

# Health Psychology: Psychological Adjustment to Chronic Disease

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## Key Words

quality of life, coping, cancer, arthritis, cardiovascular disease

## Abstract

Chronic diseases carry important psychological and social consequences that demand significant psychological adjustment. The literature is providing increasingly nuanced conceptualizations of adjustment, demonstrating that the experience of chronic disease necessitates adaptation in multiple life domains. Heterogeneity in adjustment is apparent between individuals and across the course of the disease trajectory. Focusing on cancer, cardiovascular disease, and rheumatic diseases, we review longitudinal investigations of distal (socioeconomic variables, culture/ethnicity, and gender-related processes) and proximal (interpersonal relationships, personality attributes, cognitive appraisals, and coping processes) risk and protective factors for adjustment across time. We observe that the past decade has seen a surge in research that is longitudinal in design, involves adequately characterized samples of sufficient size, and includes statistical control for initial values on dependent variables. A progressively convincing characterization of risk and protective factors for favorable adjustment to chronic illness has emerged. We identify critical issues for future research.

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## INTRODUCTION

In reflecting on his chronic and life-threatening illness, amyotrophic lateral sclerosis, Stephen Hawking tells his readers, “Apart from being unlucky enough to get ALS...I have been fortunate in almost every other respect. The help and support I received...have made it possible for me to lead a fairly normal life. . . .” (Hawking 1988, p. vii). For decades, psychological theorists and physicians have conjectured about why some people who face the enduring stress of a chronic illness adjust well, whereas others demonstrate significant emotional and inter-

personal decline. Research has yielded complex conceptualizations of what it means to adjust to chronic disease, theoretical frameworks to identify the factors that promote or hinder adjustment, and empirical evidence regarding the predictive utility of those constructs.

In this article, we examine psychosocial processes that contribute to people’s adjustment to disease, with a focus on three disease clusters that constitute the major causes of death and disability in the United States: cancer, cardiovascular disease, and rheumatic diseases. We offer crosscutting observations about what is known regarding adjustment to these diseases, beginning with a brief discussion of the definition and impact of chronic disease and then considering the concept of adjustment. We review findings across several domains of constructs that predict adjustment and conclude by identifying major contributions of this work and critical issues for continued study.

The empirical literature on adjustment to chronic disease is large; for example, we identified more than 200 longitudinal reports on predictors of adjustment to cancer alone. We were necessarily selective in our review. To address predictors of adjustment, we set boundary conditions for studies to be included as exemplars. They had to pertain to cancer, cardiovascular disease, or rheumatic diseases; be published from 1985 to 2005; be longitudinal in design; include at least 50 participants at baseline; and include adjustment to illness as an outcome. We searched PsycINFO using specified criteria; we also searched specialty medical journals that regularly publish research on disease-related adjustment and that have high impact factors (ISI Web of Knowledge Journal Citation Reports).<sup>1</sup>

<sup>1</sup>In addition to medical journals referenced in PsycINFO, we reviewed the following medical journals: (a) for cardiovascular disease, *J. Am. Coll. Cardiology*, *Eur. Heart J.*, *Am. Heart J.*, *Chest*, and *Heart*; (b) for cancer, *J. Natl. Cancer Inst.*, *J. Clin. Oncol.*, *Cancer Epidem. Biomarkers Prev.*, and *Cancer*; and (c) for rheumatic diseases, *Arth. Rheum.*, *Rheumatology*, *Ann. Rheum. Dis.*, *J. Rheumatol.*, and *Lupus*.

In this article, we do not tackle the important topics of adjustment to chronic disease in childhood, predictors of caregiver adjustment, health behavior change and psychosocial interventions<sup>2</sup> in chronic disease, and unique issues in advanced or end-stage disease. Although we selected disease clusters that span levels of life threat, controllability, and treatment demands, we are mindful that other diseases, such as diabetes and acquired immune deficiency syndrome, can pose unique challenges. The literature on psychological processes as causal in disease outcomes was not our focus. However, in the final section we address developments in that body of work.

## Definition and Impact of Chronic Disease

Chronic diseases are “illnesses that are prolonged, do not resolve spontaneously, and are rarely cured completely” [Centers for Disease Control and Prevention (CDC) 2003]. Psychologically, however, the definition of chronic disease is complex: Does one stop being a cancer patient when treatment is completed? When one celebrates the five-year anniversary after diagnosis? Although most investigators would agree that the disease process must persist at least several months to constitute chronic disease, the meaning of “chronic” lies in the eye of the beholder (Rabin et al. 2004).

More than 90 million Americans live with chronic diseases, with racial minorities and women disproportionately affected (CDC 2005). Chronic diseases cause 7 of every 10 deaths (1.7 million people each year) in the United States (CDC 2005), and they are the leading cause of disability. Chronic, disabling conditions result in major activity limitations for more than 1 in 10 Americans;

arthritis, the most common cause of disability, affects approximately 43 million people (CDC 2005). Chronic diseases account for 75% of the \$1.4 trillion medical care costs in the United States (CDC 2005). As the population ages, increasing numbers of people will live with at least one chronic condition.

Whereas some consequences of chronic disease are abrupt and unmistakable, such as in surgical interventions, others are gradual and subtle, such as losing energy (Thompson & Kyle 2000). Declines in daily activities, vitality, and relationships with friends and family can proceed with an uneven course. This great variation, even among people with the same disease, presents a genuine challenge to any attempt to cull generalizations from the literature on how people adjust to chronic disease.

## CONCEPTUALIZATIONS OF ADJUSTMENT TO CHRONIC DISEASE

What does it mean to adjust to chronic disease? Three broad conclusions emerge from the literature: (a) chronic disease requires adjustment across multiple life domains, (b) adjustment unfolds over time, and (c) there is marked heterogeneity across individuals in how they adjust to chronic illness.

### Multifaceted Nature of Adjustment

Stanton et al. (2001) identified five related conceptualizations of adjustment to chronic disease: mastery of disease-related adaptive tasks, preservation of functional status, perceived quality of life in several domains, absence of psychological disorder, and low negative affect. Increasingly, researchers are considering positive indicators of adjustment, such as maintaining positive mood and retaining purpose in life. These conceptualizations reveal that adjustment encompasses multiple components that cross interpersonal, cognitive, emotional, physical, and behavioral domains. Components also are interrelated, so that functional status affects and is affected

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<sup>2</sup>We elaborate on implications of the literature on conceptualizations and predictors of adjustment to chronic illness for the design of psychosocial interventions in Stanton & Revenson (2007).

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**MI:** myocardial infarction

**RA:** rheumatoid arthritis

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by depressive symptoms among people with chronic disease (DeVellis et al. 1997), and depression magnifies the risk for nonadherence to medical regimens in chronic disease patients (DiMatteo et al. 2000).

Hamburg & Adams (1967) identified several essential adaptive tasks in adjustment to major life transitions, including serious illness: regulating distress, maintaining personal worth, restoring relations with important others, pursuing recovery of bodily functions, and bolstering the likelihood of a personally and socially acceptable situation once physical recovery is attained. Taylor's (1983) cognitive adaptation theory also highlights self-esteem enhancement and preservation of a sense of mastery, and adds resolution of a search for meaning as an adaptive task. Focusing on physical illness, Moos & Schaefer (1984) added the tasks of managing pain and symptoms, negotiating the health care environment, and maintaining satisfactory relationships with medical professionals. Other conceptualizations (e.g., Spelten et al. 2002) focus on functional status, often operationalized as resumption of paid employment, routine activities, and mobility. Quality of life in physical, functional, social, sexual, and emotional domains also denotes adjustment to chronic disease (Cella 2001, Newman et al. 1996).

Adjustment is most commonly defined as the presence or absence of diagnosed psychological disorder, psychological symptoms, or negative mood. Investigators also have begun to examine positive affect and perceived personal growth as indicators of adjustment, for several reasons. First, many individuals with chronic disease report positive adjustment (e.g., Mols et al. 2005). Second, positive adjustment is not simply the absence of distress. A disease that disrupts life does not preclude the experience of joy (Folkman & Moskowitz 2000a), and individuals who find positive meaning in their illness are not immune to significant distress (Calhoun & Tedeschi 2006). Third, positive and negative

affect represent relatively distinct dimensions (Watson et al. 1999) and potentially have different determinants (e.g., Ehteld et al. 2003) and consequences (see Kiecolt-Glaser et al. 2002, Pressman & Cohen 2005 for reviews). Fourth, positive affect may buffer or repair negative mood (Fredrickson 2001). For example, the presence of positive affect appears to reduce the magnitude of the relation between pain and negative affect in rheumatic disease patients (Zautra et al. 2001). Finally, the depiction of chronic disease as guaranteeing unrelenting suffering can provoke inordinate despair in those who face serious disease.

Unbalanced attention to positive adjustment can also have untoward consequences. The expectation of the unfailingly "strong" patient permits the ill person little latitude for having a bad day (or a bad year). Presenting a positive face may become prescriptive, so that one falls prey to the "tyranny of positive thinking" (Holland & Lewis 2000, p. 14) or the notion that any distress or negative thinking will exacerbate chronic disease.

### **Adjustment as a Dynamic Process**

Owing to changing contextual factors, adaptation to chronic illness is neither linear nor lockstep. Twists and turns in disease progression such as cancer recurrence, repeat myocardial infarction (MI), or arthritis flares require readjustment. Although stage theories of adjustment to trauma or disease have been proposed, scant supporting evidence exists (Wortman & Silver 2001). Disease severity and prognosis, the rapidity of health declines, and whether the disease involves symptomatic and asymptomatic periods all shape the adaptive tasks of illness. In individuals with longstanding rheumatoid arthritis (RA), for example, depressive symptoms and quality of life indices are relatively stable over time (e.g., Brown et al. 1989), unless the person is coping with a flare, which involves a sudden increase in pain and disability, or joint replacement surgery (e.g., Fitzgerald et al. 2004).

## Evidence for Heterogeneity in Adjustment

Certainly, the experience of chronic illness carries psychological consequences. The strongest evidence that chronic illness provokes life disruption is offered by large-scale, prospective studies in which adjustment is assessed prior to and following disease diagnosis. For example, in the Nurses' Health Study cohort of 48,892 women, 759 were diagnosed with breast cancer during a four-year period (Michael et al. 2000). After control in analyses for multiple covariates, women diagnosed with cancer experienced an increase in pain and declines in physical and social function, vitality, and ability to perform emotional and physical roles, compared to women who did not receive a cancer diagnosis. Group differences remained for four of seven quality-of-life domains up to four years postdiagnosis, although fewer problems were apparent as time since diagnosis increased.

Polsky et al. (2005) examined five biennial waves of the Health and Retirement Study in more than 8000 adults aged 51 to 61 without significant depressive symptoms at study onset. Within two years after an initial diagnosis of cancer, diagnosed individuals had the highest risk of significant depressive symptoms (hazard ratio = 3.55 versus no incident disease), which decreased during the next six years. The risk of onset of depressive symptoms also increased significantly within the first two years of a diagnosis of heart disease or chronic lung disease (but not hypertension, arthritis, diabetes, or stroke), and higher risk for depressive symptoms persisted over the next six years for those with heart disease. Those diagnosed with arthritis had increased risk for depressive symptoms two to four years after diagnosis.

Despite elevated risk for distress, there is considerable variability in adjustment to chronic illness. For example, studies in rheumatic disease reveal large differences in pain, disability, and fatigue among populations with similar clinical parameters (e.g.,

Stone et al. 1997). Good evidence for heterogeneity in trajectories of adjustment is provided by Helgeson et al. (2004), who identified trajectories of functioning in women with breast cancer from 4 to 55 months after diagnosis. Forty-three percent of the sample evidenced high and stable psychological quality of life, 18% began somewhat lower and improved slightly, 26% evidenced low psychological functioning shortly after diagnosis but showed rapid improvement, and 12% had an immediate and substantial decline in psychological functioning with slight improvement. With regard to heart disease, Dew et al. (2005) identified five groups of heart transplant patients based on their distinct temporal distress profiles over several years: a group with consistently low distress, a group with consistent clinically significant levels of distress, groups with high distress for the first several months or for three years followed by improvement, and a group with fluctuating distress. Boudrez & De Backer (2001) also demonstrated heterogeneity in adjustment. Although most coronary artery bypass graft (CABG) patients evidenced improvement in the first six months after surgery, fully 30% of the sample demonstrated increasing distress, declining well-being, or failure to improve.

Instead of catalyzing global maladjustment, chronic disease typically has more circumscribed effects for most people. Andersen et al. (1989) observed that cancer creates "islands" of disruption in specific life domains and at particular points in the disease trajectory. For example, fear or uncertainty about the future, physical limitations, and pain are common concerns across diseases (e.g., Dunkel-Schetter et al. 1992, Newman et al. 1996); life threat is more relevant in cancer and heart disease. Effects on work and daily activities and the economic impact of treatment can loom large for all three illnesses (i.e., cancer, heart disease, and rheumatic disease). Although commonalities such as these are apparent, considerable variability in concerns exists across persons, time, and contexts. A goal of theoretical frameworks that posit

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**CABG:** coronary artery bypass graft

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risk and protective factors is to account for this variation.

## **CONTRIBUTORS TO ADJUSTMENT TO CHRONIC DISEASE**

Theories of stress and coping, self-regulation, personality, and social processes have shaped the foundation for identifying determinants of adjustment to chronic disease. Rather than detailing discrete theories, we review predictors that emerge across theories. We discuss socioeconomic variables, culture/ethnicity, and gender-related processes as more distal contributors to adjustment, and interpersonal processes, personality attributes, cognitive appraisals, and coping processes as more proximal determinants. Although these domains capture many of the factors that have received attention as predictors of adjustment, they are embedded in still other contexts not detailed here (Revenson 2003). For example, developmental issues are relevant, including whether the disease is occurring “on time” or “off time” in the life cycle (Neugarten 1979). Acknowledging a complex picture, we characterize a sampling of central contributors to adjustment.

What people think, feel, and do about their health is situated in a wider context. A contextual approach (Ickovics et al. 2001, Revenson 1990) emphasizes the interdependence of individuals’ behavior and their life circumstances, and the interplay of distal contexts and proximal mechanisms for influencing health. Macro-level or “upstream” factors (Berkman & Glass 1999) such as culture, socioeconomic status (SES), and social change (e.g., urbanization) affect social network structure, which in turn sets the stage for psychosocial mechanisms (e.g., social support) to influence health through “downstream” behavioral and physiological pathways. Similarly, Taylor et al. (1997), in an analysis of unhealthy environments, suggest that SES affects health indirectly through its influence on key physical and social environments.

## **Socioeconomic Status**

Marked and growing socioeconomic disparities in the United States are disquieting, in part because of the well-documented inverse graded association of SES with morbidity and mortality (e.g., Adler & Ostrove 1999). Reflected in educational attainment, income, occupational status, or some combination of those variables, SES affects health outcomes directly and through environmental and psychosocial mechanisms, including access to health care and risky and protective health behaviors (e.g., smoking, alcohol abuse, and exercise).

Poverty and low-SES environments set the stage for two intertwined phenomena—experiencing more stressful life events of greater magnitude and having fewer social and psychological resources to manage them—that, in turn, contribute to poorer mental and physical health (Gallo & Matthews 2003). Low education and the perception of medical care as being a substantial economic burden predict greater depressive symptoms and poorer functional status among the chronically ill (e.g., Harrison et al. 2005, Havranek et al. 2004, McEntegart et al. 1997, Stommel et al. 2004). Callahan et al. (1996) demonstrated that a sense of helplessness mediated the relation between lower education and early mortality in RA patients.

Although we conceptualize SES as a predictor of adjustment, the pattern is not unidirectional. Chronic, disabling diseases have enormous impact on work disability. Studies of RA show that people often stop working early in the disease process (e.g., Reisine et al. 2001). Such work-related disability can create downward drift in SES.

## **Culture and Ethnicity**

Although the concept of culture applies across standard social categories (e.g., race, gender, and sexual orientation), most research in illness adjustment has focused on race/ethnicity. Ethnic group membership is

a marker for many psychological processes—identity, group pride, and discrimination—that are embedded in a sociohistorical context. Thus, race and ethnicity can be considered markers related to differences in exposure to risk factors and resources. In the chronic disease literature, we uncovered few longitudinal studies of how predictors of disease-related adjustment might be conditioned by culture or ethnicity (Alferi et al. 2001, Taylor et al. 2002).

Within- or between-ethnic group cross-sectional studies were more numerous (e.g., Giedzinska et al. 2004). This small literature reveals few pronounced differences in broad indicators of disease-related quality of life, although elevated psychological symptoms or disease-related concerns have been reported in some groups (e.g., low-income Latina cervical cancer patients; Meyerowitz et al. 2000). Group differences in approaches to confronting disease also have emerged, with African American and Latina cancer patients more likely to endorse spiritual practices than white patients, for example (Lee et al. 2000).

Mechanisms for these group differences have not been established. Thus, while we can say that the correlates of mental and physical health in lupus vary across ethnic groups (e.g., Bae et al. 2001), we are hard pressed to understand why. In light of observations that between-group studies do little to illuminate mechanisms for obtained differences and that ethnic categories contain within-group variability, it is clear that very little is known about implications of culture and ethnicity for disease-related adjustment.

### **Gender-Related Processes**

Gender differences in adjustment among individuals with chronic disease mirror differences observed in the general population, such that women report more depressive symptoms than men, for example (DeVellis et al. 1997, Hagedoorn et al. 2000, Stommel et al. 2004). Women also report greater pain, symptoms,

and disability in association with rheumatic disease (Katz & Criswell 1996). Beyond the examination of group differences, gender-linked personality orientations and gender roles as they operate in relationships of the chronically ill are two areas that have received attention.

How might gender socialization translate into differentially effective modes of coping with illness? One vehicle involves the development of gender-linked personality orientations, such as agency and communion (see Helgeson 1994, Helgeson & Fritz 1998 for reviews). Agency has been linked to better adjustment across a number of chronic diseases, including coronary heart disease (Helgeson 1993). Unmitigated communion, i.e., overinvolvement with others to the detriment of personal well-being, predicts subsequent greater disease-related distress (Danoff-Burg et al. 2004; Fritz 2000; Helgeson 1993, 1994).

Interpersonal relationships are vital components of women's adjustment to major stressors (Revenson 1994), potentially creating both demands (Wethington et al. 1987) and benefits (Brown et al. 2003). Emery et al. (2004) reported that a sense of companionship enhanced women cardiac patients' emotional quality of life, and this enhancement was over and above benefits bestowed by dispositional optimism. Whether they are the patient or caregiver, women often focus on others and maintain their domestic roles. After a heart attack, men tend to reduce work activities and are nurtured by their partners. In contrast, after returning home from the hospital, women take on household responsibilities more quickly (King 2000, Michela 1987). Studies of cancer, heart disease, and arthritis reveal that women report more distress than men whether they are the patient or the caregiver (Revenson 2003, Tuinstra et al. 2004), and longitudinal research on couples' patterns of adjustment to cancers of the gastrointestinal tract in one spouse suggests that both gender and the patient/partner role affect adjustment (Northouse et al. 2000, Schulz & Schwarzer 2004, Tuinstra et al. 2004). The

intersection of biological and environmental influences on gender differences (e.g., Taylor et al. 2000) in adjustment to chronic disease is a promising area for study.

### **Social Resources and Interpersonal Support**

Most adaptive tasks of chronic disease require help from others, including emotional sustenance and practical aid. Social support affects adaptive outcomes through a number of physiological, emotional, and cognitive pathways (see Wills & Fegan 2001). It can help recipients use effective coping strategies by offering a better understanding of the problem and increasing motivation to take action. Support can encourage positive health behaviors or minimize risky behaviors, and it can diminish physiological reactivity to stress. Discussing disease-related concerns in a supportive, uncritical social environment allows people to better address the adaptive tasks of illness.

Most work examining effects of interpersonal ties in chronic disease has focused on their positive effects. Both structural aspects of social ties (e.g., marital status and network size) and functional dimensions (e.g., validating emotions and providing information) can yield benefit (e.g., Carver et al. 2005, Demange et al. 2004). Prospective studies of patients with rheumatic diseases reveal both direct and buffering effects of support on depressive symptoms (Demange et al. 2004), functional status (Fitzgerald et al. 2004), and disease activity (Evers et al. 2003). Daily stressful events are more strongly associated with next-day mood disturbance among RA patients who have lower levels of support (Affleck et al. 1994), and one way that support influences daily pain is through fostering use of specific coping strategies (Holtzman et al. 2004). Moreover, sound social support helps explain trajectories of psychological adjustment in cancer patients (e.g., Helgeson et al. 2004) and heart disease patients (Bennett et al. 2001).

Although social support is typically assessed as a fairly stable characteristic of an individual's social environment, it may change over time. Social support can erode, and greater distress reported by the patient may presage such erosion (Alferi et al. 2001, Moyer & Salovey 1999). Among men who have had an MI or CABG surgery, the beneficial effects of intimacy appear to fade over time as support becomes burdensome or demands of recovery fail to match support providers' expectations (Fontana et al. 1989). Thus, the dynamic nature of adjustment may reflect the unfolding of interpersonal as well as intrapersonal factors.

Just as close relationships can be supportive and caring, they also can be characterized by misunderstanding, disapproval, and antagonism. Well-intended support attempts can go awry, for example, if support is ill timed or does not match the recipient's needs (Cutrona & Russell 1990, Revenson 1993). Pain flares and increases in disease activity in rheumatoid disease tend to be preceded by interpersonal stress (Zautra et al. 1997, Zautra & Smith 2001), and patients who report high spousal support and appraise their illness as a challenge (rather than a threat) are more distressed, perhaps because support does not match their needs (Schiaffino & Revenson 1995). Among individuals hospitalized following their first coronary event, disappointing supportive interactions are a particularly robust predictor of poorer adjustment (Helgeson 1993). Similarly, cancer patients who report communication problems with their medical team evidence increased distress three months later (Lerman et al. 1993). Demonstrating the importance of the absence of support, social isolation prior to a breast cancer diagnosis in the Nurses' Health Study cohort predicted poorer quality of life four years postdiagnosis, explaining greater variance than did treatment- and tumor-related factors (Michael et al. 2002).

Research on couples in which one partner has a chronic illness provides insight into how the transactional nature of social support

affects patients' adjustment. Depressive symptoms may elicit feelings of irritation and resentment in the spouse, which leads to increased anger and reduced support provision (Druley et al. 2003, Revenson & Majerovitz 1990). At the same time, patients may (mis)interpret partners' negative comments to mean that they are incompetent or powerless; in a study of older women with osteoarthritis (Martire et al. 2002), this pattern of spousal interaction predicted increased depressive symptoms six months later.

Among women with RA, initial levels of social constraint—feelings that one's partner is unreceptive to hearing about one's experiences—were related to functional outcomes, distress, and pain a year later, though not to changes in those outcomes (Danoff-Burg et al. 2004; see also Stephens et al. 2002). In a study of breast cancer patients and their partners (Manne et al. 2005), perceived unsupportive behavior by the partner, involving both avoidance and criticism, predicted women's distress over time. Low social constraint has been shown to buffer the relation between disease-related intrusive thoughts and subsequent distress among cancer patients (Lepore 2001).

### **Personality Attributes**

Much of the research examining how personality affects adaptation falls into two perspectives: personality as a risk factor (Smith & Gallo 2001) or as a protective factor or stress-resistance resource (Ouellette & DiPlacido 2001). We were surprised to find few longitudinal studies that examined risk factors for psychological adjustment; for example, there is a large literature on type A behavior and hostility predicting heart disease onset and progression (Smith & Gallo 2001), but few studies examining hostility as a risk factor for adjustment to heart disease.

In recent years, dispositional optimism (Scheier & Carver 1985) has been the most frequently examined personality attribute in

relation to disease-related adjustment. Among individuals with ischemic heart disease, optimism assessed shortly after hospital discharge predicts fewer depressive symptoms a year later (Shnek et al. 2001). Optimism also predicts faster in-hospital recovery and return to normal life activities for people undergoing CABG surgery (Scheier et al. 1989; cf. Contrada et al. 2004). There is some evidence that optimism and pessimism have distinct effects on adjustment outcomes (Engel et al. 2004). In heart disease patients, low levels of pessimism soon after CABG surgery predicts more positive affect and lower pain 6 to 12 months later (Mahler & Kulik 2000). High optimism, on the other hand, appears to serve as a resource earlier in recovery. Optimism assessed near cancer diagnosis predicts more positive adjustment during the next year (e.g., Carver et al. 1993, Schou et al. 2005; cf. Stanton & Snider 1993), and optimism's benefits have been demonstrated in people with various cancers and at several periods in the disease trajectory (Allison et al. 2000, Carver et al. 2005, Miller et al. 1996, Trunzo & Pinto 2003).

Optimism's emotionally protective effects appear to work by bolstering the use of approach-oriented coping strategies and affective social support, as well as reducing disease-related threat appraisals and avoidant coping (Carver et al. 1993, Scheier et al. 1989, Schou et al. 2005, Trunzo & Pinto 2003). Personality attributes also may interact with other variables to affect adjustment. Thus, interpersonal stress predicts increases in negative affect and disease activity in arthritis patients only for those who show excessive dispositional sensitivity to others' feelings and behavior (Smith & Zautra 2002). Emotionally expressive coping predicts decreased distress and fewer medical appointments for cancer-related morbidities in breast cancer patients high in hope (Stanton et al. 2000).

Health outcomes associated with optimism also are receiving attention. Although there are null findings (Schofield et al. 2004), some evidence suggests that dispositional

optimism predicts survival in chronic disease (e.g., Giltay et al. 2004, 2006). In the Normative Aging Study, an optimistic explanatory style halved the risk for cardiac events over ten years (Kubzansky et al. 2001). If a reliable relation is established between optimism and health outcomes, examination of associated biological and behavioral mechanisms will be crucial.

### **Cognitive Appraisal Processes**

Most theories of psychosocial adjustment to illness converge on the point that how individuals view their disease is a fundamental determinant of ensuing coping efforts and adjustment. Lazarus's stress and coping theory (e.g., Lazarus & Folkman 1984) constitutes the foundation for much of the research on disease-related adjustment. In this theory, cognitive appraisal processes are assigned central importance, including primary appraisal, in which one evaluates the situation's potential for harm and benefit, and secondary appraisal, in which one assesses the situation's controllability and one's available coping resources. Perceived threats to health and life goals, disease-related expectancies, and finding meaning in the illness experience are three appraisal processes that have received a good deal of empirical attention.

**Perceived threats to life goals.** Theorists have considered appraised implications of disease for one's life goals as a key determinant of adjustment. Lazarus's (1991) revised conceptualization of primary appraisal incorporates elements of goal relevance, goal congruence, and personal meaning of the illness. In Carver & Scheier's (1998) self-regulation theory, illness represents an experience that can interfere with plans and activities that bring meaning to life (Scheier & Bridges 1995). To the extent that one perceives illness as impeding treasured goals or intruding on valued activities, psychological pain is likely. Thus, threat and harm/loss appraisals were central predictors of later anxiety and depression in cardiac

patients (Waltz et al. 1988). Perceived goal barriers predict pain and fatigue in fibromyalgia patients (Affleck et al. 2001). Among RA patients, loss of valued activities predicts depressive symptoms in the following year (Katz & Yelin 1995), mediated by unfavorable social comparisons and dissatisfaction with abilities (Neugebauer et al. 2003). Prostate cancer patients who accommodate their illness by altering important life goals appear to be less negatively affected by physical dysfunction than men who do not (Lepore & Eton 2000).

Leventhal's self-regulation theory (e.g., Leventhal et al. 2001) underscores perceived threats to the self-system with regard to disease cause, identity, time line, controllability, and consequences. For example, individuals who view their cancer as chronic or cyclic evidence greater distress than those who conceptualize it as an acute disease, controlling for actual disease stage (Rabin et al. 2004).

**Disease-specific expectancies.** Expectancies regarding control over the experience of chronic disease and confidence in one's ability to effect a desired outcome, i.e., self-efficacy, contribute to adjustment. Chronic disease can chip away at perceptions of control over bodily integrity, daily planning to engage in valued activities, and life itself. A hallmark of chronic disease is that committed involvement in medical treatments and healthy behaviors cannot ensure control over its outcome, and individuals perceive more control over consequences of disease, e.g., symptom management, than its ultimate outcome (e.g., Affleck et al. 1987b, Thompson et al. 1993).

A sense of general control predicts diminished distress in cancer patients undergoing bone marrow transplant prior to hospital discharge and one year later (Fife et al. 2000) and in cancer patients undergoing radiation (Stiegelis et al. 2003). Thompson & Kyle (2000) concluded that control expectancies need not match realistic opportunities for control to confer benefit, although others have suggested that the utility of control

appraisals depends on whether the threat is responsive to control attempts (Christensen & Ehlers 2002). For example, perceived control over RA symptoms as opposed to perceived control over disease course predicts positive affect and better adjustment (Schiaffino & Revenson 1992). A related construct within the arthritis literature is perceived helplessness. Appraisals of helplessness reliably predict increases in depressive symptoms in studies of RA patients (Smith & Wallston 1992). Moreover, perceptions of helplessness affect physical functioning independent of disease severity (Lorish et al. 1991) and may even affect inflammatory processes (Parker et al. 1991).

Control appraisals also affect adjustment to cardiac events and surgical interventions. Among CABG patients, individuals who expect more control over their recovery prior to surgery have briefer hospital stays and report less pre- and postoperative distress (Mahler & Kulik 1990). Consistent with the idea that an untoward experience during chronic illness may be viewed by the patient as a temporary setback rather than a disconfirmation of cherished control beliefs (Taylor 1983), Helgeson (1992) found the perception of control protected patients who were rehospitalized during the study: Rehospitalized patients who reported a strong sense of personal control over their illness had emotional functioning comparable to patients who did not require another hospital stay.

Disease-related self-efficacy expectancies also predict adjustment. Several longitudinal studies document the predictive utility of self-efficacy in adjustment to rheumatic diseases and joint replacement surgery (e.g., Cronan et al. 2002, Culos-Reed & Brawley 2003, Engel et al. 2004). Increases in self-efficacy also predicted less anxiety and more vigor among individuals in cardiac rehabilitation (Blanchard et al. 2002), and self-efficacy expectancies assessed preoperatively predicted subsequent depressive symptoms among older adults with heart disease (van Jaarsveld et al. 2005).

Although self-efficacy is typically considered an intrapersonal phenomenon, Rohrbaugh et al. (2004) demonstrated its potential interpersonal dynamics. Among individuals with congestive heart failure, although both the patient's and the spouse's confidence in the patient's ability to meet challenges associated with the disease predicted survival, only spouse confidence predicted survival when both ratings were included in the predictive equation. We suspect that spouse confidence also affects patient well-being.

Carver et al. (2000) have argued that perceived control is important only to the extent that it contributes to positive outcome expectancies. In two samples of breast cancer patients, the expectancy of remaining cancer free predicted less distress during the following year, whereas perceived control over the disease did not predict distress (Carver et al. 2000). A related construct, response expectancy, e.g., asking patients how fatigued they expect to be after treatment with no reference to perceived control, also predicts outcomes. Response expectancies regarding pain and fatigue assessed prior to breast cancer surgery predict those outcomes postsurgery, controlling for presurgery distress (Montgomery & Bovbjerg 2004; see also Montgomery & Bovbjerg 2001). Folkman & Moskowitz (2000b) and Tennen & Affleck (2000) offered speculations regarding the contexts in which disease-related control and outcome expectancies might affect well-being.

**Finding meaning.** Finding meaning in chronic illness has been conceptualized in several ways. Janoff-Bulman & Frantz (1997) distinguish "meaning as comprehensibility," i.e., an attempt to determine how an event makes sense, and "meaning as significance." The search for comprehensibility often prompts an awareness of personal vulnerability, which paves the way for creating meaning in life "by generating significance through appraisals of value and worth" (Janoff-Bulman & Berger 2000, p. 33). Thus, "meaning as significance"

can lead one to find benefits in the chronic disease experience.

Individuals affected by chronic disease often report personal growth arising from the experience (e.g., Cordova et al. 2001). Finding meaning and benefit in the experience of chronic disease has been examined both as a predictor of subsequent adjustment, which we address here, and as an adaptive outcome in its own right. People with RA who report interpersonal benefit in their illness show improved physical functioning a year later, but not lower distress (Danoff-Burg & Revenson 2005), and patients who perceive more benefits report fewer subsequent days during which their activities are limited by severe pain (Tennen et al. 1992).

In a review of research on benefit finding in cancer patients, Stanton et al. (2006) concluded that the evidence for a relation between benefit finding and adjustment is decidedly mixed. Among the notable positive findings, perceived positive meaning resulting from the breast cancer experience at one to five years after diagnosis predicted an increase in positive affect five years later (Bower et al. 2005), and finding benefit in the year after breast cancer surgery predicted lower distress and depressive symptoms four to seven years later (Carver & Antoni 2004). Assessed earlier in the cancer trajectory, however, benefit finding appears to have no or even a negative relation with positive adjustment (Sears et al. 2003, Tomich & Helgeson 2004); perhaps engagement in finding benefit serves distinct functions over the course of chronic disease (Stanton et al. 2006). Conceptualization, operationalization (e.g., the use of retrospective reports of positive change), and adaptive consequences of finding meaning and benefit require further theoretical and empirical attention (Tennen & Affleck 2002, 2006).

### **Coping Processes**

It is difficult to imagine that the ways that individuals respond to the demands of illness would not affect subsequent adjustment.

Although limited by problems in conceptualization, measurement, and methodology (Folkman & Moskowitz 2004, Somerfield & McCrae 2000), the empirical literature leads us to conclude that coping affects adjustment to chronic illness.

Coping efforts may be directed toward approaching or avoiding the demands of chronic disease (Suls & Fletcher 1985). This approach-avoidance continuum also reflects a fundamental motivational construct (Carver & Scheier 1998, Davidson et al. 2000). Approach-oriented or active coping strategies include information seeking, problem solving, seeking social support, actively attempting to identify benefit in one's experience, and creating outlets for emotional expression. In contrast, avoidance-oriented coping involves cognitive strategies such as denial and suppression, and behavioral strategies such as disengagement. Other coping efforts, such as spiritual coping, potentially can serve either approach or avoidance goals.

The coping strategies people employ and their utility are likely to vary as the adaptive tasks of illness change (Blalock et al. 1993). Minimizing threat, an avoidant strategy, may be useful at acute points of crisis. However, research indicates that avoidance typically predicts maladjustment over time (Roesch et al. 2005, Stanton et al. 2001). For example, in comparison with less avoidant women, breast cancer patients who were high on cognitive avoidance prior to breast biopsy reported more distress at that point, after cancer diagnosis, and after surgery (Stanton & Snider 1993; see also Hack & Degner 2004, Lutgen-dorf et al. 2002). Similarly, the use of avoidant coping to manage health problems was associated with continued emotional distress during the year following heart transplant (Dew et al. 1994). A strong and consistent finding in studies of rheumatic disease is that passive strategies directed toward disengagement predict poor adjustment over time (Covic et al. 2003, Evers et al. 2003, Felton & Revenson 1984, Smith & Wallston 1992). Coping through avoidance may involve damaging behaviors

(e.g., alcohol use), paradoxically prompt intrusion of disease-related thoughts and emotions (Wegner & Pennebaker 1992), or impede more effective coping efforts.

Although findings are not as uniform as those for avoidant coping (Roesch et al. 2005, Stanton et al. 2001), approach-oriented strategies appear to be more effective. Problem-focused coping attempts such as information seeking, cognitive restructuring, and pain control are consistently associated with indicators of positive adjustment in RA patients (Keefe et al. 2002, Young 1992). Day-to-day, relaxation coping strategies and active efforts to reduce pain contribute to reductions in next-day pain as well as enhancement of positive mood (Keefe et al. 1997). The demonstrated values of interventions that encourage the use of approach-oriented strategies such as problem-solving and emotional processing also suggest the utility of approach-oriented coping (e.g., Savelkoul et al. 2003).

Establishing the links between approach-oriented coping and adaptive outcomes is complicated by the fact that some approach-oriented strategies, such as problem solving, are not effective for immutable facets of the disease. In addition, avoidance- and approach-oriented strategies may differentially predict negative and positive outcomes (e.g., Echteld et al. 2003). The exclusion of positive adjustment indicators in many studies may obscure the benefits of approach-oriented coping.

Coping strategies are likely to mediate relations between personality attributes (e.g., optimism), interpersonal support processes, and adjustment, or to moderate the effects of other predictors. For example, the combination of high avoidance-oriented coping and low social support has been identified as a risk factor for distress in individuals with chronic illness (Devine et al. 2003, Jacobsen et al. 2002), and avoidant coping is a mechanism for the relations between unsupportive behaviors by the partner and cancer patients' distress (Manne et al. 2005). Carels et al. (2004) found among heart failure patients that a day

that included efforts to improve symptoms was followed by a day of fewer illness symptoms, whereas a day that included trying to distract oneself from the illness was followed by a day with more symptoms. Rather than focusing solely on coping as a predictor of adjustment, we urge researchers to evaluate mediational and moderational models in longitudinal, daily process, and experimental designs.

## **PROGRESS AND CRITICAL ISSUES IN RESEARCH**

### **Contributions of the Literature on Adjustment to Chronic Disease**

The literature of the past two decades offers a number of vital contributions to the understanding of adjustment to chronic disease. First, it provides increasingly nuanced conceptualizations of adjustment. Empirical evidence now supports the observations that living with chronic disease requires adaptation in multiple life domains; that adaptation is a changing, but not always fluid, process; and that examination of both positive and negative indicators of adjustment enhances understanding of the phenomenon. Although several adaptive tasks are common across diseases, we observed some sharpening of research focus in recent years to concentrate on those domains of adjustment and points in the disease trajectory that are most challenging for individuals with particular diseases. An example is the recent empirical focus on the symptom clusters of fatigue, depression, and pain in cancer, resulting in a National Institutes of Health State-of-the-Science Conference Statement (Patrick et al. 2004).

This focus on prominent psychological risks conferred by chronic disease and its treatments is balanced by research on the experience of chronic illness as an opportunity for finding positive meaning, altering health behaviors, enriching emotional life, and deepening personal relationships. Although the lion's share of the research on adjustment to chronic disease has been centered on the

period surrounding diagnosis and medical treatment, research is increasingly focused on adjustment in other phases in the disease trajectory, including the period after major medical treatments are completed, periods of relatively symptom-free quiescence, and, for life-limiting conditions, periods of disease recurrence and end-stage disease. The resulting more complex conceptualization of what it means to live with chronic disease can inform theory development as well as clinical assessment and intervention with affected individuals and loved ones.

A second contribution of the past 20 years of research is its progressively convincing characterization of risk and protective factors for favorable adjustment to chronic illness. Whereas early (and much of the recent) research yielded suggestive evidence regarding correlates of adjustment from cross-sectional studies, the past decade has seen a surge in research that is longitudinal in design, involves adequately characterized samples of sufficient size for reliable analysis, and includes statistical control for initial values on dependent variables to bolster causal inference. Although theoretical frameworks for higher-order constructs as predictors of adjustment to chronic disease have existed for some time (e.g., Moos & Schaefer 1984, Smith & Wallston 1992), we now have a good start on filling in the blanks with regard to specific factors that confer risk or protection. Thus, emotionally supportive relationships set the stage for positive adjustment to chronic disease, whereas criticism, social constraints, and social isolation impart risk. Positive generalized and disease-specific expectancies, general perceived control and mastery, and a sense of control over specific disease-related domains also promote adjustment. Active, approach-oriented coping attempts to manage disease-related challenges often bolster adjustment, whereas concerted attempts to avoid disease-related thoughts and feelings are robust predictors of heightened distress. These findings will allow investigators to hone theories of adjustment to chronic disease and to sharpen psychoso-

cial interventions in order to target specific psychosocial processes shown to influence adaptive outcomes.

We also want to note exciting progress in the development of biopsychosocial models of chronic disease. Research in rheumatic disease suggests that stressful experiences and negative affect might lead to immunologic changes, which in turn affect disease activity (although reverse causation also is possible) (e.g., Peralta-Ramirez et al. 2004, Zautra et al. 1997). In the cancer literature, plausible biological mediators of the potential relations of stress, depression, and lack of social support with disease progression also have been advanced (for a review, see Antoni et al. 2006).

The most convincing evidence is in the area of behavioral cardiology. For example, hostility/aggression, anxiety, depression/hopelessness, interpersonal isolation/conflict, and chronic stress have been reliably linked to the development of heart disease and associated morbidity and mortality (for reviews, see Gallo et al. 2004, Krantz & McCeney 2002, Rozanski et al. 1999, Smith & Ruiz 2002; for evidence on construing benefit as a protective factor, see Affleck et al. 1987a). Nowhere is progress more evident than in the burgeoning literature on the links between depression and cardiovascular disease. Although not entirely consistent (see Stewart et al. 2003 for a review), two lines of evidence are relevant. First are demonstrations that depression predicts the development of heart disease (e.g., Todaro et al. 2003). For example, adjusting for baseline risk factors, individuals with elevated depressive symptoms but without a history of coronary disease were twice as likely as their nondepressed counterparts to have carotid plaque (Haas et al. 2005). Even stronger evidence links depression to cardiac morbidity and mortality among individuals with coronary illness. Even minimal depressive symptoms increase mortality risk after an MI (Bush et al. 2001), and depression doubles the risk of a recurrent cardiac event after CABG surgery (Blumenthal et al. 2003). Carney et al. (2002) reviewed

evidence for several behavioral (e.g., treatment nonadherence) and biological (e.g., inflammation) mechanisms that might explain how depression places individuals at risk for cardiac morbidity and mortality. In a review, Frasure-Smith & Lespérance (2005) concluded that adequately powered prospective studies are “remarkably consistent in their support of depression as a risk factor for both the development of and worsening of CHD” (p. 523).

### Limitations of the Literature on Adjustment to Chronic Disease

Although we see substantial advances in understanding adjustment to chronic disease over the past decades, progress is uneven, and many questions remain. First, in contrast to the foundation of evidence on proximal variables as risk and protective factors, we know less about implications of specific distal parameters for disease-related adjustment (Link & Phelan 1995). Although relevant research is scant, economic burden and associated factors (e.g., low education) are likely to constitute barriers to positive adaptation, as are rigid and extreme gender roles. Cultural dynamics involving the intersections of ethnic identity, acculturation, socioeconomic status, and experiences of racism as they affect disease-related adjustment have received minimal attention. Community environments and other environmental factors have not been examined. For example, communities that incorporate a high degree of social capital—resources inherent in relationships including mutual trust and a sense of belongingness—might bolster adjustment. Aspects of the built environment, such as hospital spaces where families of surgery patients can spend the night comfortably, might foster a sense of control and facilitate interactions, also promoting adjustment.

By and large, the body of work on adjustment to chronic illness has not included consideration of premorbid biological, environmental, and personal contexts. With few

exceptions, research on hazardous or nurturing early environments as setting the stage for later psychological and biological adaptation under stress (e.g., Taylor et al. 1997) and on genetic vulnerability to poor psychological outcomes under adverse conditions (e.g., Caspi et al. 2003) have not been translated into research in disease-related adjustment. And, as the population ages, the presence of comorbid physical illnesses is going to complicate adjustment to chronic disease (e.g., Stommel et al. 2004).

Second, we know little about intersections among and within proximal and distal parameters in their contribution to adjustment, although research is accruing. Interpersonal relationships and personality attributes are likely to moderate the effects of cognitive appraisal and coping processes on adjustment (e.g., Affleck et al. 2001, Lepore 2001, Smith & Zautra 2002). Macro-level factors such as SES, gender, and cultural variables have been examined infrequently in conjunction with other predictors for their potential moderating influences.

Examining moderated relationships in adjustment to chronic disease is important in its implications for intervention. For example, Cameron et al. (2005) recently reported that illness perception-based education for cardiac patients failed to promote cardiac rehabilitation attendance and to reduce disability among MI patients high on negative affectivity (NA). Indeed, the intervention had detrimental effects on high-NA patients' exercise and diet habits six months after MI compared to high-NA patients assigned to standard care. Examination of moderated relations in research on predictors of adjustment can suggest variables on which to target and tailor interventions.

Third, progress on knowledge of mechanisms for the effects of identified predictors of adjustment to chronic disease is uneven. Some mediating processes, such as pathways for the effects of optimism on disease-related adjustment, are relatively well determined, but mechanisms for the influence

of other factors remain to be established. For example, although frameworks positing mechanisms of the effects of more distal factors such as SES on health-related outcomes have been developed (e.g., Gallo & Matthews 2003), research on such mechanisms for adjustment to chronic disease is just beginning. As mechanisms for ethnic disparities in chronic disease outcomes see increased empirical attention (e.g., Green et al. 2003, Meyerowitz et al. 1998, Tammemagi et al. 2005), a rise in attention to mechanisms for ethnic and cultural differences in adjustment is likely to occur. For example, psychological manifestations of ethnic group membership such as perceived racism may act as a stressor that adversely affects risk factors for cardiovascular health (Brondolo et al. 2003, Clark et al. 1999), but their implications for adaptation to chronic illness are unknown.

Fourth, we found much more attention in the literature to issues surrounding adjustment to chronic disease in some diseases than others and in some populations than others. The majority of existing research was conducted with individuals who are white and of relatively high SES. Cancer, and particularly early-stage breast cancer, yielded the largest body of work on predictors of adjustment. A related issue is that particular constructs received more attention than others in specific diseases. For example, perceptions of helplessness received more study in arthritis than in other conditions, perhaps owing to the demands associated with chronic pain and disability. And some constructs are just being added to models, such as sexuality as an important component of quality of life (e.g., Derogatis 2001) and purpose in life and spirituality as predictors of health-related outcomes (Seeman et al. 2003, Smith & Zautra 2004).

Finally, little of the research identifying predictors of disease-related adjustment has been translated directly into interventions. Exceptions are Folkman and Chesney's coping effectiveness training (Chesney et al. 2003), which capitalizes on findings from stress and coping theory to bolster adjustment

to chronic disease, and Keefe et al's. (2002) pain coping interventions for rheumatic disease, which are based on research demonstrating the adverse effects of catastrophizing and the benefits of family support. Moreover, few attempts have been made to target interventions to those who might be in most need of them, such as those who manifest risk factors for poor adjustment.

## Directions for Research

Gaps apparent in the existing literature make way for the next decade of research on adjustment to chronic disease. Integration of environmental and sociocultural contexts with more proximal predictors, accompanied by examination of mediators and moderators of their effects on adjustment, will enrich our understanding of adjustment to chronic disease. Relatively neglected populations such as individuals with very advanced disease and ethnically diverse groups merit greater inclusion, along with examination of mechanisms for observed between-group differences.

Now that considerable longitudinal research across chronic diseases is available to generate confidence in the significance of several risk and protective factors for adjustment, greater attention to translation into interventions is warranted. The existing literature can guide psychosocial interventions in at least four ways. First, it can inform the development of interventions through inclusion of processes that predict positive adjustment, for example, specific techniques aimed at bolstering self-efficacy for disease-related tasks (Graves 2003). Second, the research base can promote the specification of how interventions work, for example, through altering coping strategies or illness-related cognitions (e.g., Scheier et al. 2005). Third, the empirical literature on disease-related adjustment can aid in targeting interventions to vulnerable groups. Research on trajectories of adjustment to illness suggests that there is an identifiable group of people who have few personal and social resources and who are at

risk for a sharp decline in psychological functioning with the experience of chronic disease (Dew et al. 2005, Helgeson et al. 2004). It is this group that might best be targeted for intervention. Truly prospective research is needed to distinguish among groups that have longstanding poor functioning and those that are specifically affected by the experience of chronic illness to determine whether they need distinct intervention approaches. Finally, existing research can promote consideration of the person-environment fit in interventions (e.g., Antoni et al. 2001, Lepore et al. 2003). The intervention approach required for individuals high on negative affectivity or avoidance-oriented coping processes might differ from that required for less-vulnerable individuals, for example.

Future theoretically guided research to examine both contextual and individual contributors to multifaceted indicators of adjustment in longitudinal designs will require relatively large samples and lengthy time frames. Several additional approaches can be adopted, however. First, although we were impressed with the large body of longitudinal work that has accrued in the past two decades, experimental designs will enhance causal inference regarding risk and protective factors. Experimental research on the effects of social comparison (Stanton et al. 1999, Van der Zee et al. 1998) on adaptive outcomes in chronic dis-

ease is an example. In-depth analysis of single contributors to adjustment and specific adaptive outcomes also can be useful. Examples are the research on response expectancies as predictors of adjustment (e.g., Montgomery & Bovbjerg 2004) and on determinants of fatigue (Bower et al. 2003, 2006).

New methodologies and quantitative approaches provide tools to address the next decade of complex questions. Intensive, daily process methodologies can shed light on adjustment to disease within the life context and are particularly suited to diseases for which coping and self-management demands occur daily (Tennen et al. 2000). Hierarchical linear modeling and other approaches allow for sophisticated modeling of change over time between and within persons living with chronic disease.

Research over the past two decades increasingly has illuminated the ingredients of living well in the face of chronic disease. We expect that over the next decade we will continue to see progress in our understanding of adaptational processes. If the past is prologue, we expect that ten years from now, a review article such as this will include more culturally anchored approaches; a greater number of studies that integrate biological, psychological, and social levels of analysis; and a more seamless translation of research findings into clinical interventions.

## SUMMARY POINTS

1. Multifaceted conceptualizations of adjustment to chronic disease have been advanced in the literature, indicating that chronic disease necessitates adjustment in multiple life domains across the course of the disease trajectory.
2. Prospective research reveals that the experience of chronic disease provokes significant distress and life disruption; however, many individuals with chronic disease report positive adjustment, and good evidence exists for heterogeneity in trajectories of adjustment across individuals. Further, examination of both positive and negative indicators of adjustment in research can enrich the understanding of adjustment to chronic disease.
3. Socioeconomic and cultural contexts, as well as gender-related processes, influence adaptive outcomes in chronically ill individuals, although these domains have not received as much empirical attention as have more proximal predictors of adjustment.

4. Longitudinal research has revealed a progressively convincing characterization of risk and protective factors for favorable adjustment to chronic illness in the domains of interpersonal relationships, personality attributes, cognitive variables, and coping processes. Progress also is evident in the empirical foundations for biopsychosocial models of some chronic diseases.
5. Future progress in research on adjustment to chronic disease will include integration of environmental, sociocultural, and biological contexts with more proximal predictors, accompanied by examination of mediators and moderators of their effects on adjustment. Translation of research identifying risk and protective factors for adaptive outcomes into interventions to bolster chronic disease-related adjustment also is a promising direction for research.

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