples of individuals with chronic illness (e.g., Blashill, Gordon, Mimiaga, & Safren, 2014; Mitchell, Ferguson, Gill, Paul, & Symonds, 2013), with a focus on adjustment disorders, depression and related mood disorders, and anxiety disorders (including posttraumatic stress disorder). However, most adults with chronic disease do not develop

symptoms meeting diagnostic threshold for psychopathology. Therefore, sub-clinical levels of depressive or anxiety-related symptoms are commonly used to indicate adjustment.

Relatively high negative mood is often used to signal poor adjustment. Both general (e.g., global distress) and disease-specific (e.g., fear of disease recurrence) outcomes are assessed. Positive mood and other indicators of positive functioning are increasingly studied. Daily diary and other momentary assessment methods are employed in some studies to determine dynamic patterns of affect (e.g., Mun et al., 2017).

Functional status and role-related behaviors also indicate adjustment. An example is vocational functioning, including resumption of employment (e.g., Bhattacharyya, Perkins-Porras, Whitehead, & Steptoe, 2007). In a meta-analysis, de Boer, Taskila, Ojajarvi, van Dijk, and Verbeek (2009) found that cancer patients were 1.37 times more likely to be unemployed than the general population. Functional status also can include mobility and ability to complete routine activities. In the social realm, adjustment is indicated by the ability to maintain social roles and relationships. Perceived satisfaction or functioning in various life domains, either overall life satisfaction or perceptions of quality of life within specific domains (e.g., social, sexual, emotional, physical), can also denote adjustment. Researchers also examine the experience of disease- and treatment-related symptoms or related life disruption (e.g., Hoyt, Stanton, Irwin, & Thomas, 2013).

### ***Observations on Adjustment to Chronic Illness***

Several broad observations emerge from examining the array of conceptualizations of adjustment. First, adjustment to chronic illness is multidimensional and biopsychosocial. Second, the dimensions are interrelated. Depressive symptoms can contribute to functional status (e.g., poor glycemic control) in individuals with diabetes, for example (Schmitz et al., 2014).

A third observation is that heterogeneity in adjustment is apparent across diseases and individuals. Although most adults with chronic disease appear to adjust well over time, heightened risk for distress and dysfunction are well-documented (e.g., Whooley & Wong, 2013). In a prospective study demonstrating variability among diseases, Polsky and colleagues (2005) examined five biennial waves of data for more than 8,300 adults; individuals with cancer had the highest risk of onset of marked depressive symptoms within two years after diagnosis (hazard ratio [HR] = 3.55), followed by chronic lung disease (HR = 2.21) and heart disease (HR = 1.45), versus those with no incident disease. Risk of depressive symptoms did not emerge for adults with arthritis (HR = 1.46) until two to four years after diagnosis, and it extended through eight years after diagnosis for those with heart disease. The examination of trajectories of adjustment indicators over time also reveals distinct patterns between subgroups of individuals and over the disease course (e.g., Durá-Ferrandis et al., 2017; Kelso-Chichetto et al., 2017). Patterns often include reports of consistently high distress, low and stable levels of distress, and elevations and/or declines in distress over time.

Another observation is that psychological adjustment involves both positive and negative dimensions. Positive and negative affect are separable constructs with differential determinants and consequences (Ong, Zautra, & Finan, 2017). Even when undergoing difficult circumstances, individuals often experience positive emotions and discover meaning from their experience (e.g., Bower et al., 2005). Relying only on indication of distress will yield a partial picture of adjustment; it is also limited in that acute distress does not necessarily presage long-term interference with functioning and goal pursuit. Under stressful conditions, positive and negative affect tend to become negatively correlated, suggesting that positive affect might buffer or repair the effects of distress (e.g., Smith & Zautra, 2008). Incorporation of positive adjustment indicators also helps to counter notions that unremitting suffering and despair are guaranteed upon diagnosis.

Adjustment to chronic illness is a complex and dynamic phenomenon that unfolds over time. We recommend that researchers carefully consider their assumptions of what constitutes positive

adjustment, tailor their assessments to the theoretical question of interest, recognize that any particular assessment provides only a snapshot of circumscribed dimensions of functioning, and limit their conclusions regarding adjustment accordingly. Only through research tapping multiple dimensions of adjustment can a comprehensive portrait be achieved.

## **Contributors to Adjustment to Chronic Illness**

### ***Theoretical Perspectives on Contributors to Adjustment to Chronic Illness***

Theories of adjustment to chronic illness often derive from more general conceptual frameworks regarding adjustment to persistent stressful experiences. Among the most prominent is stress and coping theory (Lazarus & Folkman, 1984), in which central determinants of adaptive outcomes include attributes of the situation, personal resources, cognitive appraisals, and coping processes. Accordingly, cognitive appraisals and coping strategies engaged in response to a stressor substantially determine adaptive outcomes across domains.

Appraisals relevant to goal pursuit also have received attention. When one is committed to the pursuit of important goals, appraising satisfactory progress toward their attainment will contribute to positive emotional experience, and negative emotions will result from appraisals of goal blockage (Lazarus, 1991). As disease-related demands are perceived as threatening to central goals, the greater the perception of stress, the more coping processes are engaged. Self-regulation theories highlight the importance of perceived goal blockage in shaping coping and adjustment (e.g., Leventhal, Halm, Horowitz, Leventhal, & Ozakinci, 2005). To the extent that an individual expects that goals are obtainable despite illness, or to the extent that one perceives ability to identify and engage in alternative goal pursuit, then initiation of approach-oriented coping strategies is likely (Hoyt, Nelson, et al., 2017). However, if a person expects unremitting goal blockage and does not engage in new goals, disengagement might ensue. Likewise, continued pursuit of unobtainable goals will likely exert a negative effect on adjustment (Wrosch, Scheier, Miller, Schulz, & Carver, 2003).

Self-regulation theories address the implications of specific illness perceptions for adjustment. Illness may be perceived as a threat to the self-system, identity, timeline, controllability, and consequences (see Hagger, Koch, Chatzisarantis, & Orbell, 2017), with associated impact on adjustment. Chronic disease can destabilize perceptions of control over bodily integrity, ability to engage in day-to-day activities, and fulfillment of social roles. Individuals are likely to discover controllable aspects of their disease (e.g., symptom management), and the adaptive potential of control appraisals might depend on whether the threat is responsive to control attempts (Helgeson, 1992).

Extending from examinations of perceptions of personal growth following trauma (e.g., Tedeschi & Calhoun, 1995), theoretical and empirical work is illuminating the meaning and consequences of perceiving benefit in the illness experience (see Park, Lechner, Antoni, & Stanton, 2009). Individuals commonly construe their illness experience as conferring benefits in a number of realms, including enhanced relationships, greater appreciation of life, enhanced personal strength, sharpened awareness of priorities, and deepened spirituality. Appraisals of benefit or personal growth from illness experiences might facilitate reprioritization (Tedeschi & Calhoun, 1995) or maintenance of goals and self-schemas disrupted by illness-related stressors. Research in women with breast cancer suggests that growth is an unfolding process (Wang et al., 2014) whereby perceptions of personal growth buffer against feelings of vulnerability (Wang et al., 2017).

Theories of adjustment to chronic illness also specify various contexts that can influence appraisal and coping processes, ultimately shaping adjustment (e.g., Moos & Schaefer, 1993). These include macro-level factors such as socioeconomic status (SES), gender, and culture (e.g., Gallo & Matthews, 2003; Taylor et al., 2000; Whitfield, Weidner, Clark, & Anderson, 2002), as well as interpersonal,

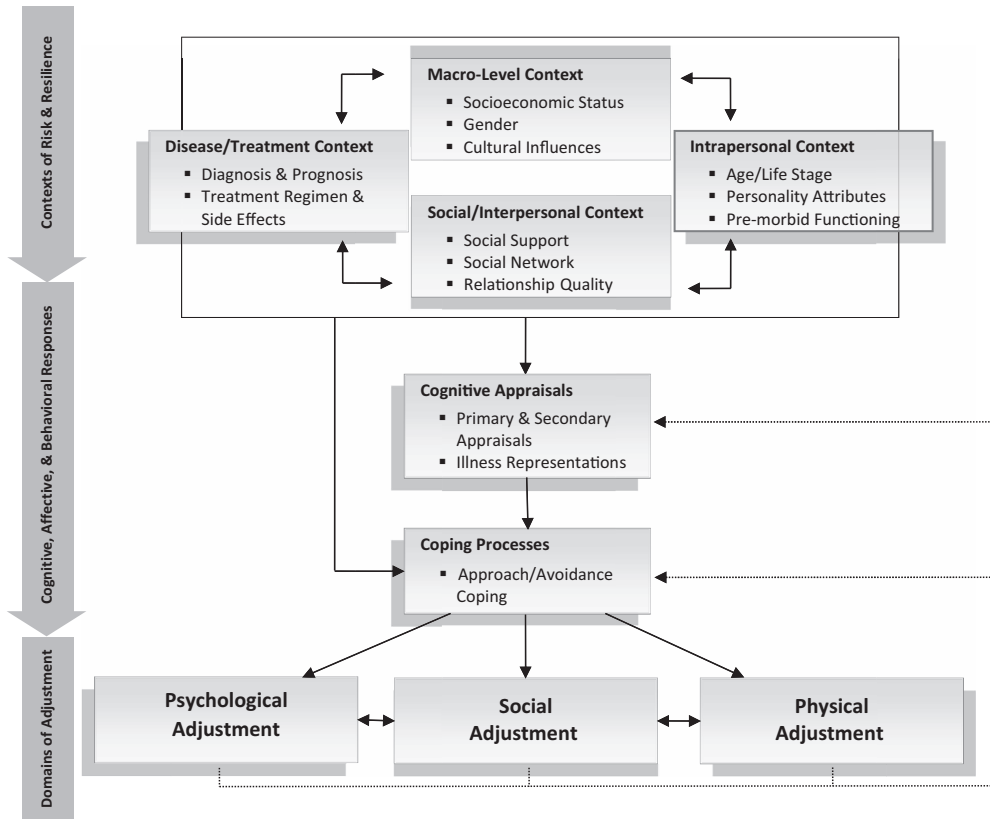


Figure 13.1 Contributors to Adjustment to Chronic Illness

intrapersonal, and disease-related contexts. Integrating frameworks regarding adjustment to chronic disease, we offer a conceptual model of influences on adjustment in Figure 13.1; recursive links and additional moderating and mediating factors are likely. In the following sections, we synthesize empirical support for the contributors to adjustment and suggest that longitudinal research over the past several decades bolsters support for causal inferences regarding risk and protective factors for adjustment to chronic disease (see also Helgeson & Zajdel, 2017; Moss-Morris, 2013).

### ***Empirical Research on Contributors to Adjustment to Chronic Illness***

#### *Sociocultural Context*

Understanding disparities in health related to macro-level contextual factors such as race, ethnicity, gender, social class, and sexual orientation is a pressing research priority. Such contexts shape responses to illness (Landrine & Klonoff, 2003) and influence the availability and quality of resources. Contextual factors can operate together. For example, culturally determined behaviors in Latino families (e.g., familial dietary practices) likely interact with socioeconomic factors (e.g., the availability of healthy foods within a low-income neighborhood) to influence individual responses to diabetes. Such intersections prompt the need for analysis of the influence of broader social and historical environments on adjustment to chronic illness. More work is needed to understand how intersectionality (see Cole, 2009) of multiple group memberships affects adaptation to chronic illness.

RACE/ETHNICITY

Substantial evidence demonstrates that incidence and consequences of chronic illness do not occur equally across ethnic and racial groups (Adler, 2013). Research suggests less favorable adjustment to illness among ethnic minorities, particularly Latinas/os and African Americans. For instance, Allen and colleagues (2010) found that African Americans with osteoarthritis reported worse pain and overall functioning than Caucasians. Notably, racial differences were accounted for by self-efficacy, affect, and use of emotion-focused coping.

It is essential to investigate mechanisms for any obtained group differences in adjustment (see Yanez, McGinty, Buitrago, Ramirez, & Penedo, 2016), for a proposed model in Latina/o cancer patients). Health care delivery and medical interactions are likely pathways. For example, relative to their White counterparts, ethnic minority patients receive less health-related information (Cooper-Patrick et al., 1999), perceive less positive affect from physicians (Johnson, Roter, Powe, & Cooper, 2004), are less likely to receive particular medical procedures (e.g., Maly, Stein, Umezawa, Leake, & Anglin, 2008), and are less likely to receive antidepressant medication for depressive symptoms (Waldman et al., 2009).

Racism and discrimination also affect health (Brondolo, Gallo, & Myers, 2009). Targets of discrimination disproportionately encounter chronic stressors and daily hassles. Disease-related stressors may act synergistically to tax coping resources and negatively influence adjustment. Research that moves beyond documenting between-group differences to examine culturally relevant processes and to incorporate intersectionality is needed.

GENDER-RELATED PROCESSES

Gender differences in depression and anxiety mirror evidence on depressive and anxiety symptoms in the general population (Salk, Hyde, & Abramson, 2017), in that women with chronic illness report higher distress than men do (Linden, Vodermaier, MacKenzie, & Greig, 2012; Polsky et al., 2005), though exceptions exist. Indicators of adjustment might be experienced differently across gender groups. For instance, research in men with prostate cancer has identified male-linked presentations of depressive symptoms (Sharpley, Bitsika, Christie, & Hunter, 2017). Research in gender non-conforming and transgender individuals with chronic illness is needed. Specification of how gender shapes emotional, behavioral, and physiological responses to illness-related stressors also is warranted (e.g., Taylor and colleagues' [2000] tend-and-befriend model of stress responses). Gender differences in inflammatory and neuroendocrine processes might be mediated by gender-related differences in stress appraisals and emotional responses to stressors, which has implications for adjustment to illness (Darnell & Suarez, 2009).

Elements of gender roles are likely contributors to adjustment to chronic illness (for a review, see Bright and Stanton [2018]). For example, Helgeson and others (see Helgeson, 2012) have documented the hazards of unmitigated agency—a disposition more prevalent in men that involves a disregard for others, a hostile orientation, and an inflated self-view—for adults living with chronic disease. A parallel orientation, unmitigated communion—characterized by a focus on others to the detriment of self-care—is more prevalent in women and is associated with higher distress during chronic illness.

Perceived threats to traditional gender roles also are important. For instance, one-third of men with prostate cancer report diminished masculinity, which is related to greater symptom-related worry (Zaider, Manne, Nelson, Mulhall, & Kissane, 2012). Moreover, men with prostate cancer who reported greater cancer-related masculine threat experience declines in health-related quality of life (Hoyt et al., 2013). Gender role expectations can also shape the acceptability and use of particular coping responses (Hoyt et al., 2013).

## SOCIOECONOMIC STATUS

The constant struggle for resources to meet basic human needs can severely constrain coping resources and constitutes a significant vulnerability for poor adjustment to chronic conditions. Inequalities in SES are associated with morbidity and mortality as well as receipt and quality of health care (see Chen & Miller, 2013). SES affects health-related outcomes directly and through environmental, biological, and psychosocial mechanisms, including access to and quality of health care, as well as circumstances influencing risky and protective health behaviors.

Low-SES environments can inflict a physical and psychological toll, leading to more consistent exposure to stressful life events coupled with fewer social and psychological resources to manage them (Gallo & Matthews, 2003). Maly, Liu, Liang, and Ganz (2015) observed declining adjustment in low-income women with breast cancer in comparison to population norms; patient self-efficacy in physician interactions was associated with better adjustment. In fact, low social status, and perceptions of illness as burdensome or uncontrollable, signal appraisals of helplessness and hopelessness and predict greater depressive symptoms and poorer functional status among the chronically ill (Havranek, Spertus, Masoudi, Jones, & Rumsfeld, 2004).

Although we conceptualize SES as a predictor of adjustment, the relation is bidirectional. For example, chronic, disabling diseases have enormous impact on work ability (e.g., Minkler, Fuller-Thomson, & Guralnik, 2006). Studies of RA patients show that people often terminate employment early in the disease process (e.g., Reisine, Fifield, Walsh, & Feinn, 2001). Such work-related disability can create downward drift in SES.

## SEXUAL ORIENTATION

Research on adjustment among sexual minorities is relatively sparse. Early life experiences, chronic life stressors, and disproportionate experiences with discrimination and rejection increase vulnerability to poor adjustment to illness and are associated with health disparities (McLaughlin, Hatzenbuehler, & Keyes, 2010). LGBT cancer survivors report more depression and relationship difficulties than heterosexual survivors (Kamen, Mustian, Dozier, Bowen, & Li, 2015). Similarly, gay and bisexual prostate cancer survivors evidence worse sexual functioning, higher distress, and lower treatment satisfaction than heterosexual men (Ussher et al., 2016).

Understanding the influence of sexual orientation on adjustment and associated mechanisms will need to include discovery of unique strengths that foster positive adjustment. For instance, sexual minorities with chronic illness are likely to identify friends as strong sources of support (e.g., Fredriksen-Goldsen, Kim, Muraco, & Mincer, 2009), and gay men with prostate cancer describe feeling more capable of managing illness demands after having successfully faced challenges related to sexual orientation (Hoyt, Frost, et al., 2017).

*Disease and Treatment Context*

Disease course (e.g., progressive versus remitting), prognosis, toxicity of treatment, degree of associated pain, and necessity for lifestyle changes all vary in controllability, predictability, and severity across different chronic diseases. Even within disease category, heterogeneity exists. For instance, the daily experience of a newly diagnosed patient with diabetes initiating insulin control behaviors may be very different than adaptive tasks for someone diagnosed years prior with well-established daily practices and controlled insulin.

The impact of the disease and treatment context on adjustment often is examined in samples of patients at similar phases in the disease course or with similar treatment profiles. However, individual differences can contribute to across- and within disease variability. For instance, in a prospective study

of adults with COPD, the individual's uncertainty about symptoms and prognosis predicted depressive and anxiety symptoms, health-related quality of life, and breathlessness over a two-year period (Hoth et al., 2013). A perception of a terminal prognosis is associated with lower quality of life and higher anxiety in cancer patients with advanced disease (Nipp et al., 2015). Disease processes themselves also can be influenced by one's internal and external resources and adjustment (e.g., Fagundes, Murdock, Chirinos, & Green, 2017).

In a six-year, prospective population-based cohort study of cancer adjustment trajectories, Burton, Galatzer-Levy, and Bonanno (2015) observed that patients exhibiting increasing depressive symptoms were more likely to have received chemotherapy. However, it is noteworthy that many studies demonstrate nonsignificant relationships between objective disease-related factors and adjustment. Bardwell et al. (2006) examined the relative contribution of early stage breast cancer parameters (e.g., treatment type, time since diagnosis, cancer stage), health behaviors, and psychosocial variables (e.g., social support, optimism) to depressive symptoms in a large sample ( $N = 2,595$ ) of women in treatment; disease and treatment factors were not significant predictors. Subjective interpretations and appraisals of disease factors, as well as coping responses and social functioning, may be more important to psychological adjustment than objective indicators.

Although disease and treatment variables are typically considered within disease category, comparing results across chronic illnesses could facilitate the discovery of important mechanisms of adjustment. Further, researchers often control statistically for disease and treatment variables without reporting the magnitude of their relations with adjustment, leaving little to be learned about their influence. In addition, investigators seldom hypothesize or test interactions of disease-related variables with other predictors.

### *Social/Interpersonal Context*

A large literature is available on the impact of the social context on adjustment to and management of chronic illness (Martire & Helgeson, 2017). Satisfying interpersonal relationships can provide a forum for emotional expression and processing, practical assistance in managing illness, and reinforcement of one's sense of meaning and connectedness. Support can encourage positive health behaviors and minimize risky behaviors. For instance, in breast cancer patients receiving endocrine therapy prescriptions, greater perceived availability of social support at prescription initiation was associated with a lower level of depressive symptoms one month later, which in turn was related to higher objective adherence four months after study entry (Bright & Stanton, 2018).

Compared to those reporting less support, patients receiving more social support tend to exhibit more effective coping, higher self-esteem and life satisfaction, and fewer depressive symptoms. Sound social support partially explains trajectories of psychological adjustment to chronic illness (e.g., Durá-Ferrandis et al., 2017). Although social support is typically assessed as a fairly stable characteristic, its effects can change over time. It is also important to note that chronic disease itself can restrict one's ability to engage in typical social activities or changing the communication climate (e.g., Fryand, Moum, Finset, & Glennas, 2002).

Support attempts can be ill-timed or poorly matched to an individual's needs. Expectations for what constitutes appropriate support and the manner in which one mobilizes and uses available support varies. Many well-intended attempts at helping can go awry, particularly when the provided support is not perceived as helpful or desired. For instance, social constraints, or the perception that others are unsupportive or unreceptive to one's emotional expression, is associated with poorer adjustment across illness groups. It is important to distinguish problematic support from the absence of support, as social isolation predicts poorer cancer-related quality of life over and above treatment- and tumor-related factors (Michael, Berkman, Colditz, Holmes, & Kawachi, 2002).



## DYADIC INFLUENCES

Research examining social support and interpersonal interactions in the context of dyadic relationships, particularly partner and caregiver relationships, has surged (see Gamarel & Revenson, 2015). Marital dissatisfaction predicts poorer cancer-related adjustment over time (e.g., Kayser et al., 2018). Higher marital satisfaction predicts shorter hospitalization following coronary artery bypass graft (CABG) in women, but not men (Kulik & Mahler, 2006). In a daily diary study, adults with diabetes who felt emotionally supported by their partners demonstrated happier mood and were more likely to evidence exercise and dietary adherence, whereas patients who perceived their partners as controlling reported more daily negative mood (Helgeson, Mascatelli, Seltman, Korytkowski, & Hausmann, 2016).

Accumulating evidence demonstrates that the traits, cognitive appraisals, and coping processes of partners can affect patients' adjustment (see Traa, DeVries, Bodenmann, & DenOuden, 2015). In a study of men receiving elective CABG (Ruiz et al., 2006), partners' pre-surgical neuroticism predicted patients' higher depressive symptoms 18 months later (moderated by relationship satisfaction). Dismissal of emotions to avoid disagreements or to protect the patient from difficult feelings (i.e., protective buffering) can prevent successful cognitive and emotional processing and increase distress (e.g., Langer, Brown, & Syrjala, 2009).

*Intrapersonal Context*

Dispositional or historical factors constitute risk and protective factors for adjustment. For instance, a history of depression or psychosocial dysfunction prior to chronic illness confers vulnerability to poorer adjustment following diagnosis (Conner et al., 2006). Individual differences in personality attributes also influence responses to stress. For instance, neuroticism consistently predicts long-term distress in cancer patients (Cook, Salmon, Hayes, Byrne, & Fisher, 2018). Similarly, higher optimism predicts lower pain intensity and physical symptoms after CABG surgery (Ronaldson et al., 2014). Other personality traits have received study. For instance, conscientiousness also is associated with lower diabetes-related mortality (Jokela et al., 2014). Clusters of personality traits also have been examined (e.g., Zhang et al., 2016). Social transactions may mediate the effects of personality. For instance, interpersonal sensitivity, the predisposition to perceive or elicit criticism and rejection from others, influences adjustment through social processes (see Marin & Miller, 2013).

*Cognitive Appraisals*

Individuals' appraisals and expectancies regarding illness can affect adjustment, and cognitive processes are potential targets of intervention. Numerous appraisal processes have been examined, though here we focus on appraisal processes as they map onto the stress and coping framework (Lazarus & Folkman, 1984; also see Hagger et al., 2017; Helgeson & Zajdel, 2017).

## PRIMARY APPRAISALS

Primary appraisal involves the individual's determination of a potentially stressful encounter's significance for well-being through assessments of threat/harm and challenge/benefit. Simultaneous appraisals of threat and challenge occur in chronic disease (e.g., Hart & Charles, 2013), and both predict adjustment. Relatively little research models the impact of appraisals on patterns of adjustment over time. Reporting on cancer-related threat and challenge appraisals over 18 months, recently diagnosed colorectal cancer patients who were older reported higher challenge appraisals than younger

adults; however, appraisals of threat (rather than challenge) accounted for older adults' more rapid decline in negative affect (Hart & Charles, 2013).

Chronic illness can disrupt the ability to maintain social and family roles; related threat appraisals are associated with worse mental health, particularly when the role is highly valued within one's cultural context (e.g., Abraido-Lanza, 1997). Such illness-related appraisals can signal a threat to the achievement of distal or higher-level (e.g., to be a good parent) and proximal or lower-level (e.g., to complete the weekly shopping) goals. In a longitudinal study of arthritis patients, goal-oriented processes including goal engagement and having broad goal management repertoire were related to better adjustment across time (Arends, Bode, Taal, & van de Laar, 2016). Continued research on how chronically ill individuals appraise and regulate goal pursuits is needed.

#### SECONDARY APPRAISALS

Maintaining perceptions of control over aspects of chronic disease and having confidence in one's ability to affect a desired outcome (i.e., self-efficacy) have long been considered valuable in adapting to chronic illness. Among CABG patients, individuals who expect more control over their recovery have briefer hospital stays, report less pre- and postoperative distress, and demonstrate an improvement in physical functioning (Barry, Kasl, Lictman, Vaccarino, & Krumholz, 2006). In a five-year study of young adults with Type I diabetes, stronger perceptions of control over their illness predicted a relative decrease in treatment-related problems five years later (Rassart et al., 2015).

Appraisals of control and self-efficacy are associated with the choice of coping strategies. In general, greater self-efficacy and having a sense of control over one's illness is associated with greater use of approach-oriented coping, which in turn tends to be related to more positive adjustment (see Roesch & Weiner, 2001). Coping self-efficacy refers to expectations about one's ability to carry out various coping strategies. Thus, individuals are more likely to employ coping strategies for which they have higher efficacy expectations. Likewise, disease-related self-efficacy expectancies predict positive adjustment (e.g., Schneider et al., 2012).

#### *Coping*

Heterogeneity across studies exists in how coping is assessed, relationships obtained between coping strategies and outcomes, and the inferences that are made. Findings regarding the salutary effects of approach-oriented coping are not as consistent as those for the hazards of avoidant coping (e.g., Morris, Moghaddam, Tickle, & Biswas, 2017). Approaching illness-related emotions also predicts positive outcomes under particular conditions (see Moreno, Wiley, & Stanton, 2017). In longitudinal studies, emotional expression and other emotion regulation efforts predict adjustment in breast cancer survivors (Stanton et al., 2000) and arthritis patients (e.g., Hamilton, Zautra, & Reich, 2005). Approach-oriented coping also affects adjustment in other contexts. For instance, provision of early palliative care to adults newly diagnosed with incurable lung or gastrointestinal cancer improved quality of life and reduced depressive symptoms by increasing use of approach-oriented coping (Greer et al., 2018).

#### **Future Research Directions**

This synthesis supports a biopsychosocial framework for adjustment to chronic illness in which the process of adaptation is multiply determined. Although enduring psychological distress is an important dependent variable, expansion of outcomes to additional domains, including functional and biobehavioral variables and positive indicators of adjustment, is recommended. This is increasingly critical as the number of individuals with multiple chronic conditions continues to increase (Parekh,

Goodman, Gordon, Koh, & The HHS Interagency Workgroup on Multiple Chronic Conditions, 2011). Multiple diagnoses exert compounded physical burden and human suffering. The preponderance of studies of psychological adjustment to chronic illness focus on a single illness. Research with patients with multiple chronic conditions will be necessary to meet the needs of this growing health care challenge.

Investigation of distal and proximal contextual factors remains an important direction for research. Most studies focus on the predictive qualities of a single factor; however, more attention to the combined presence of multiple risk factors can potentiate effects is needed. This will be most important to the investigation of contextual factors to illuminate the determinants of between- and within-group disparities in adjustment. Prospective and longitudinal studies are needed to identify sociocultural predictors and group difference in adjustment trajectories relative to significant events in the disease and treatment course.

A future direction will be to relate literatures on psychosocial contributors to disease progression and psychoneuroimmunology to understand how psychological adjustment reciprocally relates to disease processes and biological mechanisms of disease (e.g., immune dynamics, neuroendocrine regulation, circadian rhythms). Biological processes, such as autonomic and inflammatory responses, contribute to the composition of clusters of adjustment-related symptoms such as fatigue, pain, and depression. Innovation will require characterizing pathophysiological processes that underscore or interfere with positive adjustment. For instance, circadian disruption and heightened inflammation are associated with increased risk of depression among chronic disease groups (e.g., Irwin, Olmstead, Ganz, & Haque, 2013), and emotional responses to acute and sustained stressors contribute to the modulation of neuroendocrine activity that may provide a link between stress responses, suppressed immunity, and disease-related processes (Fegundes et al., 2017). Further, some evidence indicates that trajectories of psychological and related biological processes covary across time (e.g., Thornton, Andersen, Crespin, & Carson, 2007).

A promising direction in biobehavioral research is in identifying genetic and other biological vulnerabilities that might affect risk and resilience, as well as the capacity of the social and intrapersonal contexts to influence gene expression and biological processes (Miller, Chen, & Cole, 2009). Identification of genetic vulnerability for poor adjustment will enhance precision in the identification and treatment of patients at high risk for poor adjustment. For instance, Dooley, Ganz, Cole, Crespi, and Bower (2016) identified that breast cancer survivors genetically predisposed to lower levels of neuroplasticity are at greater risk for inflammation-associated depressive symptoms.

Relatively few studies have tested comprehensive models of adjustment in longitudinal designs (see Kershaw et al., 2008 for a model). Evaluations of comprehensive models will allow investigators to hone theories of adjustment, learn more about contextual determinants of adjustment trajectories, and sharpen psychosocial interventions that target biopsychosocial processes.

Finally, experimental and intervention studies can test conceptual models of adjustment that translate basic findings into strategies to bolster adjustment and that allow for stronger causal inference. Translational research over the past decades has yielded a cadre of intervention approaches with strong efficacy in improving adjustment (or preventing poor adaptation) to chronic illness such as coping effectiveness training in HIV+ men and other patient groups (see Folkman et al., 1991), interventions to improve medical regimen adherence and reduce medical symptoms, (see Dunbar-Jacob, Schlenk, & McCall, 2012), or cognitive-behavioral stress management (e.g., Penedo, Antoni, & Schneiderman, 2008). Theoretically grounded research on adjustment to chronic illness can refine such interventions by: pointing to potential mechanisms by which interventions may gain their utility (e.g., decreasing avoidant and increasing approach-oriented coping); identifying at-risk patients for whom interventions might be appropriate (e.g., patients low in optimism); and targeting intervention components for maximal effectiveness (e.g., bolstering disease-related self-efficacy). Finally,

examining prospective trajectories of adjustment will allow for the implementation of interventions at critical periods in the disease course.

The knowledge base on adjustment to chronic disease is advancing. Along with experimental research, theoretically guided research on contributors to adjustment in longitudinal designs will require relatively large samples, modeling of the dynamic relations among contextual factors, and use of prospective research designs that span long time frames. The next decade of research is likely to produce culturally and socioeconomically informed models, elaboration of biobehavioral mechanisms for adaptive outcomes, and greater translation of theory and research into intervention.

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