The occurrence of depression in neurological patient groups is significantly greater than what would be expected based on incidence of depression in the general population, in which lifetime and 12-month point-prevalence rates are estimated at 17% and 7%, respectively (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). For example, estimates suggest that 16% of individuals with dementia report clinically significant depression and 26.8% report clinically significant apathy (Lyketsos et al., 2002). A meta-analysis examining post-stroke depression estimated that 23.3% of patients meet criteria for Major Depressive Disorder (MDD), with another 15% of patients reporting significant depressive symptoms (Robinson, 2003).

Among multiple sclerosis (MS) patients, the post-MS diagnosis lifetime prevalence of depression is estimated at approximately 50% (Joffe, Lippert, Gray, Sawa, & Horvath, 1987), whereas point-prevalence rates of depression are roughly 15% (Patten, Beck, Williams, Barbui, & Metz, 2003). The literature on depression prevalence in Parkinson’s disease (PD) reports prevalence rates of MDD ranging from 8 to 24%, with as many as 11–54% of PD patients reporting clinically relevant depressive symptoms during their lifetimes post-disease onset (Reijnders, Ehrt, Weber, Aarsland, & Leentjens, 2008). In adults with Attention-Deficit/Hyperactivity Disorder (ADHD), point-prevalence rates of Major Depressive Disorder (MDD) are estimated at 18.6%, and the prevalence of any mood disorder is 38.3% (Kessler et al., 2006). Regarding traumatic brain injury (TBI), research indicates that 53.1% of patients meet the criteria for MDD in the 12-month period following their hospitalization (Bombardier et al., 2010).
It is perhaps unsurprising that those suffering from disorders with such pervasive effects on functioning would also struggle with depressed mood. Neurological disorders are associated with declines in cognitive and/or physical functioning. Decrements in these areas interfere with patients’ daily lives in ways that can be distressing (Lewinsohn, Mermelstein, Alexander, & MacPhillamy, 1985). For example, research in patients with MS has demonstrated that reduced participation in recreational activity is in part responsible for the relationship between physical disability and depressed mood (Voss et al., 2002). The fact that these changes require considerable adjustment on the part of the patient and their family cannot be overstated. This transition often includes extended periods of uncertainty about the future, as well as mourning for the loss of a pre-disorder past. Many patients also experience loss of functional autonomy, which can threaten personal identity and self-esteem.

In addition to these psychosocial stressors, there are also documented biological contributions to depressed mood in neurological populations. Mood is not unlike cognitive and motor functioning, in that it arises from the brain and damage to neurological circuits that maintain and regulate mood disrupt emotional functioning. Evidence supporting neurobiological antecedents of depression can be found in the stroke, dementia, MS, and PD literatures (Feinstein et al., 2004; Remy, Doder, Lees, Turjanski, & Brooks, 2005; Schweitzer, Tuckwell, O’Brien, & Ames, 2002; Singh et al., 2000). However, it has also been observed that the relationship between neuropathology and depression is far from a one-to-one correlation. For example, in the MS literature, markers of neuropathology have been found to account for less than 50% of the variance in depression symptoms (Arnett & Strober, 2011). With methodological improvements in the quantification of brain function, it is likely that better indicators of neuropathology will exhibit more robust associations with depression. However, the current state of the field strongly suggests that psychosocial factors modulate the relationship between disease burden and depression in neurological disorder populations.

If the relatively higher incidence of depression in neurological disorder patients is unsurprising, it is somewhat remarkable that over half of patients manage to maintain healthy mood states in the face of disease-related stress and in light of possible damage to mood-regulating neural systems. Clinical science has historically focused on those factors that confer risk for negative outcomes, and this approach is understandable, as a thorough understanding of risk is necessary to prevent harm. However, another approach towards minimizing harm and improving well-being is the promotion of resiliency factors. Only in recent decades has psychological science come to embrace an increased focus on positivity (Seligman, Steen, Park, & Peterson, 2005). The clinical neuropsychology subfield has been particularly slow to integrate this perspective, with a recent review finding no increased focus in key neuropsychological journals on positive health-promoting factors over a 10-year period (Randolph, 2011).

Coping is one of the best-studied positive health-promoting factors, and decades of research have demonstrated that coping style modulates the relationship between stress and negative emotional states. Furthermore, coping has been examined in a
number of neurological disease populations including TBI, MS, adult ADHD, stroke, and PD (Arnett, Higginson, Voss, Randolph, & Grandey, 2002; Curran, Ponsford, & Crowe, 2000; Godfrey, Knight, & Partridge, 1996; Herrmann et al., 2000; Johnston, Morrison, Macwalter, & Partridge, 1999; Rabinowitz & Arnett, 2009; Young, 2005). With this context in mind, the aim of this chapter is twofold: (1) to discuss coping—how it has been operationalized, and how it may mitigate depression, and (2) to use the MS literature as an example of how coping has been examined in a neurological disease population.

**Coping**

Coping is the set of cognitive processes and behaviors that an individual uses in response to stress in order to reduce or manage distressing emotional states (Menninger, 1963; Vaillant, 1977). There is abundant evidence in the literature to suggest that coping is a major factor in the relation between stressful events and psychological and behavioral outcomes (Andrews, Tennant, Hewson, & Vaillant, 1978; Billings & Moos, 1981; Collins, Baum, & Singer, 1983; Coyne, Aldwin, & Lazarus, 1981; Felton, Revenson, & Hinrichsen, 1984; Folkman & Lazarus, 1988; Lazarus & Folkman, 1984; Menaghan, 1982; Mitchell, Cronkite, & Moos, 1983; Pearlin & Schooler, 1978; Schaefer, 1983; Shinn, Rosario, Morsch, & Chestnut, 1984; Taylor, Wood, & Lichtman, 1983; Vaillant, 1977). Lazarus and Folkman (1984) have proposed a stress and coping theory that identifies a two-stage process—cognitive appraisal of the stressor followed by the enactment of coping behavior—that is thought to mediate the relationship between a stressor and its immediate and long-range outcomes.

Coping may be related to outcome directly; alternatively, coping may affect outcome by buffering the impact of stress. Stress-buffering models propose that coping impacts outcomes by moderating or suppressing the effects of stress (Wheaton, 1985). According to a stress-buffering model, the effects of coping should only be evident at high levels of stress (Finney, Mitchell, Cronkite, & Moos, 1984). That is, coping is mobilized by increased stress in order to dampen its causal impact. On the other hand, the effect of stress and coping on outcomes could be interactive. A moderation model suggests that under certain coping conditions (i.e., when certain coping strategies are employed), stress has substantially less impact. The suppression and moderation models of stress buffering are not mutually exclusive, and it is possible that coping is related to stress and outcome via both additive and interactive mechanisms (Wheaton, 1985). For example, one study examining the stress-buffering effects of coping suggests that certain coping styles may have a direct effect on adjustment, while other styles may operate by buffering the impact of stress (Aldwin & Revenson, 1987).

Traditionally, coping strategies have been conceptualized as belonging to one of two general domains: problem-focused coping and emotion-focused coping. Problem-focused coping refers to active coping behaviors aimed at altering the source
of stress, whereas emotion-focused coping is intended to regulate emotional responses to a stressor (Folkman & Lazarus, 1980). Studies in the chronic illness literature have demonstrated that high levels of depression are associated with emotion-focused coping. Problem-focused coping, on the other hand, is associated with better adjustment and lower levels of distress (Arnett et al., 2002; Rabinowitz & Arnett, 2009; Revenson & Felton, 1989; Thompson, Gil, Abrams, & Phillips, 1992).

Although much of the coping research has relied on the problem-focused vs. emotion-focused distinction, this conceptualization of coping has been criticized for being too simple (Carver, Scheier, & Weintraub, 1989). Many researchers have found that responses to the Ways of Coping scale (Folkman & Lazarus, 1988), a widely used coping scale designed to assess problem- and emotion-focused coping, form several factors rather than just two (Aldwin, Folkman, Schaefer, Coyne, & Lazarus, 1980; Aldwin & Revenson, 1987; Coyne et al., 1981; Folkman & Lazarus, 1985; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Parkes, 1984; Scheier, Weintraub, & Carver, 1986). Furthermore, some investigators have found that subtypes of emotion-focused coping are not necessarily correlated with each other or are inversely correlated, suggesting that emotion-focused coping is not a uniform construct (Carver et al., 1989).

In many theoretical contexts, it may be more useful to isolate a subset of emotion-focused coping strategies that are clearly maladaptive. Carver and colleagues (1989) have proposed a more theoretically derived measure of coping behaviors called the COPE that incorporates 13 conceptually distinct scales. A second-order factor analysis of the COPE yields four factors, each consisting of three scales—an active coping factor (comprised of the active coping, planning, and suppression of competing activities subscales), an avoidant coping factor (comprised of the denial, mental disengagement, and behavioral disengagement subscales), a third factor comprised of seeking social support (for both emotional and instrumental reasons) and focus on emotion, and a fourth factor incorporating acceptance, restraint coping, and positive reinterpretation and growth (Carver et al., 1989). Researchers have considered the active and avoidant coping factors as operationalizations of adaptive and maladaptive coping, respectively (Arnett et al., 2002), and this distinction has been supported theoretically and empirically (Arnett et al., 2002; Carver et al., 1989; Rabinowitz & Arnett, 2009).

**Coping Style and Process**

Coping has been discussed as both a process and a style (Lazarus, 1993). A style approach to coping focuses on dispositional aspects of coping, based on the assumption that individuals tend to rely on the same coping strategies in a variety of contexts over time. This conceptualization has its roots in ego psychology’s defensive styles. A dispositional or trait approach to coping captures the idea that individual differences play a role in determining a relatively stable collection of coping behaviors. However, the idea that individuals actually display such stability in coping style is
controversial. For example, Folkman and Lazarus emphasize that coping is a dynamic process that changes and develops over the course of a stressful transaction, rather than a stable style (Folkman et al., 1986; Folkman & Lazarus, 1980, 1985). Carver and colleagues (1989), however, report evidence that supports the utility of a trait approach to coping. Using a dispositional assessment of coping, Carver et al. found modest links between coping dispositions and several personality variables and between coping dispositions and situational coping activities. These findings suggest that coping disposition represents a meaningful construct that contributes to situational coping. Additionally, work done by Folkman and Lazarus demonstrates that certain coping strategies, like positive reappraisal, were relatively stable within individuals across five stressful encounters over five months (Folkman et al., 1986).

From a process perspective, coping changes over time in response to the dynamic situational context in which it occurs (Lazarus, 1993). The process perspective emphasizes state aspects of coping, with attention to the influence of context on an individual’s choice of coping strategy. Work in this area has found that people employ several coping strategies in every stressful situation (Folkman & Lazarus, 1980), that some coping strategies are more stable over time than others (Folkman et al., 1986), and that coping changes from one time to another during the course of a stressful encounter (Folkman & Lazarus, 1985). Research on process aspects of coping offers an important contribution to the understanding of emotional and cognitive responses to stress. However, the major limitation of an extreme contextualization of coping is that it fails to capture a functional portrait of the whole person (Lazarus, 1993). It is likely that both stable and situational perspectives are relevant to an individual’s emotional functioning. However, dispositional coping may be most relevant to chronic psychological outcomes like depression.

**Stress and Coping in MS**

Stress and coping theory, as applied to MS and other chronic illnesses, proposes that adjustment to illness is determined by illness parameters (conceptualized as stressors) and mediated by the coping process—including cognitive appraisal, coping resources, and coping strategy (Maes, Leventhal, & De Ridder, 1996). Illness parameters researched in MS include illness duration, disability, disease severity, and cognitive dysfunction (Pakenham, 1999).

The first stage of the coping process involves appraisal of the stressor. During this process, the individual evaluates whether a particular encounter with the environment is relevant to his or her well-being. For example, an encounter may be threatening, containing the possibility for harm or loss, or challenging, holding the possibility of mastery or benefit (Folkman et al., 1986). Research suggests that uncertainty and threat appraisals may be related to higher levels of distress, whereas challenge appraisals are related to better adjustment (Pakenham, Stewart, & Rogers, 1997; Wineman, Durand, & Steiner, 1994). In MS, the impact of disease-related
symptoms on work performance can be a significant source of stress. An example of a threat appraisal for this stressor might be “my symptoms cause me to perform poorly at work, and I will probably lose my job.” A challenge appraisal could be “my symptoms pose a challenge for me at work, but I may be able to come up with creative strategies to get around this.”

Once an individual has appraised the stressor, the next stage is evaluation of available coping resources. Coping resources are the personal and environmental characteristics at an individual’s disposal when a coping strategy is chosen and enacted (Moos & Billings, 1982). Social support has been the most well-researched coping resource in the chronic illness literature (Pakenham, 1999). Consistent with work in other patient populations, studies on the role of social support in adjustment to MS have demonstrated that higher levels of social support are related to better psychosocial outcomes (Long & Miller, 1991; Wineman, 1990). In the example of an individual coping with employment-related challenges, there are many resources that could be brought to bear. For example, a good reputation with an individual’s employer could be harnessed in order to modify work duties, in turn minimizing the impact of symptoms on job performance. Social support could be advantageous if friends and family members can relieve the individual of some of his or her household responsibilities outside of the workplace. For some individuals, job security and relative financial comfort may afford them the option of considerably shifting their work responsibilities, working from home, or changing careers.

Finally, individuals select and enact a coping strategy contingent on the availability of the requisite resources (Lazarus & Folkman, 1984). This stage of the coping process has received the most attention in the literature on adjustment to MS. In general, active and problem-focused coping strategies have been shown to be associated with better psychosocial outcomes in MS patients, whereas avoidant and emotion-focused strategies are linked with negative outcomes (Aikens, Fischer, Namey, & Rudick, 1997; Arnett et al., 2002; Foley, Bedell, LaRocca, Scheinberg, & Reznikoff, 1987; Jean, Paul, & Beatty, 1999; Pakenham, 1999; Pakenham et al., 1997; Schwartz, 1999; Warren, Warren, & Cockerill, 1991). Returning to the example of the patient who is struggling at work, an active problem-focused approach might involve speaking with his or her supervisor and exploring options for adjustments in responsibilities or work hours. For example, working mornings for 7 days/week or working from home part-time may allow an MS patient to maintain adequate productivity while managing fatigue more effectively. An avoidant coping strategy would consist of ignoring or denying MS-related changes in workplace functioning, whereas an emotion-focused strategy could involve venting to a spouse about stress at work.

**Cognitive Dysfunction and Coping**

Despite the fact that cognitive dysfunction is present in about 50% of MS patients (Arnett & Strober, 2011; Brassington & Marsh, 1998) and that cognitive problems have been shown to be highly associated with deficits in everyday functioning
(Higginson, Arnett, & Voss, 2000; Rao, Leo, Bernardin, & Unverzagt, 1991), relatively little research has been conducted examining how cognitive dysfunction may be related to coping. Cognitive dysfunction in patients with MS and other neurological disorders can be conceptualized as a stressor. Work in this area has demonstrated that coping moderates the relationship between cognitive dysfunction and depression in MS (Arnett et al., 2002). This research suggests that when MS patients use high levels of avoidant coping, or low levels of active coping, they are at high risk for developing depression if they experience cognitive decline (Aikens et al., 1997; Arnett et al., 2002; Foley et al., 1987; Jean et al., 1999; Pakenham, 1999; Pakenham et al., 1997; Schwartz, 1999; Warren et al., 1991). Furthermore, our research has demonstrated that the relationship is robust longitudinally, in that maladaptive coping style precedes depression (Rabinowitz & Arnett, 2009).

Because coping involves cognitive processes, in addition to acting as a stressor, cognitive deficits may also have a direct effect on executing the cognitive and behavioral strategies that comprise coping. While cognitive skills are an important personal resource, cognition has received relatively little attention in the literature on coping with chronic illness. However, research on the development of emotion regulation, a process akin to coping, has long recognized the role of cognitive abilities such as attention and executive functioning in emotional processes (Gross, 1998).

Cognitive skills are invoked both during the appraisal stage and the coping stage of the Folkman and Lazarus stress and coping model (Lazarus & Folkman, 1984). This notion is supported by one study that examined the relationship between executive functioning and coping behavior in patients with TBI (Krpan, Levine, Stuss, & Dawson, 2007). The investigators found that higher scores on executive functioning tasks were related to the use of planful problem-solving coping, whereas poorer executive performance was predictive of escape-avoidant coping. Our work has also demonstrated that coping is a key intervening factor in the relationship between cognitive dysfunction and depression in patients with MS (Rabinowitz & Arnett, 2009). That is, cognitive deficits may result in a diminished ability to use adaptive active coping strategies and a concomitant increased reliance on maladaptive coping. In our study, relatively greater reliance on maladaptive coping in conjunction with low levels of adaptive coping was related to higher levels of depression symptoms in MS patients (Rabinowitz & Arnett, 2009).

This finding indicates that individuals with high levels of cognitive dysfunction may have difficulty employing active coping strategies as a result of their disability. There are important clinical implications of this work for both MS patients and other individuals with neurological disorders. Psychotherapeutic interventions, like cognitive behavior therapy (CBT), have been shown to be effective in treating depressed MS patients (Mohr, Boudewyn, Goodkin, Bostrom, & Epstein, 2001; Mohr, Burke, Beckner, & Merluzzi, 2005). Learning and practicing coping skills in session may relieve much of the cognitive burden individuals face when coping with unfamiliar or unanticipated stressful situations. Hence, effective talk therapy could mitigate the effects of cognitive deficits on coping ability. This may be one of the mechanisms by which CBT is an effective treatment for depression in MS patients and other groups with neurological disorders.
However, as a result of cognitive dysfunction, depressed clients with neuropsychological deficits may be different from depressed clients without such deficits in their ability to integrate and apply the skills learned in therapy. Clinicians who serve these clients should be aware that cognitive limitations could interfere with therapeutic change in this way. In order to increase treatment efficacy, therapists may need to augment traditional CBT interventions for depression in order to make them more accessible to cognitively compromised clients.

Such a CBT intervention has been employed in the context of traumatic brain injury (Freeman & Freeman, 2005). Many of the principles recommended for treating adjustment to brain injury may apply to the treatment of depression in patients with other neurological conditions as well. Hibbard and colleagues suggest that cognitive therapy may be ideal for brain-damaged individuals, in that it is behaviorally oriented, time limited, active and directive, and focused on current problems. However, the authors go on to suggest that certain modifications to traditional CBT should be made for use in this population—for example, a greater emphasis on behavioral techniques, expansion of positive social interactions, modeling of assignments by both the patient and the therapist, simplification of tasks, establishment of a therapeutic alliance with a spouse or relative that may help the patient complete homework assignments, and a focus on challenging and correcting cognitive distortions exhibited in session (Freeman & Freeman, 2005).

Work in the area of traumatic brain injury offers specific recommendations for addressing cognitive limitations. Memory deficits may be addressed by requiring the patient to take notes, make audiotapes of sessions, or review materials presented in each session. Attentional difficulties may be mitigated by highly structuring the session, using visual anchors, or presenting material in a multimodal format. Repetition and slowed presentation could assist patients with speed of processing deficits. Additionally, asking structuring questions may help cognitively compromised individuals organize their thoughts (Whitehouse, 1994). Our research with MS patients suggests that teaching clients to apply some of these cognitive aids outside of session, in situations necessitating a coping response, may be particularly beneficial. However, it should be noted that although this practical advice is certainly intuitively appealing, whether or not these techniques would improve treatment efficacy for depressed individuals with MS is an empirical question yet to be addressed.

**Conclusions**

Coping is an important factor that contributes to individuals’ emotional and behavioral responses to stress. For individuals with neurological disorders who encounter considerable stress related to neurological deficits and functional impairments, coping may be a particularly critical variable in promoting health and well-being. For neuropsychologists hoping to improve quality of life for their patients, there are many lessons to be gleaned from the decades of research on stress and coping.
For example, active and problem-focused strategies for coping with stress are associated with better adjustment and decreased likelihood of depression. Furthermore, cognitive deficits are often related to depression in patients with neurological disorders. Neuropsychologists are well suited to characterize cognitive deficits and provide recommendations for coping with these impairments. The research on cognitive dysfunction and coping highlights the importance of providing active and problem-oriented recommendations for managing disease-related stress. However, because cognitive deficits may impair individuals’ ability to enact active coping strategies, neuropsychologists should also provide recommendations that take advantage of coping resources while providing scaffolding in the form of social support or cognitive aids to maximize successful coping. Thoughtful attention to these issues in clinical practice has the potential to improve quality of life for patients with neurological disease. Further research on positive health-promoting factors like coping promises to provide new directions for improvements in evidence-based practice.

References


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