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MS CONTROL, COPING, AND SOCIAL SUPPORT: RELATIONSHIP TO

DEPRESSION IN MULTIPLE SCLEROSIS

A Thesis in

Psychology

by

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ABSTRACT

Individuals with Multiple Sclerosis (MS) consistently show high rates of depression, and *depression* can have profound and negative impacts on the health and well-being of these patients. *MS control, coping, and social support* may all impact depression in MS. *MS control* is a construct that is associated with the domains of learned helplessness and attributional style. The MS literature reports relationships between coping and depression, social support and depression, and learned helplessness and depression. However, there is relatively little research examining possible interrelationships among these variables in predicting depression in MS. This study sought to refine and redefine these potentially broad constructs based on an analysis of the content validity and psychometric properties of tests developed to measure them, and to explore their inter-relatedness based on a comparative analysis of five structural equation models comprised of these constructs modeled in theoretically different ways.

One-hundred-and-one MS patients were administered a series of questionnaires assessing multiple domains of MS control, coping, social support, and depression. The nature of the relationships among these constructs for individuals with MS was examined with consideration given to demographic and disease-related variables. In all five models, the construct *depression* was the variable being predicted and was measured as a combination of mood and negative evaluative symptoms of depression. *MS control* was represented through the measurement of items assessing feelings of control related to MS. *Coping* comprised measures of active coping—active coping, planning, and suppression of competing activities—and avoidant coping—denial, behavioral

disengagement, and mental disengagement. Finally, *social support* was measured as the number of supports and satisfaction with that support.

Each model was tested for goodness of fit to the data via five fit indices: Chi-square, the Chi-square to degrees of freedom ratio (CMIN/df), the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), and the root-mean-square error of approximation (RMSEA). These fit indices were compared among models in order to determine which model best depicted the relationship among these constructs. Finally, a gender discrepancy among these constructs was predicted, such that *MS control*, *coping*, and *social support* were predicted to be more strongly associated with *depression* for women than for men.

All five models displayed adequate goodness of fit to the data via the evaluation of *three* of the five fit indices. When the avoidant coping measures were removed from the models (based on poor psychometric fit of these measures within the models), all five models displayed adequate goodness of fit to the data via the evaluation of *four* of the five fit indices.

Given that all models displayed some goodness of fit, per standard SEM interpretive approaches, the most parsimonious model (Model 1) was considered the best explanation of the associations among these constructs. Thus, the explanation that MS control, coping (particularly, active coping), and social support all account for significant independent amounts of the variance in depression in this population (specifically, for women) is the best fitting explanation for the current data. According to Model 1 (with data for active coping/ women only), these data suggest that MS control, coping, and

social support account for 15%, 14%, and 26% of the variance in depression,

respectively. Regression analyses showed that this and the other models were only a

good fit for women in the sample.

Hence, social support appears to have a significant, independent impact on

depression for women with MS, followed by MS control and active coping. Specifically,

this study illustrates how poor social support (particularly few social supports),

ineffective coping (particularly lack of planning in response to stress), and strong feelings

of MS control (particularly a belief that "MS is controlling my life") may likely lead to

depression in women with MS. Psychotherapeutic care for this population may be most

effective if consideration for each of these specific domains is targeted as part of a

comprehensive treatment protocol.

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CHAPTER 1

INTRODUCTION

MS is the most common neurological disease diagnosed in middle adulthood. It is particularly devastating because of its impact on individuals who are just beginning careers and starting families. Common symptoms include hemiparesis (weakness or paralysis of one side of the body), paresthesias (tingling or numbness sensations most often in the hands or feet), vision changes (often optic neuritis experienced as temporary blindness), cognitive changes (slowed processing speed and impaired cognitive control), fatigue, and depression. Symptom onset and progression of the disease is marked by great variability, instability, and unpredictability. This variability, instability, and unpredictability of symptom onset and disease progression, along with no available cure makes MS particularly difficult to adjust to, and can foster feelings of helplessness amongst individuals diagnosed with this disease. If patients' attempts to cope with their diverse symptoms are met with unsuccessful outcomes (as is often the case for individuals with MS), learned helplessness may be likely to develop. Not surprisingly, the prevalence rates, and lifetime incidence rates, of depression for individuals with MS exceed that of the general population by approximately 35-40% (Arnett 2003; Brassington and Marsh, 1998; Fischer et al., 1994; Goldman Consensus Group, 2005; Minden and Schiffer, 1990; Patten and Metz, 1997; Sadovnick et al., 1996).

The prevalence rates, and lifetime incidence rates, of learned helplessness for individuals with MS have yet to be reported.

Social support group attendance and successful stress maintenance have long been hallmarks of the recommendations intended to decrease depression in individuals who are diagnosed with MS. The assumption that social support and normalization of the experience of living with MS will help individuals learn to adjust better to the disease has been a staple of psychotherapeutic treatment approaches for these individuals. However, few studies have yet empirically demonstrated a benefit of these support groups on aspects related to quality of life or adjustment (in particular, depression) for individuals with MS. In fact, there have been some inconsistencies reported in the literature as to the benefits of social support, in general. Some of these inconsistencies may be explained along gender-relevant domains, as some more recent research has demonstrated a gender difference in the benefits of specific types of social support. Generally, these differences have involved greater benefits from spousal support for men, and greater benefits of extra-marital social support for women. Some of these inconsistencies may also be explained by the use of inappropriate, uni-dimensional, and uni-directional measures of social support. For these reasons, the construct of social support as conceptualized in this study is multi-dimensional, multi-directional, and gender discrepancies were considered.

Successful adaptation to stress, another hallmark of positive mood in individuals with MS, has long been theorized to be achievable by individuals employing adequate coping techniques. The literature on coping is variable, but techniques have generally been divided dichotomously into "helpful" and "unhelpful" categories. As with

the social support literature, there have been some inconsistencies within the reports citing the benefits of "helpful" coping strategies to aspects of quality of life and adjustment for individuals with MS. Some of these inconsistencies may be explained by the multifaceted nature of what has historically constituted "helpful" v. "unhelpful" coping for a specific population. Recent research has demonstrated more consistent findings by considering more unitary coping dimensions: Specifically, by defining active coping as "helpful" and avoidant coping as "unhelpful", recent studies have been able to demonstrate more consistent positive and negative associations, respectively, with long-term adjustment, and depression, in individuals with MS. However, no study had yet examined the independent role of each of the even more unitary coping dimensions that comprise the constructs of active coping—active coping, planning, and suppression of competing activities—and avoidant coping—denial, behavioral disengagement, and mental disengagement. Finally, as there are no published findings associated with gender differences in coping in MS, gender discrepancies in the coping dimensions were examined in this study, as described subsequently.

Current psychotherapeutic interventions aimed at helping individuals with MS often employ cognitive-behavioral strategies in an effort to enhance coping skills in order to facilitate successful stress maintenance, better adjustment to disease, enhanced quality of life, and lower levels of depression in these individuals. Yet, as with social support, few studies have empirically demonstrated treatment outcome benefits in this regard. One likely impediment to attempts to demonstrate empirically validated support for the benefits of either social support or "helpful" coping in this population, may be the lack of an understanding of the existing pathway(s) linking these variables to successful

adjustment and improved quality of life, or conversely, linking these variables to unsuccessful adjustment, worsened quality of life, and depression.

Depression is common in MS, and its etiological pathways are in need of further understanding. Since depression may be construed as a symptom of, and a complication of MS, its etiological pathway(s) may be further obscured by the impact of social support and coping on its onset and maintenance. For example, if depression was a symptom of MS directly resulting from the disease process, and active coping and good social support had a direct positive effect on depression, effective use of active coping and good social support would likely attenuate that depression. Likewise, if depression was a complication of MS brought about directly and/ or indirectly by a sense of loss of control over the disease, good social support and active coping might attenuate the depression directly and/ or indirectly by reducing levels of loss of MS control via coping and social support, and vice versa.

The construct of MS control is associated with the domains of learned helplessness and attributional style. Learned helplessness was first described as the behavioral adaptation to a mental state sustained after being subjected to inescapable negative situations. This description was made in association with animals who had been repeatedly subjected to inescapable shocks. Learned helplessness has long been thought to be related to depression, generally (Seligman, 1975). However, as discrepancies in the literature of learned helplessness in humans were published, the construct underwent some revisions. At first revision, it was deemed that learned helplessness was characterized by an attributional style that asserted bad events were caused by internal, global, and stable factors, and consequent depression was the result of a diathesis-stress

situation that presupposed this attributional style (Abramson, Seligman, & Teasdale, 1978). At second revision, it was deemed there was a subtype of depression—hopelessness depression—that was characterized less by causal attributions and more by maladaptive cognitive styles in the presence of negative life events (Abramson, Metalsky, & Alloy, 1989). Given the unpredictable nature of MS, it is not surprising that learned helplessness was identified as something that characterizes some individuals with the disease (Shnek et al., 1997). However, given the evolution of this construct over the years, and a content analysis of the questions being used to assess this domain in this study, it was deemed *MS control* was the most appropriate name to define this construct for purposes of the present study.

The role MS control, coping, and social support may play in the relationship to depression in individuals with MS has not yet been considered in the literature. Specifically, the possibility of indirect pathways between MS control and depression via social support and coping, and between coping and depression via social support and MS control, and between social support and depression via coping and MS control in this population, has not yet been examined in the literature. The assessment of these mediation models may have implications for the value of MS control, coping, and social support to psychotherapeutic treatment of depression in individuals with MS.

For example, if it is found that feelings of MS control lead to maladaptive coping strategies and/ or poor social support which leads to depression, those maladaptive coping strategies and/ or aspects of poor social support could be identified and therapeutic efforts aimed at reducing feelings of MS control should lead to a reduction in the use of those maladaptive coping strategies and/ or better social support and decreased

depression. Likewise, if it is found that maladaptive coping leads to high levels of MS control and/ or poor social support, which leads to depression, those feelings of MS control and/ or aspects of poor social support could be identified and therapeutic efforts aimed at reducing maladaptive coping strategies should lead to a reduction in feelings of MS control and/ or better social support and decreased depression. Similar therapeutic intervention implications exist for all the models explored in this study.

Before presenting working theoretical models of these possible interactions between MS control, coping, social support, and depression in MS, I will briefly define these constructs. Coping is a process invoked in response to stress. Coping is a multifaceted construct, but in this study, I focused on two aspects of this that may be particularly salient in the MS population: Active coping and avoidant coping. Active coping is a response to stress that facilitates positive psychological outcomes. Avoidance coping is a response to stress that involves high levels of denial and behavioral and mental disengagement. Active coping is comprised of three distinct types of coping: active coping, planning, and suppression of competing activities. Avoidant coping is also comprised of three distinct types of coping: denial, behavioral disengagement, and mental disengagement. Social support is the comfort given to us by others. Within the social support construct, at least two domains are identified: quantity of social support (i.e. number of people who provide support) and satisfaction with this support. Depression is a mental state characterized by a pessimistic sense of inadequacy. Within the depression construct, at least three domains can be identified: Mood, negative evaluative, and neurovegetative symptoms. MS control, in this study, is the belief that the MS disease process controls one's life, or that one lacks control over one's life as a

result of the MS disease process. Given these construct definitions and relevant

identifiers, there are many ways to conceive of how they might be interrelated in the life

of an individual with a chronic, progressive, deteriorating disease of an unpredictable

nature, such as is MS.

Following a brief overview of the models to be tested in this study, I will present

a more detailed description of the relevant literature surrounding each of the constructs

examined; including their relationship to depression, in general, depression in MS, and

their relationship to each other. Periodically, the literature on the relationships regarding

these constructs in individuals with other chronic progressive diseases (such as

Rheumatoid Arthritis) is discussed, with consideration given to the likely applicability of

findings within those populations to individuals with MS, if no relevant literature in MS

was available.

This study examines five theoretical models depicting ways in which MS control,

coping, and social support may be associated with depression, and one another, in

individuals with MS. In all five models, depression is considered to be the main negative

outcome, though it is understood that the correlational nature of the data precludes

making causal assumptions. Though speculative, a working model of these relationships

might be used as a psychotherapeutic guide to enhance understanding and treatment of

depressed MS patients in order to lessen their depressive symptomology, and potentially

improve their health and well-being. Treatment interventions could then be developed

that allow for clearer articulation of the causal relationships among these variables.

Given the complexity inherent in theoretical models of constructs subjected to

structural equation modeling techniques, I will begin my examination of the predicted

individual pathways of possible interrelationships among MS control, coping, social support, and depression using illustrations of the different models. **Figure 1** illustrates the simple hypothesized direct pathways from MS control, coping, and social support, predicted to impact depression. This model is presented solely to facilitate conceptualization of the possible impact of these constructs on depression and is not being statistically analyzed. **Figure 2** illustrates the five models that are statistically analyzed in this study depicting possible pathways to depression from MS control, coping, and social support. These models are compared to determine which model has the best statistical "fit"—offering the best possible explanation for the relationship among these constructs. These models are intended to provide a visual schematic of these complex theoretical interrelationships, and can be used as a framework for conceptualizing the relevant literature discussed subsequently.

The literature review to follow will begin with an overview of the characteristics of MS, generally, followed by a section on MS and depression. Next, coping will be discussed, generally, followed by a synopsis of the literature linking coping to depression, then coping to depression in MS. This will be followed by a review of social support, in general, then a review of social support and depression, followed by a review of social support and depression in MS. The literature addressing the overlap between these constructs (i.e., coping, social support, and depression in MS) will be discussed at the conclusion of these two sub-sections. Finally, MS control will be discussed, generally, followed by a discussion of the interrelationships among MS control and the other constructs of interest to this study in individuals with MS. It is hoped that the presentation of constructs in this manner will allow for a better understanding of each

construct first, independently, then in regards to depression in MS, then in relation to

each other and depression in MS.

Figure 1. Simplified Models

Factors that might alleviate depression (directly) for individuals with MS:
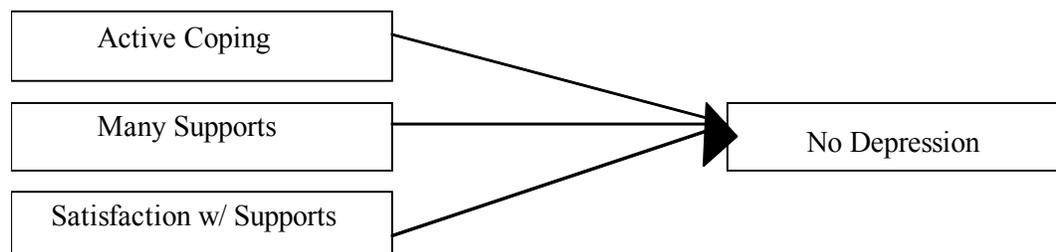
Factors that might exacerbate depression (directly) for individuals with MS:
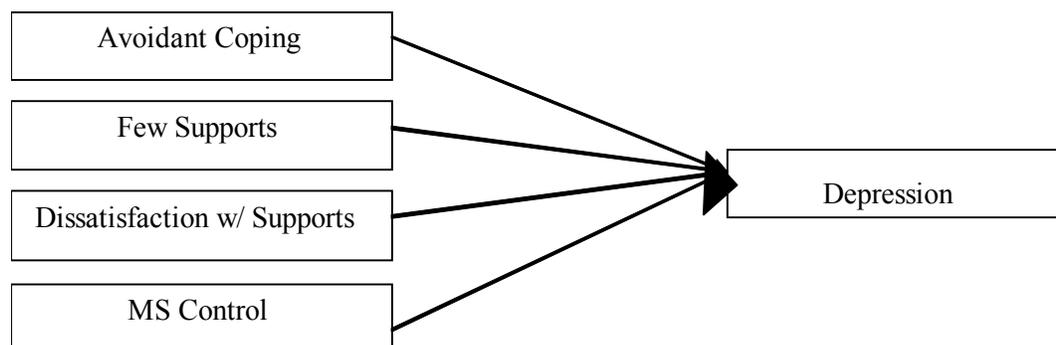
Figure 2. SEM Models

Model 1
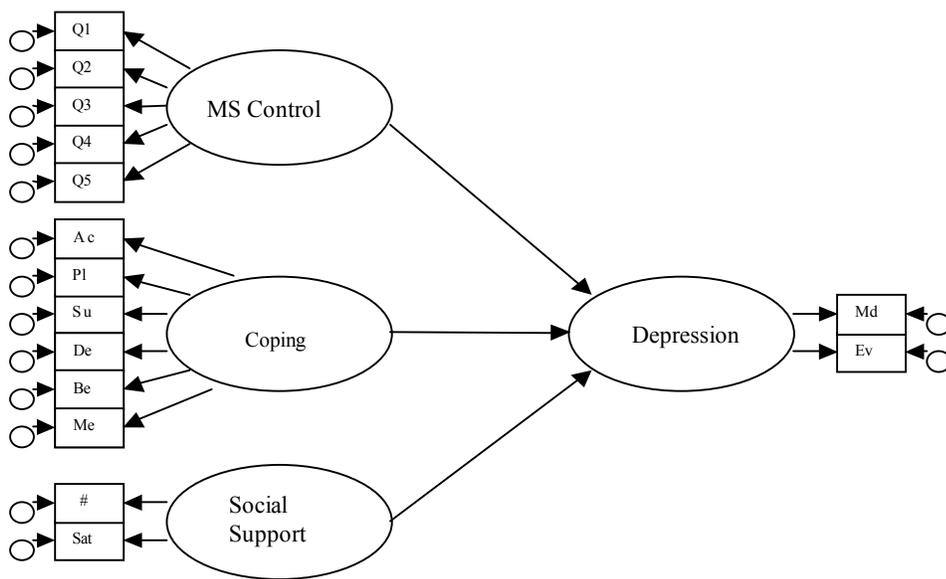
Model 2
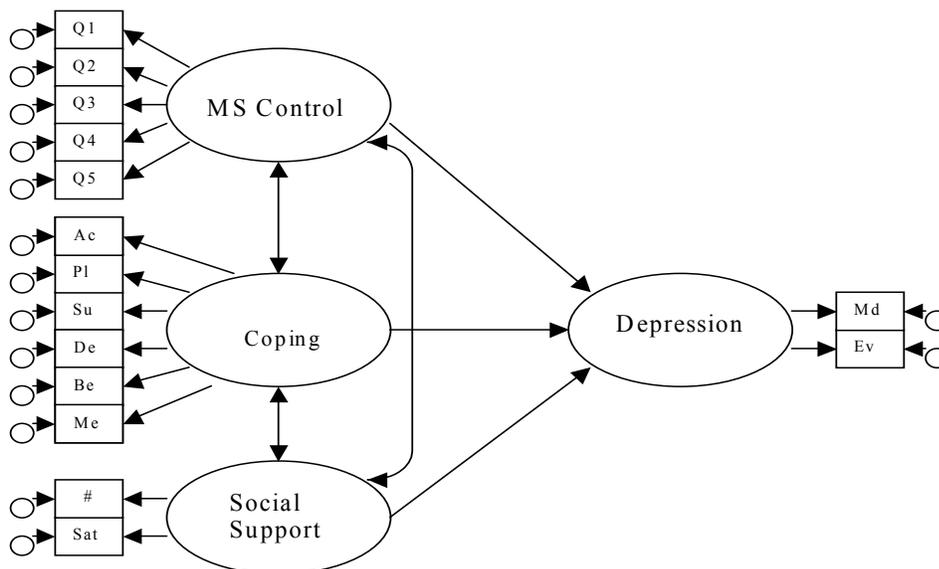
Key: ◯= error : Q1, Q2, Q3, Q4, Q5 refer to items 1-5, respectively, on the MSAI: Ac=Active coping, Pl=Planning, Su=Suppression of competing activities, De=Denial, Be=Behavioral Disengagement, Me=Mental Disengagement: #=Number of social supports, Sat=Satisfaction with those supports: Md=Mood, Ev=Evaluative

Model 3
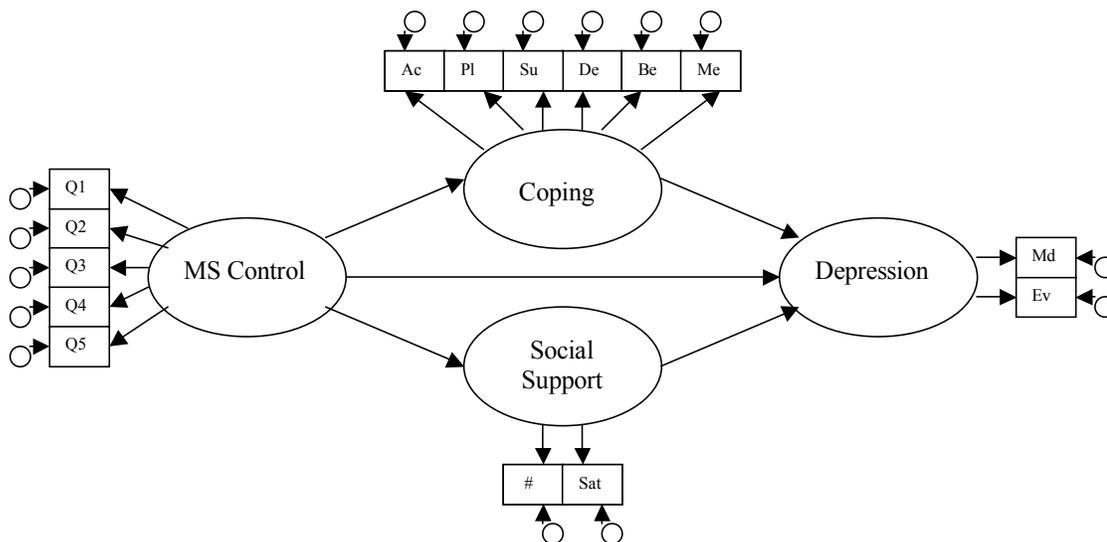
Model 4
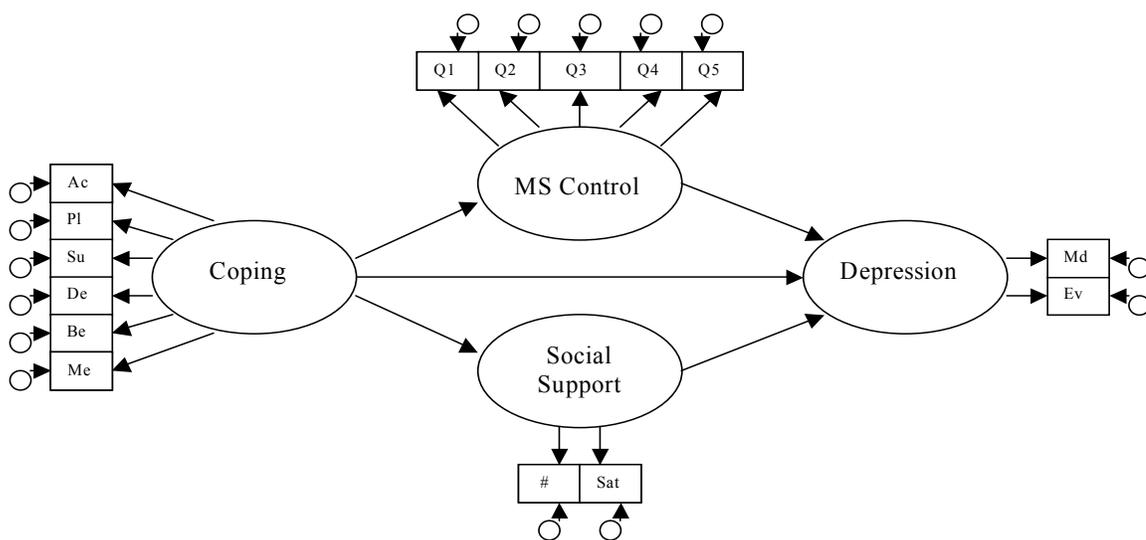
Key: ◯= error : Q1, Q2, Q3, Q4, Q5 refer to items 1-5, respectively, on the MSAI: Ac=Active coping, Pl=Planning, Su=Suppression of competing activities, De=Denial, Be=Behavioral Disengagement, Me=Mental Disengagement: #=Number of social supports, Sat=Satisfaction with those supports: Md=Mood, Ev=Evaluative

Model 5
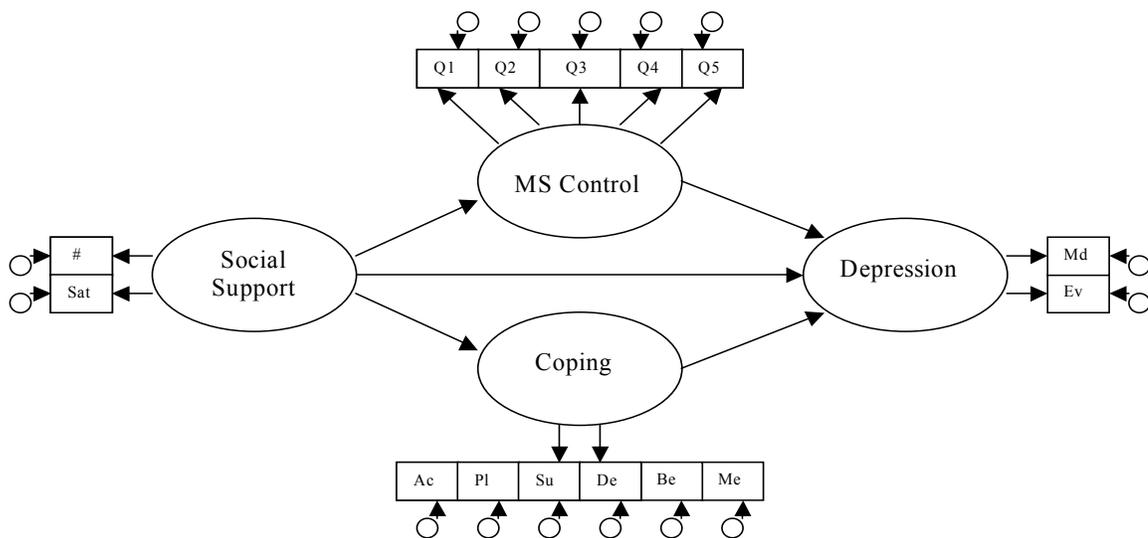
Key: ◯= error : Q1, Q2, Q3, Q4, Q5 refer to items 1-5, respectively, on the MSAI: Ac=Active coping, Pl=Planning, Su=Suppression of competing activities, De=Denial, Be=Behavioral Disengagement, Me=Mental Disengagement: #=Number of social supports, Sat=Satisfaction with those supports: Md=Mood, Ev=Evaluative

1.1. Multiple Sclerosis

Neuropathology, Epidemiology, and Clinical Manifestations of MS

Multiple Sclerosis is a chronic demyelinating disease that affects the central nervous system (CNS). It is the most common non-traumatic neurologic disease affecting individuals between the ages of 20 and 40, afflicting approximately .05% of the population in areas considered to have a high incidence of the disease (Baum & Rothschild, 1981; Bennett, Dittmar, & Raubach, 1991). Although gender ratio estimates vary, most estimates fall in the range of two to three females for every male.

The disease course of MS is unpredictable and non-uniform across patients. Two of the more common disease courses have been characterized as primary-progressive and relapsing-remitting. The primary-progressive course is marked by a gradual, yet steady, decline in functioning, while the relapsing-remitting course is marked by a stepwise decline with periods of disease exacerbation interspersed with periods of stability or even improvement in functioning. Additional disease courses are characterized as secondary progressive, marked by an initial relapsing-remitting course followed by a progressive course, and progressive-relapsing, marked by an initial primary-progressive course followed by acute relapses (Bennett, Dittmar, & Raubach, 1991; Lublin and Reingold, 1996).

The etiology of MS is still uncertain, however, there is evidence for a strong genetic component. Offspring of individuals with MS have a 1 in 50 chance and siblings have a 1 in 20 chance of developing the disease (Compston, 1994). In contrast, the

lifetime risk of developing MS for people living in the Western World is approximately 1 in 800 (Compston, 1994). There is also support for an environmental contribution to MS. Support for this comes from evidence of higher prevalence rates in regions farther from the equator (Kurtzke, Beebe, & Norman, 1979) in addition to evidence of possible viral agents associated with the disease (Poser, 1978). Other theories have postulated that an aberrant immune system reaction may be etiologically involved in MS (Sadovnick, Dyment, & Ebers, 1997).

MS causes the destruction of the myelin sheath of nerve fibers within the CNS. Scar-like lesions, called sclerotic plaques, which form in the areas where demyelination occurs, block transmission of nerve impulses. These blocked nerve impulses result in a variety of clinical manifestations involving psychiatric, cognitive, neurological, and physical disabilities (Bennett, Dittmar, & Raubach, 1991).

The most common neurological and physical symptoms at the onset of MS include: fatigue, motor slowing, dysarthria (slurred speech), weakness, tingling, or numbness in the limbs and extremities, bladder dysfunction, and optic neuritis. The latter involves an inflammation of the optic nerve resulting in partial blindness (Knight, 1992). Some additional common symptoms include spasticity, which is characterized by sudden spastic motor movements, problems with gait/ balance, and paresthesias (Arnett, 2003; Brassington, & Marsh, 1998). Since most of these early symptoms also occur in myriad other disorders, it is often difficult to diagnose patients with MS early in the disease course. Consequently, some patients are initially diagnosed with hysteric/ somatization disorders (Arnett, 2003).

Cognitive and Psychiatric Manifestations of MS

Cross-sectional studies have shown that between 40-60% of MS patients have significant cognitive deficits of some kind (Arnett, 2003; Rao, Leo, Bernardin, & Unverzagt, 1991). There are several areas of cognitive functioning commonly affected in individuals with MS. Deficits in recall memory and speeded cognitive processing are most often seen. Attention and concentration are other commonly affected cognitive domains in MS patients (Maurelli et al, 1992; Rao, Leo, Bernardin, & Unverzagt, 1991). Deficits in executive functioning and visual spatial skills are also common. Executive functioning includes aspects of cognitive flexibility, concept-formation, verbal abstraction, information processing, problem solving, planning, and sequencing (Arnett, 2003). Finally, although deficits for MS patients in intellectual functioning are uncommon (Bennett, Dittmar, & Raubach, 1991), some studies have reported greater drops in specific IQ scale scores for MS patients compared with same-age controls (Maurelli et al., 1992; Rao, Leo, Bernardin, & Unverzagt, 1991; Ron, Callanan, & Warrington, 1991).

There is high comorbidity of psychiatric symptomology in individuals with MS, as well. Depression and bipolar disorder are common psychiatric diagnoses in patients with MS, with lifetime prevalence rates of 47-54% (three times that of the general population) and 13-16% (ten to fifteen times that of the general population), respectively (Joffe et al., 1987; Minden, Orav, & Reich, 1987). According to Minden & Schiffer (1990), depression in MS seems likely due to the interaction of biological, psychological, and social factors. Increased frustration and irritability are also common

psychopathologic symptoms reported in individuals with MS. Finally, lack of insight can be an issue for some individuals with MS.

Depression in MS

Lifetime prevalence rates of depression for individuals with MS are not only higher than those for the general population (as was noted previously), but they are also higher (average 16.8%) than those for otherwise "healthy" depressed persons (Minden, Orav, & Reich, 1987; Patten et al., 2003; Schubert & Foliart, 1993; Seigert and Abernethy, 2005), and for persons with other chronic medical conditions/ progressive neurological syndromes (average 34%) (Patten et al., 2003; Whitlock & Siskind, 1980). The etiology of the relationship between depression and MS has been the source of much speculation and, to date, no definite answer is suggested by the literature. Some studies have hypothesized that the high rates of depression in MS (compared with other chronic debilitating diseases) is a response to the stressfulness associated with the uncertainty about disease course that is characteristic of MS (Shnek et al., 1995; 1997). In support of this, Randolph and Arnett (2005) demonstrated that higher levels of MS symptom variability were associated with higher levels of depression in this population. Relatedly, Zabad, Patten, & Metz (2005) reported that depression was 2.64 times more likely to occur in individuals with relapsing-remitting (a disease course marked by greater variability and uncertainty) v. primary progressive MS.

Regarding possible biological influences, there is some evidence in the literature that depression is correlated with left anterior temporal/ parietal lesion lode (Feinstein et al,

2004; Pujol et al., 1997). Although such data suggest the possibility of an important

biological disease-related substrate to depression in MS, even the authors of such work

note that psychosocial variables are likely to account for more variance in depression in

MS than lesion location and overall lesion burden given the magnitude of correlations

that have been found.

Disease course uncertainty and lesion load may represent non-gender-biased disease

manifestations of the relationship between depression and MS. Williams et al. (2005)

reported a finding that suggests further support for a potentially non-gender-biased

contribution to the MS-depression relationship. The authors reported that rates of

depression in a large (N=451) unusually predominantly male (85.8%) sample of

individuals with MS were similar to those found in more traditionally predominantly

female samples of persons with MS (in contrast to gender discrepancies in this domain

reported in the general population which favor depression in women). However, caution

is warranted against reasoning that an equal prevalence of depression between women

and men with MS indicates that there is a non-gender-biased mechanism of action

promoting depression in MS.

Further complicating the issue of discerning factors underlying depression in MS is

the potentially non-uni-directional nature of depression in this population. Depression

has been theorized to be potentially both a complication and a symptom of MS, making it

reciprocally problematic for its negative effects on MS, and theoretically, more resistant

to treatment (Mohr & Cox, 2001). There is some support for an indirect hypothesis of

this relationship that suggests that depression affects behavior that in turn makes MS

symptomatology worse. Such may be the case in drug noncompliance, where patients

may be prescribed antidepressant medication as well as medication for their MS symptoms, yet their lethargy, ambivalence, and cognitive difficulties makes them less likely to take medications on a regular basis, making their symptomology for both conditions worse (Mohr et al., 1996). Support for this hypothesis comes from studies demonstrating that the successful treatment for depression in this population is associated with improved medication adherence (Mohr et al., 1996; 1997). Further confounding this relationship is the possibility that medication usage to reduce MS exacerbations may be positively correlated with depression (Mohr et al., 1998; Neilley, Goodin, Goodkin, & Hauser, 1996), though this finding is not consistently supported in the literature (Borras et al., 1999; Galeazzi et al., 2005; Patten, Fridhandler, Beck, & Metz, 2003; Patten and Metz, 2001; Zephir et al., 2003; Zivadinov et al., 2003), and these more recent studies—with superior treatment outcome design methods compared with the preceding studies—suggest this is likely not the case (Siegert & Abernethy, 2005).

There is also support for a direct hypothesis of the depression-MS pathology relationship, indicated by studies demonstrating a positive relationship between depression and T-cell production of interferon-gamma (IFN-γ), a lynchpin of MS pathogenesis (Seidel et al., 1995; 1996). The hypothesis that the causal direction of this relationship is that depression has a direct and negative affect on the immune system of individuals with MS, is derived from a study demonstrating that the successful treatment for depression in this population is associated with reduced T-cell production of IFN-γ (Mohr et al., 2001). No study demonstrating the reverse causal direction (i.e. reducing T-cell production of IFN-γ, reduces depression) has been reported to date.

The complexity involved in discerning the etiological/ causal relationship(s) between depression and MS described herein, and the concomitant concerns regarding the application of effective treatments for depression in this population, warrant a better understanding of the role psychosocial variables, such as coping and social support, add to this paradigm in at least a correlational (as the present study does not address causality) manner.

1.2. Coping

Although there are many types of coping behaviors, two broad subtypes have long been recognized in the literature. Problem-focused coping (PFC) refers to coping behaviors more commonly employed when a situation seems manageable and controllable. PFC involves those strategies aimed at altering the source of stress (Lazarus, 1993). PFC is generally considered "adaptive" and includes (but is not limited to) such coping techniques as: accepting responsibility, confronting the problem, problem solving, reappraising the situation positively, benefit-finding, planning, active coping, seeking support, positive reinterpretation, and growth. Emotion-focused coping (EFC) refers to coping behaviors more commonly employed when a situation seems unmanageable, uncontrollable, in need of acceptance, or is related to health (as opposed to work). EFC involves those strategies aimed at reducing the emotional distress elicited by a stressful situation (Lazarus, 1993). EFC is generally considered "maladaptive" and

includes (but is not limited to) such techniques as: distancing, escape-avoidance, acceptance, wishful thinking, denial, mental/ behavioral disengagement, reliance on religion, reliance on alcohol/ drugs, and distortion (Lazarus & Folkman, 1984). It is important to recognize, however, that the broad categories of PFC and EFC may contain coping subtypes that are not necessarily positively correlated with one another (Carver, Scheier, & Weintraub, 1989; Scheier, Weintraub, & Carver, 1986).

Since Lazarus' distinction between PFC and EFC was identified, research on coping has identified more precisely how different methods of coping might serve an adaptive or maladaptive purpose, particularly for individuals with chronic illnesses. Many studies have linked the use of EFC (now including catastrophizing, passive coping, and guarding) to worse medical outcomes, greater symptom severity, treatment resistance, and poorer adjustment to illness (including depression) in individuals with depression (Endler, Parker, & Butcher, 1993; Ravindran et al., 2002) and chronic medical conditions (including Rheumatoid Arthritis, cancer, Hypertension, Diabetes Mellitus, chronic pain, Systemic Lupus Erythematosus, and MS) (Bombardier, D'Amico, & Jordan, 1990; Epker & Gatchel, 2000; Engel, Schwartz, Jensen, & Johnson, 2000; Felton & Revenson, 1984; Fournier, de Ridder, & Bensing, 1999; Kozora et al., 2005; McNett, 1987; Pakenham, 1999; Rollnik, Karst, Fink, & Dengler, 2001; Turner, Jensen, & Romano, 2000; Wineman, Schwetz, Zeller, & Cyphert, 2003). And a similar—yet helpful—effect has been demonstrated (though not as extensively) for the use of PFC (now including optimistic thinking, self-esteem, personal mastery, coping competence, and self-efficacy) in individuals with depression and chronic medical conditions (including Rheumatoid Arthritis, cancer, Osteo Arthritis, Coronary Artery Disease,

artherosclerosis, Hypertension, Diabetes Mellitus, chronic pain, Cystic Fibrosis, Chronic

Obstructive Pulmonary Disease, stroke, and MS) (Bisschop, Kriegsman, Beekman, Deeg,

2004; Burker et al., 2000; Fournier, de Ridder, & Bensing, 1999; Kerns, Rosenberg, &

Otis, 2002; Mishel, Padilla, Grant, & Sorenson, 1991; Pakenham, 1999; Schroder, 2004).

Emotional approach coping (EAC), however, is a type of EFC that appears to be

adaptive in certain chronic medical conditions. Smith, Lumley, & Longo (2002),

contrasted how EAC and 5 passive pain-coping strategies were related to depression in

patients with chronic myofascial pain. The authors reported that passive strategies were

substantially positively related to negative affect, whereas EAC was inversely related to

negative affect, suggesting that certain EFC techniques may be psychologically adaptive

in a chronic pain population. McCracken (1998) also reported that chronic pain patients

who demonstrated "acceptance" (a traditional EFC designation) of their pain condition

demonstrated less pain-related anxiety and avoidance, less depression, less physical and

psychosocial disability, more daily uptime, better work status, and better adjustment to

their condition, independent of level of pain.

The aforementioned reports of specific types of EFC techniques leading to better

health outcomes may partly be explained by the nature of chronic pain v. other types of

chronic diseases. For example, Fournier, De Ridder, & Bensing (2002), hypothesized

that optimistic beliefs about one's self-efficacy and one's medical outlook are ways of

coping that would be differentially beneficial to one's physical health depending on the

controllability of the chronic disease from which one suffered. The authors reported that

unrealistic beliefs are more helpful to patients with a more uncontrollable/ less

predictable disease course (such as chronic pain, Rheumatoid Arthritis, and MS), and

positive efficacy expectancies are more helpful to patients with a more controllable/ predictable disease course (such as Diabetes Mellitus).

Coping in MS

It has been shown that coping predicts adjustment[•] in individuals with MS (McCabe & McKern, 2002; McCabe, McKern, & McDonald, 2004), and that adaptive coping is associated with better psychological health (Stuifbergen 1995; Schwartz, 1999), while maladaptive coping is associated with worse psychological health (Murray, 1995). However, as was mentioned previously, the literature challenges what constitutes adaptive versus maladaptive coping in different chronically ill populations. In part, this has been due to problems *assessing* coping in chronically ill populations due to the applicability of the questionnaire items to specific diseases, the nature of what aspect of the illness, specifically, the questionnaire items are referring to, and a lack of applicability and psychometric weaknesses (e.g. low reliability and validity) of the current coping measurements for these populations (Schreurs & de Ridder, 1997; Felton & Revenson, 1984; Carver, Scheier, & Weintraub, 1989; Folkman & Lazarus, 1980).

In general, it is currently commonly regarded that for individuals with MS, EFC is negatively correlated to illness adjustment, whereas PFC is positively correlated to illness

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[•] Worse adjustment is typically operationalized as depression or psychological distress (Arnett et al., 2002).

adjustment (McCabe & McKern, 2002; De Ridder, Schreurs, & Bensing, 2000). Likewise, Mohr et al. (2002) reported that coping served as a buffer between stress and new brain lesions (indicative of exacerbations) in MS, with PFC techniques being beneficial, and EFC techniques being harmful.

Discrepancies in the Literature on Coping in MS

There is some discrepancy in the literature as to the longitudinal impact of PFC versus EFC on psychological adjustment to MS. Although Pakenham (1999) reported that high PFC use and low EFC use predicted better psychological adjustment longitudinally over 12 months, McCabe, McKern, & McDonald (2004) found no such longitudinal effect. Although the length of these two studies and many of the demographic variables of the participants in these two studies were similar, and with the MS population generally, it should be noted that Pakenham's study included disproportionately more individuals with a progressive disease course. It may be that a coping style marked by high PFC use and low EFC use has a more significant longitudinal impact on psychological adaptation in a more severely disabled population, or one with a more predictable disease course.

Interestingly, for ill individuals, EFC strategies are reportedly relied on more in cases of more illness uncertainty (Wineman, Durand, & Steiner, 1994), and once PFC strategies have been tried and failed to relieve distress (Tennen, Affleck, Armeli, & Carney, 2000)—thereby potentially inducing a state of learned helplessness. However, as was reported by Smith, Lumley, & Longo (2002), McCracken (1998), and Fournier, De

Ridder, & Bensing (2002), it is possible that in populations suffering from more

uncontrollable/ less predictable pathologic chronic disease courses (such as chronic pain,

Rheumatoid arthritis, and MS) compared with chronic diseases with more predictable

courses (such as Diabetes Mellitus and Spinal Cord Injury), the use of certain EFC

strategies (such as EAC, acceptance, and unrealistic beliefs) may represent a helpful

adaptation to illness.

Coping and Depression in MS

As might be expected, the literature on coping and depression in individuals with MS

has generally reported a positive correlation between EFC and depression. For example,

Aikens, Fischer, Namey, & Rudick (1997) demonstrated that escape-avoidance coping

techniques (a type of EFC) predicted depression in MS (though, given a small sample

size (N=22), this finding should be interpreted cautiously). Felton & Revenson (1984)

reported that wishful thinking (an EFC technique) was positively correlated to negative

emotional outcomes in a variety of chronic medical conditions including MS.

Interestingly, however, the relationship between PFC and depression in MS has been

more inconsistent than has the EFC-depression relationship in multiple studies (Aikens,

Fischer, Namey, & Rudick, 1997; Beatty et al., 1998; Jean, Beatty, Paul, & Mullins 1997;

Jean, Paul, & Beatty, 1999; Lynch, Kroencke, & Denney, 2001; Mohr, Goodkin, Gatto,

& Van der Wende, 1997; Pakenham, 1999). For example, Mohr, Goodkin, Gatto, & Van

der Wende (1997) reported that avoidance (an EFC technique) was positively correlated

to depression; however, problem-solving (a PFC technique) showed no correlation to depression.

The stronger EFC-depression relationship (compared with the more variable PFC-mild depression relationship) that exists in the literature may indicate the EFC category contains a more cohesive group of coping techniques—with higher positive correlations between the specific types of EFC techniques included in the broad EFC category, than in the PFC category. However, as was mentioned previously, at least three specific EFC techniques (EAC, acceptance, and unrealistic beliefs) have demonstrated positive impacts on mood in unpredictable disease course populations including MS. Mohr & Cox (2001) emphasize that, just as not all techniques relegated to the PFC category are reported to be "adaptive", not all techniques relegated to the EFC category are reported to be "maladaptive" in an MS population. This suggests the need to consider the impact of a more cohesive subset of both adaptive and maladaptive coping techniques in an MS population, as opposed to the broader EFC and PFC categories.

The relationship between coping and depression may also be more significant for subgroups of the MS population that are more impaired in some, or multiple, domains. This may be more likely given the findings by Warren, Warren, & Cockerill (1991) that during an exacerbation, individuals with MS are more likely to use EFC, and during a remission they are more likely to use PFC. Other possible indicators of this are published reports citing a moderating/ buffering effect of coping on depression in cognitively impaired MS patients. Specifically, Arnett et al. (2002) showed that coping moderated the relationship between cognitive dysfunction and depression in MS; only when patients used high levels of avoidance coping or low levels of active coping

was the relationship between cognitive dysfunction and depression significant.

Relatedly, Mohr, Goodkin, Gatto, & Van der Wende (1997) showed that coping

moderated the relationship between physical disability and depression in MS.

The possibility that MS subgroup variability affects the relationship between

coping and depression has interesting implications regarding the relationship between

coping, depression, and MS control. It may be that individuals with MS who are

experiencing high levels of MS control may constitute a unique subgroup. Given the

flexibility in use of coping strategy suggested by Warren, Warren, & Cockerill (1991)

that occurs in this population depending on whether patients are in an exacerbation or

remission, and the more trait than state-like parameters of MS control, it may be that

individuals who experience high levels of MS control are at greater risk for depression

via poor coping. Specifically, perhaps MS control leads to poor coping which leads to

depression; thereby positioning coping in a mediating role between MS control and

depression. This study explored this possibility as indicated by **Model 3** (**Figure 2**).

Active and Avoidant Coping as More Optimal Measures

As was mentioned previously, it is critical to consider the cohesiveness of

the coping techniques derived from the PFC and EFC constructs. The research on coping

and depression in individuals with another chronic, systemic, unpredictable, incurable,

debilitating disease—Rheumatoid Arthritis (RA)—is enlightening in this regard.

Interestingly, just as the literature linking PFC and EFC to depressive symptomology in

MS conveys more consistency for the "maladaptive" EFC–depression relationship, than

for the "adaptive" PFC—lower depression relationship, the literature in the RA population follows a similar pattern. While EFC is consistently positively correlated to negative emotional outcomes in individuals with RA (Brown, Nicassio, & Wallston, 1989; Covic, Adamson, Hough, 2000; Felton & Revenson, 1984; Keefe, Brown, Wallston, & Caldwell, 1989; Scharloo et al., 1999; Sharpe, Sensky, Allard, 2001; Smith, & Wallston, 1992), PFC has failed to be consistently linked to positive emotional outcomes in this population (Parker et al. 2005; Rhee et al., 2000; Schiaffino, Revenson, Gibofsky, 1991).

In contrast to this mixed relationship between PFC/ EFC and depression, when the literature on the relationship between *active coping* and *avoidant coping* to depression in individuals with RA is considered, the inconsistencies diminish. *Active coping* is defined as an individual's approach to life activities that facilitates positive psychological outcomes (in light of stressful events) (Carver, Scheier, & Weintraub, 1989). *Avoidance coping* is defined as maladaptive coping involving high levels of denial and behavioral and mental disengagement (Arnett et al., 2002). Several studies have reported a relationship between both active coping and avoidant coping, and positive and negative affect, respectively, in a RA population. Avoidant coping has been consistently positively correlated to psychological distress, poor psychological functioning, and negative affect in RA patients (Curtis, Groarke, Coughlan, & Gsel, 2005; Evers, Kraaimaat, Geenen, & Bijlsma, 1997; Newman & Revenson, 1993; Young, 1992). Additionally, active coping has also been consistently positively correlated to less psychological distress, better psychological functioning, and positive affect (Brown, Nicassio, & Wallston, 1989; Groarke, Curtis, Coughlan, & Gsel, 2004; Revenson &

Felton, 1989; Manne & Zautra, 1992) in RA patients. These findings suggest that perhaps using measures of active and avoidant coping, instead of the broader measures of PFC and EFC, when examining the link between coping and depression, may lead to more reliable results in a MS population, as it seems to have done so in the RA population. This may simply be due to the fact that active and avoidant coping are more limited and unitary constructs than EFC or PFC, and thus are more likely to be consistently associated with whatever they are used to predict.

The use of more limited and unitary active and avoidance coping constructs has proved to be illuminating in the MS literature, as well. When Arnett et al. (2002) examined the moderating role of active and avoidant coping on depression in MS patients, they found that cognitive dysfunction only predicted depression in the context of either low levels of active coping or high levels of avoidant coping. According to these investigators, active coping and avoidant coping, unlike PFC and EFC, represent relatively unitary factors of coping. Furthermore, Arnett & Randolph (2006) reported a longitudinal association between MS patients whose depression worsened over time and a decrease in their use of active coping, and patients whose depression improved over time and an increase in their use of active coping.

The measures of coping that were used in this study were chosen based on the findings reported in the aforementioned studies. These studies utilized the more unitary constructs of active and avoidant coping. In doing so, more consistent results were reported in both a RA population (an illness population similar to MS in regards to the chronicity, unpredictability, and resistance to treatment of the disease), and a MS population (Arnett et al. 2002; Arnett & Randolph, 2006). The data concerning the

relationship between coping and depression in a MS population garnered by focusing on measures of active and avoidant coping led to this study's use of these same measures. The more cohesive "adaptive" and "maladaptive" categories of coping techniques identified as *active* and *avoidant coping*, respectively, were used in this study to determine the nature of the relationship between coping, social support, MS control, and depression in a MS population.

The present study, however, additionally investigated the role of active and avoidant coping with more scrutiny. By examining even more unitary dimensions of active and avoidant coping—the 3 individual types of coping that comprise each of these constructs—this study sought to determine if one specific type of coping has more impact than the others on the relationships among constructs being investigated currently. Specifically, the three types of coping included in the active coping construct—active coping, planning, and suppression of competing activities—and the three types of coping included in the avoidant coping construct—denial, behavioral disengagement, and mental disengagement—were each examined to determine their comparable efficaciousness in this population. This seemed particularly useful given that when Carver, Scheier, & Weintraub (1989) first reported the distinct active and avoidant coping categories based on a second order factor analysis of 978 COPE responses, the authors noted that "there may be populations for which, or circumstances in which, these conceptually distinct tendencies are also empirically distinct (p.274)." The present study assumes that individuals with MS are a unique population with unique circumstances and, therefore, further scrutiny of these specific coping styles is warranted.

1.3. Support

The nature of support has been theorized to be just as multifaceted a psychosocial domain as coping. Historically in the literature, there have been distinctions made between different dimensions of support, types of support, and characteristics of support. More specifically, Weiss (1974) suggested six dimensions of support including: intimacy, social integration, nurturance, worth, alliance, and guidance. Kelley (1978) suggested three types of support including: personal, intra-organizational, and extra-organizational. Support descriptions have included other types of support, as well, including: tangible support, emotional support, instrumental support, informative support, functional support, belonging support, and social support (Schreurs & de Ridder, 1997). Of these various types of support, *social support* has traditionally been the hallmark by which clinician's estimate the strength of a patient's "support system". However, as noted by Weiss (1974) the strength of one's support system also depends on the *worth* of such a system. Due to their multi-faceted nature, social support and the worth of such support are difficult concepts to define and measure accurately, though their importance to psychological well-being has been recognized in the literature for over 50 years.

Social Support

Durkheim's (1951) anomie theory depicts the importance of social integration to individual psychological well-being. Bradburn (1969) found that social relationships

were one of the strongest correlates of positive emotions. More recently, Baumeister and Leary (1995) suggested people have a fundamental need for close social relationships. Additionally, social connectedness and social support have been associated with better levels of autonomic activity, better immunosurveillance, and lower levels of stress hormones (Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

Cobb (1976) defines social support as information from others that one is loved and cared for, esteemed and valued, and a part of a network of communication and mutual obligations. More recently, social support has been defined two ways: (1) as information which affords the perception of being cared for, esteemed and valued by members of one's social network (Dubow et al., 1991; Dubow & Ullman, 1989), and (2) as the availability of people on whom we can rely, and who let us know that we are cared for and valued (Sarason, Levine, Basham, & Sarason, 1983).

However, a large component of information about human relationships is ignored when social support is defined and measured as exclusively benevolent (Tilden & Galyen, 1987). Social support may help ward off disease and sickness (Berkman, 1995; Berkman & Syme, 1979; Henderson et al., 1980; Henderson, 1984), while lack of such, and bad support, may increase morbidity and mortality rates (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; Lewis & Rook, 1999; Rook, 1990). Social relations can promote positive adaptation to illness or exacerbate illness-related negative health outcomes (Berkman, 1995). Positive social relations are positively correlated to positive psychological and health outcomes (Seeman, 1996), and a lack thereof, and/ or negative social relations are positively correlated to negative psychological and health outcomes (Berkman, Glass, Brissette, & Seeman, 2000; Berkman & Kawachi, 2000). Additionally,

as Cohen & Wills (1985) note, there may be both a main (or direct) effect and an indirect (or buffering) effect in relation to social supports' enhancing (or alternatively, destructive) effect on health.   For example, social support may influence medical compliance and other health behaviors in both helpful and hurtful ways in ill populations (Daschner, 1986; Doherty, Schrott, Metcalf, & Iasiello-Vailas, 1983; McMahon, 1986; Schafer, McCaul, & Glasgow, 1986), leading indirectly to positive or negative health outcomes, respectively.

Social Support and Depression

Several studies have reported a negative correlation between negative social interactions and psychological well-being (Abbey & Andrews, 1985; Burg & Seeman, 1994; Ingersoll-Dayton, Morgan, & Antonucci, 1997; Lakey, Tardiff, & Drew, 1994; Walen, & Lachman, 2000). Several specific aspects of negative social "support"/ interactions have been identified in the literature to be related to depression including: social conflict, negative social interactions, social strain, criticism, undermining, irritation, burden, purposefully malicious attacks, coerciveness, well meaning attempts that go awry, and a lack of supports and/ or satisfaction with these supports (Sarason, Levine, Basham, & Sarason, 1983; Schreurs & de Ridder, 1997). Sarason, Levine, Basham, & Sarason (1983) reported that particularly individuals with few supports, and dissatisfaction with those supports, are more likely to experience negative affect. In fact, negative support was reported to be a better predictor of depression than positive support

in healthy individuals (Rook, 1984) and individuals with cancer (Manne, Taylor, Dougherty, & Kemeny, 1997).

Investigations into the possibility that positive social support might serve to buffer the negative psychological consequences of negative social support have produced inconsistent findings (Okun, & Keith, 1998; Revenson, Schiaffino, Majerovitz, & Gibofsky, 1991; Schuster, Kessler, & Azeltine, 1990; Sherman, 2003; Walen, & Lachman, 2000). However, Okun & Keith, (1998) reported that the presence of positive social support from multiple sources was more strongly correlated with depression than was negative support.

Social Support, Depression, and Stress/Illness/Disease

There have been many reports on the health benefits of social supports for "compromised" populations, such as individuals who are stressed, ill, and/ or have a disease (Auerbach, & Kilmann, 1977; Cohen, & Wills, 1985; Cohen, 1988; Nuckolls, Cassel, & and Kaplan, 1972; Sosa, Kennel, Robertson, & Urrutia, 1980). It has been suggested that social support may lead to better adjustment for ill individuals (Cohen, Miller, & Rabin, 2001; Goodenow, Reisine, & Grady, 1990; McCracken, Semenchuk, & Goetsch, 1995; Lambert, Lambert Jr., Klipple, & Mewshaw, 1989). Positive social support has been negatively correlated to morbidity and mortality (Berkman, 1995; Feldman, Downey, & Schaffer-Neitz, 1999; Helgeson & Cohen, 1996; Peirce et al., 2000) and depression (Doeglas et a., 1994) in disabled and ill individuals, longitudinally and cross-sectionally. Penninx et al. (1998) reported having a partner and having many close relationships to be negatively correlated to depression in individuals with a variety of chronic diseases. In contrast, it has been suggested that unsatisfying social supports

may lead to depression in individuals with RA (Revenson, Schiaffino, Majerovitz, & Gibofsky, 1991). Interestingly, it has been suggested that the impact of both positive and negative social "supports" on depression may be stronger for individuals with chronic illness, such as RA and OA (Zautra et al., 1994), than for healthy individuals.

Social support has been reported to interact significantly with several other psychosocial variables leading to both qualitatively positive and negative outcomes. It has been reported that social support modulates effects of stress on immune system functioning (Cohen et al., 1997; Esterling, Kiecolt-Glaser, & Glaser, 1996; Sarason, Sarason, Potter, & Antoni, 1985). For populations who live alone, are unmarried, or have few social supports, stressful life events reportedly exert a stronger influence on the development of psychiatric disorders (Andrews, Tennant, Hewson, & Vaillant, 1978; Eaton, 1978; Winefield, 1979). Personality traits (such as self esteem, locus of control, and extroversion/ introversion) may propagate (and/ or moderate) the circular relationship between poor social support and depression, in general (Coyne, 1976; Sarason, Levine, Basham, & Sarason, 1983). However, positive social support may buffer the relationship between stressful life events and depression, perhaps in part by interacting with these personality traits (Sarason, Levine, Basham, & Sarason, 1983).

Social Support and MS

It has been reported that the variety, amount, and quality of social supports are all diminished in individuals with MS (Gilchrist, & Creed, 1994; Hakim et al., 2000; McIvor, Riklan, & Reznikoff, 1984; Mohr et al., 1999; Sanford, & Petajan, 1990)

compared with their pre-morbid levels. Additionally, individuals with MS are reported to have more isolation (O'Brien, 1993; Walsh & Walsh, 1989), perceive less social support (Miles, 1979; O'Brien, 1993), and have fewer social contacts (Miles, 1979; Zeldow, & Pavlou, 1984) than persons with less or no disabilities, and than persons with RA (Rudick et al., 1992). This may, in part, be due to the unique impact MS control has on this population.

Several studies have noted a change in the nature of social support needs of patients with MS as the disease progresses. For example, Kraft, Freal, & Coryell (1986) reported that younger patients and those with short illness duration reported needs for more psychological and vocational support, whereas those with higher disability/ longer duration reported needs for more instrumental aid. Qualitative changes in social networks and personal relationships over the course of the disease are also frequently reported (Gilchrest & Creed, 1994; McIvor, Riklan, & Reznikoff, 1984; Mohr et al., 1999). According to Braham, Houser, Cline, & Posner (1975) and Kraft, Freal, & Coryell (1986), support needs change over the course of the MS disease process depending on the severity and the type of disability of the patient.

As might be expected, for individuals with MS, studies report a detrimental impact of negative social support on health and psychological well-being (Fiore, Becker, & Coppel, 1983; Tilden & Galyen, 1987), whereas positive social support is positively correlated with psychological health (Maton, 1988) and self-esteem (Foote et al., 1990). Social relationships and social contacts are an important predictor of psychological health in individuals with MS (Gulick, 1997). Additionally, contact with healthy people (Maybury & Brewin, 1984; Miles, 1979), perceived support from friends and family

(McIvor, Riklan, & Reznikoff, 1984), and the proximity of a significant other's residence (Miles, 1979), were all positively correlated to better psychosocial adaptation in individuals with MS.

Social Support and Depression in MS

Several studies have reported the potentially ameliorative role of social support in reducing depressive symptomology in individuals with MS (Gulick, 1994; Miller, 1997; Pakenham, 1999; Wineman, 1990). Interestingly, social relationships were reported to buffer the negative impact of uncertainty on psychological health of women with MS (Crigger, 1996). Finally, social supports have been suggested to moderate the impact of stress and depression on immune system functioning in patients with MS, though, for statistical reasons including a small sample size (n = 14), a non-random patient selection process, and statistical significance for only 1 of 2 measures of immune system functioning, this finding should be interpreted cautiously (Mohr & Genain, 2004).

Viewed from another perspective, lack of social support has been identified as an important risk factor for depression in individuals with MS (McIvor, Riklan, & Reznikoff, 1984). This lack of social support may be initiated or worsened by aspects of the disease process that may lead to either over-taxing and burn-out of current supports, or a lack of making and/ or maintaining new supports, which may then lead to depression. The current study, therefore, incorporated models that consider the impact of social support on depression independently (**Model 1, Model 2, Model 5—Figure 2**) and as a mediator between MS control and depression (**Model 4—Figure 2**), and coping and depression (**Model 5—Figure 2**).

Gender, Marital Status, Social Support and MS

Better social support functioning and larger size of social support network were positively correlated to activities of daily living (ADL) for women with MS more than for men with MS, yet these women had lower levels of perceived social support then did the men (Gulick, 1994). McCabe, McKern, & McDonald (2004) reported that lower social support significantly predicted higher depression in women with MS but not in men with MS. Interestingly, it was reported by Harper et al. (1986) that women with MS and men with MS were equal in the quantity of social supports reported, suggesting that perhaps the perceived quality of, and the perceived satisfaction with (v. the quantity of social supports or the size of the support network) might be critical domains to ascertain. Wineman (1990) reported that women with MS, more then men with MS, reported getting more satisfaction from social support, generally.

Gulick (1994) noted a general increased risk for women and unmarried persons for decreased social support. Zeldow & Pavlou (1984) reported that being married functioned as a potential buffer for the impact of MS on psychological health, and those who were married reported more overall support. Gulick (1994) reported that available support was higher from spouses than from other sources, regardless of gender. Interestingly, King & Arnett (2005) reported that depression was the best predictor of either patient or significant-other rated dyadic adjustment, implying that in what may be a patient's greatest supportive relationship, greater levels of relationship problems were associated with higher levels of depression. However, Gulick (1994) suggested there were differences in the relationship between marriage and support based on gender (with

men reporting more aid support from their spouse than did women). Although men

report that the majority of their support comes from their spouses, women report that

their support comes from multiple sources (Gulick, 1994). Not surprisingly, men, but not

women with MS, reported a less severe sense of lost support as a result of the disease

process when they had a spouse (Gulick, 1995).

Gender and Social Support

Some of the discrepancies in the gender-specific findings reported here may be

partly explained by health psychology-feminist theory. Noddings' (1984) theory of

relational ontology and Gilligan's (1982) findings on the importance of social relations to

women's health, suggest that women base more of their self-esteem on their social

relationships than do men. Therefore women may be differently, and perhaps more

strongly, affected by such relationships (or lack thereof), depending on the nature of these

relationships and their centrality to the individual's concept of self. Additionally,

according to Belle (1982), women give more support than they receive, and they get more

support from children and friends, than from spouses (Antonucci & Akiyama, 1987;

Lowenthal & Haven, 1968). Perhaps women get equal, or more, satisfaction from giving

support than from receiving it, thereby complicating the nature of the gender support

discrepancies reported previously.

Gender differences in aspects of perceived and experienced social support, and

the unique effects of these differences on correlates of individual psychological well-

being—including depression—for individuals with MS have already been identified in

the literature. This study explored the nature of social support by garnering information

about both the quantity of supports and the perceived satisfaction with received social

support. Particular consideration was given to gender discrepancies in this regard.

1.4. Coping and Support

The relation between coping and support for individuals with a chronic

disease was conceptualized by Schreurs and de Ridder (1997) (in a meta-analysis of

coping and support research) as consisting of four distinct types of relatedness: (1)

Seeking social support as a coping strategy, (2) social support as a coping resource, (3)

social support dependent on individual coping style, and (4) coping by a social system.

Although all four types of relations allow for negative social support interactions in

addition to positive ones, the authors favor (2) and (3) for their ability to potentially more

completely convey the nature of the relationship between these two psychosocial

variables. Although Schreurs & de Ridder (1997) maintain that it is problematic that

coping is generally studied independently of support, both coping and support have been

shown to have an independent impact on the psychological well-being of chronically ill

patients (Maes, Leventhal, & DeRidder, 1996; Reifman, 1995; Kessler, Price, &

Wortman, 1985). However, Hirsch (1980) speculated that *both* support *and* coping were

important to successful adaptation to major life changes.

Coping, Support, Illness, and Disability

Steptoe (1991) and Penninx et al. (1998) suggested the importance of both coping and social support to adjustment to chronic illness, generally. Murray (1995) suggested that the effects of MS on psychological health were dependent on both coping & support networks. McNett (1987) suggested that social support influences coping effectiveness in chronically disabled (i.e. wheelchair-bound) populations. Leake, Friend, & Wadhwa, (1999) suggested that adaptive coping may increase social support (and vice-versa) leading to an improvement in adjustment to disease in a population of chronically ill renal dialysis patients. Likewise, Manne & Zautra (1989) used a path model analysis to demonstrate that good support led to more adaptive coping, which led to better adjustment to illness in women with RA. In contrast, Hatchett, Friend, Symister, & Wadhwa (1997) suggested that unsatisfying support can lead to poor coping and to poor adjustment to chronic illness, generally.

Coping, Support, Depression, and Illness/ Disability

Andrews, Tennant, Hewson, & Vaillant (1978) suggested that social support and coping help buffer against psychological impairment in light of life stress and disease. It may be that psychosocial resources and how they relate to depression depend on the nature of the specific illness/ disease one might have. For example, Penninx et al. (1996) suggested that differences in disease characteristics, such as functional incapacitation and illness controllability, may explain observed psychological differences across diseases.

This implies MS control may differentiate individuals' with MS responses to coping, social support, and depression, from those responses of individuals with other (less unpredictable) chronic debilitating diseases.

    It has been suggested that EFC and social support may be more psychologically adaptive for individuals with uncontrollable diseases (Pearlin & Schooler, 1978), life-threatening diseases (Ell, Mantell, Hamovitch, & Nishimoto, 1989; Feifel, Strack, & Nagy, 1987; Rolland, 1987), and/ or functionally incapacitating diseases (Fitzpatrick, Newman, Archer, & Shipley, 1991). Perhaps reflective of this notion, in cancer patients, direct positive effects on psychological well-being were found for having a partner, many close relationships, mastery, self-efficacy, and self-esteem. In pulmonary disease patients, psychological buffer effects were found for mastery and having many diffuse relationships, while for cardiac and RA patients, receiving emotional support was pivotal, and for diabetes patients instrumental support was key (Penninx et al., 1998). Finally, social support and active coping were negatively correlated to depression for African Americans and Latinos with physical disabilities, chronic illness, and neurological diseases (Zea, 1996).

1.5. Learned Helplessness, Attributional Style, and Control

Learned helplessness was first described as the behavioral adaptation to a mental state sustained after being subjected to inescapable negative situations. This description was made in association with animals who had been repeatedly subjected to inescapable shocks. However, as discrepancies in the literature of learned helplessness in humans were published, the construct underwent some revisions. At first revision, it was deemed that learned helplessness was characterized by an attributional style that asserted bad events were caused by internal, global, and stable factors, and consequent depression was the result of a diathesis-stress process that presupposed this attributional style (Abramson, Seligman, & Teasdale, 1978). At second revision, it was deemed there was a subtype of depression— hopelessness depression—that was characterized less by solely internal, global, stable, causal attributions, and more by more inclusive, general, maladaptive cognitive styles in the presence of negative life events (Abramson, Metalsky, & Alloy, 1989).

In the current literature, learned helplessness is functionally conceptualized as a psychological state in which individuals expect that their efforts to control outcomes of situations will be ineffective, usually stemming from past experience with uncontrollable, unpredictable, aversive outcomes (Shnek et al., 1995). Learned helplessness is found to be positively correlated with, and a predictor of, depression, and negatively correlated with self-efficacy, generally. However, learned helplessness may have some overlap/ theoretical similarity with the construct of self-efficacy, and may also be conceptualized

as a subtype of depression (Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978; Shnek et al., 1997).

Learned helplessness has also been positively correlated with an external locus of control. Interestingly, perceived internal control (a theoretical antithesis to learned helplessness) is positively correlated to adjustment to illness in individuals with RA (Scharloo, et al., 1998; Schussler, 1992; Tennen et al., 1992). Additionally, perceived control and causal attributions have been reported to moderate the relationship between disability and depression in RA patients (Schiaffino & Revenson, 1992). These findings suggest that *control* is likely related to depression and disability in individuals with RA, and other similar chronic diseases, such as MS. In fact, one study that hypothesized that chronic, unpredictable, uncontrollable diseases (such as MS) lead to learned helplessness and to depression (Shnek et al., 1997), utilized the same measure of *MS control* used in this study (though in Shnek et al.'s study the measure was conceptualized to be assessing learned helplessness) to explore this possibility.

Learned helplessness has also previously been shown to be independently associated with poor coping, poor social support, and depression in individuals with RA (Callahan, Brooks, & Pincus, 1988; Nicassio et al., 1985; Smith, Christensen, Peck, & Ward, 1994; Smith, Peck, & Ward, 1990; Stein, Wallston, Nicassio, & Castner, 1988). Relatedly, it has been suggested that changing beliefs about personal control and disease-related beliefs might help improve the functioning and health of individuals with RA (Scharloo et a., 1998). Given the commonalities between RA and MS in terms of disease unpredictability, these findings suggest that such a relationship among MS control,

coping, support, and depression may also exist in a MS population; the implied suggestion for improvement in functioning in this population might also hold true.

Coping, Support, Learned Helplessness, and Depression in MS

Mohr et al. (1999) asked MS patients about the subjective psychosocial experience of having MS. Factor analysis of patients' responses resulted in 3 categorical variables: *demoralization* (which included helplessness) was positively correlated to depression, *benefit-finding* (a form of active coping which included a deepening of relationships) was positively correlated to seeking social support, and *deteriorated relationships* was positively correlated to depression and to lower levels of self-control. Demoralization and deterioration in relationships have previously been recognized as psychosocially problematic domains for individuals with MS (Mohr et al., 1999). The literature on benefit-finding in populations adapting to illness, generally (Affleck, & Tennen, 1996), and to MS (Mohr et al., 1999), in particular, suggests that benefit finding may be either a direct effect of MS, or a coping strategy that may lead to improved mental health. However, in Mohr et al.,'s (1999) study, benefit finding was not directly related to depression, suggesting that there may be a more complex, dynamic relationship between depression and benefit finding (and perhaps active coping, in general) in MS patients.

According to Baron and Kenny (1986), when there are discrepant findings reported in a literature, it may be an indication that there is mediation and/ or moderation occurring among variables. In regards to the reports involving benefit finding and depression, perhaps benefit-finding (and/ or other active coping techniques) is correlated with better social support, which, in turn, leads to less depressive symptomology. Alternatively,

perhaps it is necessary for the cumulative effect of two adaptive psychosocial variables (e.g. active coping *and* good social support) to lead to less depressive symptomology in MS.

Conversely, perhaps it takes the cumulative effect of two maladaptive psychosocial variables (e.g. avoidant coping *and* MS control, or avoidant coping *and* poor social support) to lead to more depressive symptomology in MS. For example, McCabe, McKern, & McDonald (2004) reported that individuals with MS who were less likely to use PFC *and* who were less likely to have good social support, were more likely to have poorer adjustment to illness and depression, than were those individuals who were less likely to display either trait (e.g. PFC use or poor social support) independently. Interestingly, this pattern was more common in men with MS than in women with MS.

1.6. Gender Discrepancies in MS

Gender discrepancies within the MS literature may, in part, reflect gender differences in the population, generally. For example, depressive symptomology has been more commonly reported for women versus men in the general population (Culbertson, 1997; Nolen-Hoeksema, 1987), and for individuals with MS (Schiffer, Weitkamp, Wineman, & Guttormsen S, 1988). However, several studies have found this not to be the case in MS (Joffee et al., 1987; Minden, 2000; Tedman, Young, & Williams, 1997; Williams et al., 2005). While for women with MS, depression has been negatively

correlated with "adaptive" coping techniques, there has been no such relationship reported for men (Steck, Amsler, Kappos, & Burgin, 2001).

Hickey & Greene (1989) reported that men with MS have lower levels of depression and hopelessness then a "control" group of psychiatrically depressed men, but women with MS have similar depression and hopelessness levels compared to psychiatrically depressed women. McCabe & McKern (2002) reported that women with MS endorse poorer psychological health than do men with MS. Interestingly, Weissman et al. (1977) reported that women with MS tend to report more affective symptoms (both positive and negative symptoms) then men with MS, generally.

Given these gender differences, it is not surprising it has been theorized that there may be gender differences in what are considered "adaptive" coping strategies (McCabe, McKern, & McDonald, 2004). It has been reported that for men with MS, PFC is inversely predictive of depression, while for women with MS, seeking social support is inversely predictive of depression (McCabe, McKern, & McDonald, 2004). Women more than men (both with MS and "healthy" controls) tend to seek social support and focus on the positive aspects of situations (McCabe, McKern, & McDonald, 2004). Although Affleck et al. (1999) reported that women with RA used more EFC strategies each day than did men with RA, it was not indicated which gender had a better outcome based on their coping strategy. This may be one reason why previous literature suggests a weaker link between the relationship of "adaptive" coping and good social support to depression, versus that of "maladaptive" coping and poor social support to depression. Many previous studies did not consider such gender discrepancies, and given that MS is

more common in women, it can be difficult to discern these complex relationships in a given MS sample.

Issues involving gender discrepancies may enlighten the literature reporting inconsistent relationships between demographic and disease-related variables in the MS population and their association with depression. It was previously postulated that the unpredictability of the disease course (potentially related to MS control), rather than disease course type, and lesion location, might explain aspects of these discrepancies. Another possibility is that gender discrepancies may suggest confounds in the literature elicited by the disproportionate number of women with MS included in these studies (albeit this is appropriately reflective of the MS population at large). Some findings may, at best, be attributable only to women with MS.

Despite Williams et al.'s (2005) report of an equal distribution between depression rates of men v. women with MS, depression etiology in this population is still unknown. Therefore, consideration of gender discrepancies pertaining to the constructs hypothesized to be related to depression in this study—MS control, coping, and social support—may illuminate such potential confounds in the literature. Given the fewer number of findings (albeit there is a dearth of research available in this domain) relating MS control (and theoretically related constructs), coping, and social support to depression in men with MS, the present study explored the nature of the gender discrepancies between MS control, coping, and social support.

1.7. Optimal Outcome Models and Measures

Gender differences and issues related to mediation may explain some of the aforementioned discrepancies reported in the literature. These possibilities are accounted for in the current hypothesized theoretical models. Optimal outcome measurement choice is another domain that may explain reported discrepancies in the literature pertaining to the constructs of interest in this study. For example, two recent studies reported finding no relationship between social support and depression in populations with chronic, progressive, diseases. Curtis, Groarke, Coughlan, & Gsel (2004) found no such relationship between these variables in a sample of women with RA, and Wineman (1990) found no relationship between these variables in a sample of men and women with MS. These investigators used measures of social support indicating emotional/ informational support, tangible support, positive social interaction, affectionate support, and structural support (a single item indicating number of close friends and relatives), and Wineman (1990) used measures of social support indicating perceived socialization, tangible assistance, advice and guidance, social reinforcement, and emotional sustenance. Yet neither study measured number of supporters throughout a variety of life domains and satisfaction with that support. The present study included such measures in the assessment of social support.

The use of sub-optimal measures of social support potentially leading to discrepancies in the literature pertaining to the relationship between social support and depression may be reflected in the literature pertaining to coping and depression, as well. Hickey & Greene (1989) found no relationship between coping and depression, and coping and hopelessness, in a sample of Irish men and women with MS; and Wineman, Durand, & Steiner (1994) found no predictive relationship between coping strategy and psychological well-being (including depression) in a sample of men and women with MS. Both Hickey & Greene (1989) and Wineman, Durand, & Steiner (1994), however, were relying on measures of global PFC and EFC, which, as noted previously, may be coping indices comprised of multifaceted domains of varying levels of "adaptive" and "maladaptive" coping, respectively. Consequently, the present study employed the more unitary "adaptive" and "maladaptive" coping constructs of active and avoidant coping, respectively. Furthermore, additional analyses of the even more unitary coping styles that comprise active coping—active coping, planning, and suppression of competing activities—and avoidant coping—denial, behavioral disengagement, and mental disengagement—were analyzed in this study.

Finally, measures of depression used in most prior work were derived from inventories not intended for use with medical populations. This is problematic because vegetative symptoms of depression that may overlap with disease symptomology (e.g. fatigue, sexual dysfunction, sleep disturbance, etc.) in medical patients may inflate their overall depression scores on typical inventories used to measure depression. The present study employed a measure of depression that has been validated for use in MS populations, and does not include neurovegetative symptoms that may overlap with MS

symptomatology. Specifically, this study utilized measures of mood and negative evaluative aspects of depression.

1.8. Treatment Outcome Research

The hypotheses explored in the current study were partly derived from reported results from treatment outcome studies in MS. Teaching adaptive coping has been shown to predict good psychological outcomes in MS (Mohr et al., 2001; Mohr & Cox, 2001). Cognitive Behavioral Therapy (CBT) has been reported to be beneficial in treating depression in MS (Crawford & McIvor, 1987; Foley et al., 1987; Larcombe & Wilson, 1984) via cognitive restructuring and behavioral modification, even when administered via telephone (i.e. without the potential benefits of extra tangible social support) (Mohr et al., 2000). Intervention programs teaching coping versus insight, and teaching coping versus telephone peer support, respectively, were effective at reducing depression in MS, generally (Schwartz, 1999). However, Schwartz (1999) reported that, although the coping group also increased psychosocial role performance and improved coping, generally, for those patients with affective problems already, the telephone peer support intervention was better at reducing depression and lowering use of avoidant coping. Finally, Uccelli et al. (2004) reported peer support group therapy by itself to be inconsistent at reducing depressive symptomology in individuals with MS, and potentially harmful to some participants. However, there was no report by Uccelli et al. (2004) of the participants' satisfaction with this peer support, leaving room for the

possibility that it may have been perceived as negative social support for participants in the study.

1.9. Present Study

With consideration of the aforementioned issues in the literature, this study incorporated what seemed to be the most optimal measures for each construct being assessed. Several competing theoretical models explaining the relationship among these constructs were hypothesized. The assessment of social support included inventories of both quantity (number of people) and quality (satisfaction with) of social support. The assessment of coping was based on measures of active coping and avoidant coping, specifically, and included each of the individual types of coping contained within the active (active coping, planning, and suppression of competing activities) and avoidant (denial, behavioral disengagement, and mental disengagement) coping domains. Depression was assessed with a measure validated for use in MS that includes only mood and negative evaluative depression symptoms, thus avoiding the potential ambiguity of neurovegetative depression symptoms in this medical population. The MS control measure is one that has been adapted specifically for individuals with MS and employs a 5-item assessment of MS control across several domains. Consideration was given to demographics including: age, gender, disease course, symptom and diagnosis duration, number of exacerbations, and severity of disease/ disability. Finally, consideration was given to the possibility that mediation between MS control and depression by coping

and/or social support (**Model 3-Figure 2**), mediation between coping and depression by MS control and/ or social support (**Model 4-Figure 2**), and/ or mediation between social support and depression by MS control and/ or coping (**Model 5-Figure 2**), may account for a portion of the aforementioned discrepancies in the literature.

The relationship among MS control, coping, social support, and depression in individuals with MS may be a complex, multifaceted relationship with both positive and negative implications for depression. Additionally, there may be direct and indirect pathways of interrelationships among these constructs. Specifically, it may be that mediation is occurring among MS control, coping, and/ or social support and depression in this population. Finally, these pathways may be more pronounced, and/ or may hinge more on the role of MS control, coping, and/ or social support for women than for men.

The literature reviewed previously suggests that any of the hypothesized structural equation models are possible. SEM analysis is ideal for situations such as this—when there are several different scenarios of sets of relationships among variables predicting a particular outcome (in this case, depression). Additionally, SEM analyses allow for the consideration of multiple computations simultaneously (i.e. correlations and regressions; and multiple mediation analyses). SEM analysis helps to decipher which of the models best fit the data. Illustration of the relationships among the variables could provide clues regarding possible causal associations that could then be tested using treatment outcome/ longitudinal approaches. For example, if MS control predicts depression via social support—that is, social support mediates the relationship between MS control and depression—MS control could be targeted in psychotherapy, with the prediction that

reduced MS control beliefs should result in improved social support which then would be hypothesized to result in lower levels of depression.

<u>Hypotheses</u>

As illustrated in **Figure 2,** five different path models were compared. In all 5 models, the construct *depression* is the outcome and is represented through the measurement of *mood* and negative *evaluative* symptoms of depression. The construct *MS control* was represented through the measurement of five items assessing this state across multiple domains. The construct *coping* was measured by the types of coping comprising the domains of active (active coping, planning, and suppression of competing activities) and avoidant (denial, behavioral disengagement, and mental disengagement) coping. Finally, the construct *social support* was represented through the measurement of *number* of supports and *satisfaction* with that support.

Model 1 and Model 2 (Figure 2) depict *MS control, coping* and *social support* as significantly and independently predicting *depression* in MS. **Model 2** further asserts that *MS control, coping*, and *social support* are all correlated with one another.

Model 3 (**Figure 2**) depicts *coping* and *social support* as mediating the relationship between *MS control* and *depression.* **Model 4** (**Figure 2**) depicts *MS control* and *social support* as mediating the relationship between *coping* and *depression.* Finally, **Model 5** (**Figure 2**) depicts *MS control* and *coping* as mediating the relationship between *social support* and *depression.*

The way Models 3, 4 and 5 make sense logically, in light of existing data, is described in the following examples.

Example 1: It may be that feelings of loss of personal control (high MS control) lead to maladaptive coping strategies and/ or poor social support, which lead to depression (as Model 3 depicts, and as the existing literature suggests might be the case). Model 3 additionally allows for the identification of specific relevant aspects of MS control, maladaptive coping strategies, and/ or aspects of poor social support. If this model is found to be psychometrically sound, it would suggest that improvement in feelings of personal control (lower MS control) should influence coping and/ or social support, which should cause a decrease in depression (as the existing literature also suggests might be the case). A comparison of the strength of this model versus the other four models can be psychometrically compared via SEM analysis.

Example 2: It may be that using maladaptive coping strategies leads to feelings of loss of personal control (high MS control) and/ or poor social support, which leads to depression (as Model 4 depicts, and as the existing literature suggests might also be the case). Model 4 also allows for the identification of specific relevant aspects of maladaptive coping strategies, MS control, and/ or aspects of poor social support. If this model is found to be psychometrically sound, it would suggest that improvement in coping technique should influence feelings of personal control (lower MS control), and/ or social support, which should cause a decrease in depression (as the existing literature also suggests might be the case). As with Model 3, a comparison of the strength of this model versus the other four models can be psychometrically compared via SEM analysis.

Example 3: The same premise described above applies for Model 5; however, in this case it is suggested that poor social support may lead to reduced feelings of personal control (higher MS control), and/ or maladaptive coping strategies, which may led to

depression. Finally, it should be noted that while the a priori predictions being made here indicate maladaptive aspects of MS control, coping, and social support as leading to depressive symptomology, it is possible that the inverse is true—in which case the data will indicate adaptive aspects of MS control, coping, and social support as leading to less depressive symptomology.

Lastly, a gender discrepancy among these constructs was predicted, with *MS control*, *coping*, and *social support* predicted to be more strongly associated with *depression* in women than in men.

CHAPTER 2

METHODS

2.1. Subjects

One hundred and one Caucasian MS patients were tested. Participants were all

diagnosed as having definite or probable MS based on criteria of Poser, Paty, &

Scheinberg (1983). Diagnoses and course types were determined by board-certified

neurologists. Participants were recruited from outpatient neurology clinics and a local

MS Society in the Northeastern United States. Specifically, participants were recruited

through letters sent to local neurologists, an advertisement in the local MS society

newsletter, and talks given at local MS Society meetings. Potential subjects were told of

an opportunity to participate in a study of the relation between cognitive, psychological,

and physical symptoms of MS. Those who expressed interest in the study were

interviewed by telephone to determine if they met inclusionary criteria. Eligible

participants were scheduled for testing.

Participants were excluded if they had a history of drug or alcohol abuse, nervous

system disorder other than MS, severe motor or visual impairment that would prohibit

them from being able to perform the cognitive tests, or could not be evaluated on an

outpatient basis. The final sample consisted of 80 women and 17 men. Four individuals

(3 women and 1 man) were excluded for the following reasons: uncertain MS diagnosis;

extensive history of electroconvulsive therapy; prior history of stroke; history of brain

injury with loss of consciousness, and a history of learning disability.

After providing informed consent, participants completed a psychosocial interview followed by a neuropsychological test battery (which included having them complete the questionnaires used for this study) lasting approximately four to five hours. In return for their participation, participants received a written neuropsychological evaluation consisting of an assessment of their neuropsychological performance and $75.00. The treatment of participants was in accordance with the ethical standards of the American Psychological Association.

2.2. Questionnaires

Chicago Multiscale Depression Inventory (CMDI; Nyenhuis et al., 1998). The CMDI is a self-report questionnaire designed to assess depressive symptomology in medically ill patient populations. It consists of 14 questions assessing depressive symptomology in each of three domains: mood, evaluative, and vegetative symptoms of depression. Participants are asked to indicate on a scale from 1 (Not al all) to 5 (Extremely) the extent to which one word describes them during the past week including today. For the mood subscale such words include: sad, glum, low, etc…, for the evaluative subscale such words include: worthless, a failure, unwanted, etc…, and for the vegetative scale such words include: exhausted, tired, poor appetite, etc….

Distinguishing among components of depression is important given the potential overlap between MS symptoms and neurovegetative symptoms of depression (Aikens et al., 1999; Arnett & Randolph, J.J. (2006); Benedict et al., 2002; Mohr et al., 1997;

Nyenhuis et al., 1995). Due to the potential confound of including vegetative symptoms (which may also be symptoms of disease) as a marker of depressive symptomology (Nyenhuis et al., 1998), and in accordance with the precedent set in previous studies on depression in MS (Arnett et al., 1999; 2002; Arnett, Higginson, & Randolph, 2001), only scores from the mood and evaluative scales were utilized in this study. The mean t-score of patients' responses on these two subscales was used as the measure of depression.

The CMDI has demonstrated a relatively high level of internal consistency for the mood, evaluative, and total scale scores (coefficient ɑ = .91, .77, and .89, respectively). Split-half reliability measures for these scales have also been relatively high (r = .85, .72, and .84, respectively). Finally, convergent validity measures (based on comparisons with the Beck Depression Inventory (BDI), Profile of Mood States (POMS), and Geriatric Depression Scale (GDS)) have all been high and significant (.59< r < .77; p< .001) (Nyenhuis et al., 1998).

The COPE (COPE; Carver, Scheier, & Weintraub, 1989). The COPE is a self-report questionnaire designed to assess a variety of coping techniques used in response to stressful situations (though dispositional coping techniques are being assessed, as well (Lazarus, 1993)). The COPE is a 60-item scale comprised of 13 conceptually different subscales. Participants are asked to indicate on a scale from 1 (I wouldn't do this at all) to 4 (I would do this a lot) the extent to which they would respond in the manner indicated to a hypothetically stressful event involving their employer inquiring suspiciously if they have MS. The active coping domain is comprised of the active coping, planning, and suppression of competing activities subscales, and the avoidant coping domain is comprised of the denial, behavioral disengagement, and mental

disengagement subscales (Arnett et al., 2002; Carver, Scheier, & Weintraub, 1989). Each subscale is comprised of 4 items assessing that specific coping style across multiple domains. A sum of participants' responses on each of these six subscales was used as the measure of coping.

The COPE has demonstrated a moderate to high level of internal consistency for the active coping subscale measures (coefficient α = .62, .80, and .68, respectively) and the avoidant coping subscale measures (coefficient α = .71, .63, and .45, respectively). Test-retest reliability measures for these scales (over a 6 to 8 week period) have also been moderate to high for active coping subscales (.46 < r < .69) and avoidant coping subscales (.42 < r < .66). The avoidant coping and active coping domains used in the present study represent two independent (.02 < r < -.28 between active coping and avoidant coping indices)—though significantly, inversely correlated—and equally important domains of coping. Furthermore, given that the factor loadings ranged between .29 and .73 for the items comprising the active coping indices, and between .23 and .75 for the items comprising the avoidant coping indices, there is good evidence that these two coping measures underlie different dimensions of the same construct (Carver, Scheier, & Weintraub, 1989). Notably, while the factor loadings for some of the individual coping items are not very strong, when the items are considered together, the internal consistency reliabilities for all of the active coping subscales (.62, .80, and .68, respectively) and all of the avoidance coping subscales (.71, .63, and .45, respectively) suggest the active and avoidant coping subscales are psychometrically strong coping indices.

Because we asked participants to respond to the COPE in light of a specific, hypothetically stressful, situation (i.e. situational coping), mention of the situational versus the dispositional (e.g. related to more generalized reactions to situations) attributes of the COPE is warranted. In a follow-up study, it was reported that situational COPE items (such as the hypothetical situation we presented to participants) were very similar in validity measures to the dispositional COPE items; however, all scale alphas on the situational COPE items tended to be higher than those on the dispositional COPE items. This suggests that internal consistency may be greater when rating specific behavioral situations compared with general tendencies. It should also be noted that the correlations between the dispositional and situational coping scales correlated at a low to moderate level for both active coping subscales (.25, .24, .14, respectively) and avoidant coping subscales (.28, .22, .34, respectively) suggesting the uniqueness of the construct of situational coping (Carver, Scheier, & Weintraub, 1989).

Social Support Questionnaire (SSQ; Sarason, Levine, Basham, & Sarason, 1983). The SSQ is a self-report questionnaire designed to assess both the number of social supports (1-9 people) and the participant's satisfaction with those supports (1=very dissatisfied to 6= very satisfied) throughout a variety of psychosocial domains. The questionnaire is a series of 27 questions asking such things as "Whose lives do you feel that you are an important part of?", "Whom can you talk with frankly, without having to watch what you say?", and "Whom can you count on to listen openly and uncritically to your innermost feelings?"

Although the SSQ has not been frequently used as a measure of social support in MS samples, based on previous literature it seems to be an excellent way of assessing two

independent, though related (r = .34 between SSQ-N & SSQ-S) and equally important

domains of social support that have previously not been assessed in this population.

Furthermore, given that the factor loadings exceeded .60 for SSQ-N and .30 for SSQ-S,

there is good evidence that these two support measures underlie different dimensions of

the same construct. Finally, the SSQ displays good internal reliability (coefficient α = .97

and .94, respectively); and stability over time (test-retest correlations of .90 and .83,

respectively) over a 4-week interval. Average number of supports, and average

satisfaction with these supports, across the 27 domains being queried, are the

measurements of social support utilized in this study (Sarason, Levine, Basham, &

Sarason, 1983).

Multiple Sclerosis Attitudes Index (MSAI; Shnek et al., 1995). The MSAI is a

self-report questionnaire designated in this study to assess MS control in individuals with

MS. It is based on the Attitudes Index (AI) created for individuals with RA (Nicassio et

al., 1985). In the RA sample, the 5-item version had high validity and moderately high

levels of internal consistency (Chronbach's alpha > .69) (Shnek et al., 1995). The

validity of the AI was established in a RA population (N= 219) through exploration of

construct validity, and convergent and divergent validity measures with functional

measures and other standard psychological and psychosocial inventories.

The MSAI index was adapted from this 5-item version and modified for use in the

MS population in the following ways: The letters "MS" were inserted in the title before

the letters "AI", the word "arthritis" was changed to "MS", and the word "pain" was

changed to "MS symptoms" (Question 3) (Shnek et al., 1995). Comparable internal

consistency was reported when this scale was used in an MS population (Chronbach's alpha = .65) (Shnek et al., 1995).

The MSAI consists of 5 items originally purported to assess learned helplessness in an MS population. Construct validity analysis of the 5 items, however, rendered this measure to seem more appropriate as a measure of MS control, specifically, rather than the broader construct of learned helplessness. Participants were asked to respond to a series of statements such as, "MS is controlling my life" and "It seems fate and other factors beyond my control affect my MS" by indicating on a scale from 1 (Not at all) to 5 (Extremely) how much each statement best applies to them. The participants' individual responses on each of the 5 items was used as the measure of MS control, with one of the items—"I am coping effectively with my MS"—reverse scored.

While this latter item may seem to overlap constructually with coping, the item was considered to assess a domain of loss of personal control to the MS disease process marked by an inability to cope effectively with the disease. Measurement of this domain was deemed appropriate and important for inclusion in the MS control construct. Additionally, it was recognized as important to keep the MSAI scale as close to the original as possible with the understanding that it's psychometric properties within this data set could be scrutinized further via SEM analysis.

Demographic and Disease-related Variables:

Expanded Disability Status Scale (EDSS; Kurtzke, 1983). The EDSS assesses physical and neurological disability in MS patients on a variety of functional systems including cerebellar, brain stem, pyramidal, and sensory systems, based on patients' responses to a variety of questions. Ratings are made on a continuous 0 to 10 scale,

ranging from no physical disability/ disturbance in functional systems to extreme

functional system disturbance. Higher EDSS scores are indicative of greater disability.

Symptom Duration. Time since symptom onset was examined as individuals with

MS usually experience symptoms for some time before a diagnosis of possible or

probable MS can be made (Poser, Paty, & Scheinberg, 1983).

Diagnosis Duration. Given that the measure of MS control subsumes one has

already been diagnosed with MS, inclusion of the measure of diagnosis duration was seen

as vital.

MS Course Type. MS course type was examined by dividing patients into

their diagnostic course type: Relapsing-Remitting, Secondary Progressive, Primary

Progressive, and Progressive Relapsing. For statistical purposes described subsequently,

course types were than grouped dichotomously into Relapsing (including Relapsing-

Remitting and Progressive Relapsing) and Progressive (including Secondary Progressive

and Primary Progressive) categories. This dichotomization was deemed theoretically

reasonable given the occurrence of a higher number of exacerbations within the relapsing

course types versus the progressive course types.

Number of MS Disease Exacerbations. Number of lifetime MS disease

exacerbations was deemed pertinent to the construct of MS control, and seemed to add

quantitative and qualitative information about the disease experience above and beyond

that of MS Course type alone. For example, it is possible that an individual may

experience a more globally physically disabling course type (such as Primary

Progressive) that is marked by fewer exacerbations, verses a less globally physically

disabling course type (such as Relapsing Remitting) that is marked by more frequent

exacerbations. The potential for emotional disability caused by the number of exacerbations, in particular (above and beyond course type categorization), was deemed important to consider in light of the constructs of interest in this study. For example, it may be that for a given individual more exacerbations (as opposed to, or in addition to, more physical disability) may lessen feelings of personal control (and enhance feelings of MS control) thereby potentially affecting coping and/ or social support and/ or experience of depressive symptomology. Additionally, course type designation does not imply an equitable distribution of number of lifetime MS exacerbations within a given MS sample population, or potentially, the MS population at large. Finally, Kroencke & Denney (1999) noted finding individuals with MS used different coping techniques during an exacerbation than in other disease states. This suggests that exacerbation may foster unique cognitive and psychological adaptation. While no individual in the current study was having an exacerbation at the time of testing, frequent exacerbations may lead to differentials in the constructs of interest in this study.

Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996). The BDI is a self-report questionnaire comprised of 21 multiple-choice items intended to estimate the severity of an individual's current level of depression. Scores can range from 0 to 63, ranging from no depression to severe depression. Higher BDI scores are indicative of greater depression. Although this measure may be a problematic measure of depression in a medically ill population due to its inclusion of questions assessing vegetative symptomology of depression, it was included strictly as a reference point for the magnitude of depressive symptomology in this sample compared with other MS sample populations, and the MS population as a whole.

2.3. Statistical Analyses

Initially, two sets of correlations were conducted.

(1) The COPE (six subscales comprising active and avoidant coping), SSQ (indices of number of supports and satisfaction with those supports), MSAI (a sum of all 5 items), and CMDI (mood and evaluative subscales) were correlated with one another in order to verify that a statistical relationship between these variables existed, to describe this relationship, and to utilize this information as a basis for eliminating any theoretical models from consideration that no longer were applicable based on the results of these correlations. Specifically, if all the measures pertaining to a particular construct of interest in this study (i.e., MS control, coping, social support) were not significantly correlated with either of the two depression measures, inclusion of that construct in any of the 5 structural equation models would no longer be theoretically or statistically valid, and that construct would have to be removed from the Models.

(2) The CMDI mood and evaluative subscales, EDSS, symptom duration, diagnosis duration, MS Course type, number of MS disease exacerbations, gender, age, and education indices were correlated with one another in order to determine the relationship between depression and demographic and disease-related information. Any demographic and disease-related variables significantly correlated with either of the depression measures were included as control variables in the models to be tested.

Notably, MS course type was originally a categorical variable that was dichotomized and was therefore able to be subjected to correlational analysis. This

method of analysis was chosen over a group analysis approach for theoretical reasons

(mentioned previously) and for statistical reasons—due to the excessively small number

of participants represented by two of the MS course types (Primary Progressive, N = 4;

Progressive Relapsing, N = 1).

After the aforementioned correlation analyses were conducted, all remaining

appropriate theoretical models were subjected to SEM analyses to determine the model

with the best statistical fit with the data.   Four different goodness-of-fit indices were

compared: The chi-square to degrees of freedom ratio (CMIN/df), the Comparative Fit

Index (CFI), the Incremental Fit Index (IFI), and the root-mean-square error of

approximation (RMSEA). A comparison of these fit indices was conducted to evaluate

which model represented the simplest model with the best fit to the data, while giving

consideration to population-based and sample-size biases within the indices (Loehlin,

2004).

Specifically, the CMIN/df was given priority as a fit index because it takes the

relatively small sample size into consideration. In a small sample, lack of consideration

to the degrees of freedom of the model can render chi-square non-significant (suggestive

of good model fit) even in the face of a poor fit with the data. A CMIN/df ratio less than

2 suggests that the model is an acceptable fit to the data, with consideration given to the

relatively small sample size (Ullman, 1996). The CFI and the IFI addressed the issues of

parsimony and sample size while taking the degrees of freedom into account. Both of

these indices range from 0 to 1.0, with a value greater than .90 representing acceptable fit

of the model to the data (Byrne, 2001). Finally, RMSEA is a population-based index, so

it is relatively insensitive to sample size, has an explicit parsimony adjustment, and

accounts for the models' degrees of freedom. Values below .10 are considered to

represent a "good" fit of the model to the data, and values below .05 are considered to

represent a "very good" fit of the model to the data (Steiger, 1989).

Finally, regression analysis with combined mood and evaluative subscales of

depression as the dependent variable, and MS control, coping, and social support

measures as the predictor variables, was conducted with a selection for gender, such that

the amount of variance in depression independently accounted for by each of the MS

control, coping, and social support measures for the women in this sample was identified.

Due to the small male sample size (N=17), regression analysis was unable to be

conducted with the data from the males in this study. However, exploratory correlational

analysis, while still cautionary due to the small sample size, was performed in order to

explore the relationship between coping, MS control, and social support for men in this

sample.

For the women in this sample (N=80), a linear regression was conducted where

any demographic variables significantly correlated with the depression indices were

entered at Step 1, and all 5 MS control indices, all 3 active coping subtypes, all 3

avoidant coping subtypes, number of social supports, and satisfaction with that support,

were entered simultaneously at Step 2. Standardized beta coefficients were compared in

order to best determine the independent significant contribution of each of the MS

control, coping, and social support measures to variance in depression for the women in

this sample.

To test for the presence of multicollinearity, the tolerance of independent/

predictor variables was evaluated. Tolerance has a range from zero to one. The closer

the tolerance value is to zero, the more that independent variable relates a level of

multicollinearity, and the more variance error is introduced into the equation. Any

predictor variable having a tolerance level < .01 was excluded from the data analyses.

An alpha level of .05 was used for all a priori predictions within the correlation,

SEM, and regression analyses.

CHAPTER 3

RESULTS

3.1. Sample Characteristics

Descriptive statistics for this sample including means and standard deviations for demographic, disease-related variables, and construct measures, are presented in **Table 1**. This study sample is similar to a multitude of other study samples described in the MS literature in regards to all demographic characteristics, disease-related variables, and construct measures (Arnett et al., 2002; Beatty et al.,1998; Pakenham, 1999); though, notably, as the specific measures used in this study for social support and MS control have not yet been widely used in the MS literature, comparisons of these construct measurements with those reported in other MS studies were greatly limited.

Exploration of gender differences in these descriptive measures revealed nominally significantly higher active coping mean scores for women (M_{women} = 12.85(1.92), M_{men} = 12.31(2.82); F = 5.28, p = 024), and significantly higher denial coping mean scores for men (M_{women} = 4.97 (1.42), M_{men} = 6.19 (2.11); F = 8.96, p = 004). Additionally, there was a nominal tendency for men to have a higher mean educational level (M_{women} = 14.23(1.92), M_{men} = 14.53(2.45); F = 3.67, p = .059), a higher mean BDI score (M_{women} = 11.25(6.66), M_{men} = 14.25(9.38); F = 3.94, p = .050), and higher mean behavioral disengagement (M_{women} = 5.92 (1.94), M_{men} = 6.38(2.99); F = 3.70, p = 058) and mental disengagement (M_{women} = 7.78(1.75), M_{men} = 8.63(2.55); F = 3.69, p = .058) coping scores than women. Thus, while this sample as a whole appears to

be using more active coping than avoidant coping techniques (as has been reported in

other MS studies measuring these same coping techniques), the men in this sample, in

contrast to women, tend to use more avoidant coping than active coping techniques.

Table 1. Means and Standard Deviations for Demographic, Disease-related variables, and Construct measures (*n* = 97; 80 women and 17 men)						
Demographics	*M*	*SD*	Disease-related variables	*M*	*SD*	
Age (Yrs.)	47.34	8.95	Symptom duration (Yrs.)	14.44	9.01	
			Diagnosis duration (Yrs.)	10.56	8.19	
Education (Yrs.)	14.28	2.01	Number exacerbations	5.73	5.48	
			EDSS (0-10)	4.57	1.56	
MS Course Type	*n*	*%*	Dichotomized MS Course Type	*n*	*%*	
Relapsing Remitting	74	76.3	Relapsing	75	76.3	
Secondary Progressive	18	18.6				
Primary Progressive	4	4.1	Progressive	23	23.7	
Progressive Relapsing	1	1.0				
Depression measures	*M*	*SD*	Social Support measures	*M*	*SD*	
BDI (0-63)	12.44	8.25	Av. number of supports (0-9)	3.46	1.84	
CMDI Mood (14-70)	50.78	10.4				
CMDI Negative Evaluative (14-70)	52.16	14.4	Av. satisfaction with supports (1-6)	5.35	.82	
MS control measures	*M*	*SD*	Coping measures	*M*	*SD*	
"MS is controlling my life." (1-5)	2.74	1.25	Active coping (4-16)	12.76	2.10	
"I would feel helpless if I couldn't rely on other people for help with my MS." (1-5)	2.45	1.28	Planning (4-16)	13.14	2.46	
"No matter what I do, or how hard I try, I just can't seem to get relief from my MS symptoms." (1-5)	2.45	1.21	Suppression of competing activities (4-16)	10.36	2.29	
"I am coping effectively with my MS." (Reverse scored.) (1-5)	2.06	.93	Denial (4-16)	5.18	1.62	
"It seems as though fate and other factors beyond my control affect my MS." (1-5)	2.67	1.22	Behavioral Disengagement (4-16)	6.00	2.14	
			Mental Disengagement (4-16)	7.92	1.92	

3.2. Correlation Analyses

Pearson correlation coefficients (two-tailed significance) were used to examine

relationships between the constructs of interest. Both social support measures and four of

the five MS control items were significantly associated with both depression measures;

however, only one of the six coping measures (planning) was inversely associated with

one of the depression measures (negative evaluations) (see **Table 2**).

Notably, this lack of correlation between coping and depression is not likely due

to reliability of the active (α = .58, .82, and .51, respectively) and avoidant (α = .54, .65,

and .42, respectively) coping subscales. However, because four of the six COPE

subscales of interest were lower in reliability than the combined active and avoidant

coping indices (α = .81 and .63, respectively), a correlation was computed between the

overall active and avoidant coping indices and the two depression measures. Active

coping was significantly correlated with both mood (r = .21, p = .038) and negative

evaluations (r = .29, p = .004). Avoidant coping was not significantly correlated with

either of the depression measures (p > .10).

Three of the five MS control measures were positively correlated with one

another (.31 < r < .76, $p \leq$ .002). Item 4 ("I am coping effectively with my MS.": Reverse

scored) and Item 5 ("It seems as though fate and other factors beyond my control affect

my MS.") were not correlated with each another but were significantly correlated with

the other three items (see **Table 3**). The lack of association between these two MS

control items may indicate a lack of relatedness between one's feeling of personal control

over effective use of coping techniques for MS, and one's perception of the role of fate

and other uncontrollable factors over the disease.

The three active coping domain measures were all positively correlated with one

another ($.38 < r < .58$, $p = .000$); however, only two of the three avoidant coping domain

measures were positively correlated with one another (denial and behavioral

disengagement, $r = .24$, $p = .021$). All of the active and avoidant coping domain

measures were inversely correlated with at least one measure from the converse domain

except suppression of competing activities, which was not significantly correlated with

any of the avoidant coping domain measures, and mental disengagement, which was not

correlated with any of the other coping measures from either the active coping or

avoidant coping domains (see **Table 4**).

The two social support measures were positively correlated with each other ($r =$

$.47$, $p < .005$) and the two depression measures were also correlated with one another ($r =$

$.81$, $p < .005$). As expected, the mood and evaluative depression measures positively

correlated with the combined mood and evaluative measure that was used as the

dependent variable in the regression analysis ($r = .93$, $r = .97$, $p < .001$, respectively).

Also of note, these two depression measures correlated with the BDI ($r = .74$, $r = .69$, $p <$

$.001$, respectively), as did the combined mood and evaluative measure ($r = .75$, $p < .001$)

(see **Table 5**).

Only a few of the MS control measures, coping measures, and social support

measures were associated with one another. Specifically, Item 4 of the MSAI was

inversely correlated with number of social supports ($r = -.34, p = .001$), and positively

associated with the Behavioral Disengagement COPE subscale ($r = .22, p = .038$).

Additionally, Items 1 and 3 of the MSAI were both positively correlated with

Suppression of Competing Activities ($r = .27, p = .011$ and $r = .22, p = .039$,

respectively). Thus, the construct of MS control is, in some way, significantly related to

all other constructs (depression, social support, and coping) being assessed in this study.

Number of social supports was inversely correlated with the Denial COPE subscale ($r = -.21, p = .050$); therefore, social support also appears to be related to all other constructs

(depression, MS control, and coping) being assessed in this study. Inherent in these

aforementioned construct relationships, coping is also related to all other constructs of

interest in this study. Given this, the five hypothesized SEM models **(Figure 2)** are all

appropriate for SEM analysis.

     Because correlation analysis of demographic and disease–related variables to the

two depression measures revealed no significant correlations, no demographic or disease-

related variables were included in the SEM or regression analyses. Notably, significance

values associated with the Pearson correlations in this latter analysis were not even

suggestive of a trend towards significance with one exception: EDSS scores were

correlated with negative evaluative depression symptoms ($r = .20, p = .052$).

Table 2. Correlations of Measures of MS Control, Coping, and Social Support, to Depression Measures		Depression Construct Measures	
Construct Name	Construct Measure	Mood	Negative Evaluative
MS Control	"MS is controlling my life."	.325 ** .001	.369 ** .000
	"I would feel helpless if I couldn't rely on other people for help with my MS."	.122 .233	.167 .102
	"No matter what I do, or how hard I try, I just cant seem to get relief from my MS symptoms."	.203 * .046	.218 * .032
	"I am coping effectively with my MS." (Reverse scored.)	.308 ** .002	.355 ** .000
	"It seems as though fate and other factors beyond my control affect my MS."	.210 * .039	.216 * .033
Coping	Active Coping	-.159 .134	-.179 .092
	Planning	-.201 .056	-.250 * .017
	Suppression of Competing Activities	-.054 .612	-.171 -.105
	Denial	.060 .569	.127 .226
	Behavioral Disengagement	.141 .176	.161 .124
	Mental Disengagement	.041 .699	-.005 .961
Social Support	Number of supports	-.366 ** .000	-.349 ** .001
	Satisfaction with supports	-.311 ** .003	-.330 ** .001
** Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).			

Table 3. Correlations of Measures of MS Control					
MSAI Items	1	2	3	4	5
1. "MS is controlling my life."		.613** .000	.762** .000	.475** .000	.343** .001
2. "I would feel helpless if I couldn't rely on other people for help with my MS."		1	.514** .000	.353** .000	.311** .002
3. "No matter what I do, or how hard I try, I just cant seem to get relief from my MS symptoms."			1	.317** .002	.483** .000
4. "I am coping effectively with my MS." (Reverse scored.)				1	.100 .329
5. "It seems as though fate and other factors beyond my control affect my MS."					1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).

Table 4. Correlations of Measures of Coping						
Coping Measures	1	2	3	4	5	6
1. Active coping		.584** .000	.382** .000	-.160 .131	-.291** .005	-.002 .985
2. Planning		1	.435** .000	-.255* .015	-.390** .000	-.147 .164
3. Suppression of Competing Activities			1	.087 .412	-.089 .402	.112 .290
4. Denial				1	.239* .021	.169 .106
5. Behavioral Disengagement					1	.161 .123
6. Mental Disengagement						1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).
   Active coping domain measures: Avoidant coping domain measures

Table 5. Correlations of Measures of Social Support and Depression

	1	2
1. Number of social supports	1	.474 ** .000
2. Satisfaction with social supports		1

	1	2	3	4
1. Mood	1	.807 ** .000	.932 ** .000	.743 ** .000
2. Negative Evaluative		1	.966 ** .000	.687 ** .000
3. Mood and Evaluative Combined			1	.746 ** .000
4. BDI				1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).

3.3. Model Goodness-of-Fit

Figure 3 presents the SEM results for the five hypothesized models. Individual item, measure, and construct measure names were not included in the Figure in order to allow for clearer perception of the individual measurement values. The placement of individual items, measures, and constructs matches the illustrations in **Figure 2**, exactly.

The predictive effect of each individual item, measure, or construct on its corresponding construct (i.e. the construct signified by the attached line with a single-headed arrow) is indicated by the path coefficient overlaying the line with the single-headed arrow. The path coefficient should be mathematically squared if percentage of variance (of the relevant construct) predicted by the item, measure, or construct is to be determined. Positive path coefficients represent positive relationships with the associated construct, while negative path coefficients represent inverse relationships with the associated construct. The numbers outside the rectangles and small circles associated with certain constructs (depending on the model) indicate the error associated with that item, measure, or construct.

As can be seen in **Model 1** (**Figure 3**), the five MSAI questions were all predictive of the MS control construct to varying degrees (path coefficients = .95, .65, .80, .48, and .41, respectively). Active coping, planning, suppression of competing activities, denial, behavioral disengagement, and mental disengagement, were variably predictive of the coping construct (path coefficients = .69, .86, .49, -.27, -.44 and -.12,

respectively). Number of supports and satisfaction with supports were both strong

predictors of the social support construct (path coefficients = .69 and .70, respectively).

Mood and negative evaluative depression symptoms were both strong predictors of the

depression construct (path coefficients = .86 and .94, respectively).

MS control, coping, and social support all independently predicted depression

(path coefficients = .39, -.30, and -.49, respectively). Hence, these constructs

independently predicted 15%, 9%, and 24% of the variance in depression, respectively.

MS control was positively related to depression, and coping and social support were

inversely related to depression. As MS control increased so did depression, and as active

coping and social support improved, depression diminished. Exploration of the values

associated with the predictive ability of avoidant coping measures on the coping construct

(path coefficients = -.27, -.44 and -.12, respectively), revealed the avoidant coping

measures did not sufficiently influence the net predictive effect (in terms of polarity of

the relationship) of the coping construct on depression in this model.

Because the coping construct contained measures that demonstrated both

positive and negative path coefficients related to the coping construct, a more thorough

explanation of the polarity of the coping construct within and between the different

models is warranted. There are instances where the construct of coping relates as a

"beneficial" construct overall (such as is demonstrated by the negative relation with

depression in **Models 1, 2, 4, and 5**), and other instances where coping relates as a

"harmful" construct, as indicated by its positive relation with MS control (**Model 2**) and

depression (**Model 3**). To account for this, and due to the weak path coefficients

evidenced by the three Avoidant Coping measures throughout the models (noted

previously), the models were also analyzed without these three avoidant coping indices (see **Table 7**).

Model 2 revealed the correlation (illustrated by the curved line with the double-headed arrow) between MS control and coping to be $r = .13$, coping and social support to be $r = .24$, and MS control and social support to be $r = -.21$. When the mediation models (**Models 3**, **4**, and **5**) were evaluated, it was evident that no mediation was occurring. In none of these models were the path coefficients associated with the mediator constructs greater than the path coefficient between the non-mediator construct and depression. Furthermore, as is evidenced by both the correlation analyses and the SEM analyses (though most easily discernable in **Model 2**), MS control, coping, and social support are not as strongly correlated with one another as each is correlated with depression, independently.

Finally, a comparison of the goodness-of-fit indices for the original five models can be viewed in **Table 6**, and a comparison of the goodness-of-fit indices for these same five models without the Avoidant Coping measures can be viewed in **Table 7**. No model was a good fit with the data according to the Chi-square estimate, even when the Avoidant Coping indices were removed. However, the Chi-square estimate suggested all the models were a *better* fit to the data once the Avoidant Coping indices were removed. In fact, by all goodness-of-fit measure indications, the models were a better fit to the data once the Avoidant Coping indices were removed. The CMIN/*df,* IFI, and RMSEA estimates all indicated all the models were a good fit with the data, regardless of the inclusion of the Avoidant Coping indices. However, again, these indices all suggested all the models would be a *better* fit with the data if the Avoidant Coping indices were

removed from the models. Finally, the CFI estimate indicated that the original models were "borderline" good fit with the data, and "definitely" good fit with the data without the Avoidant Coping indices included in the models.
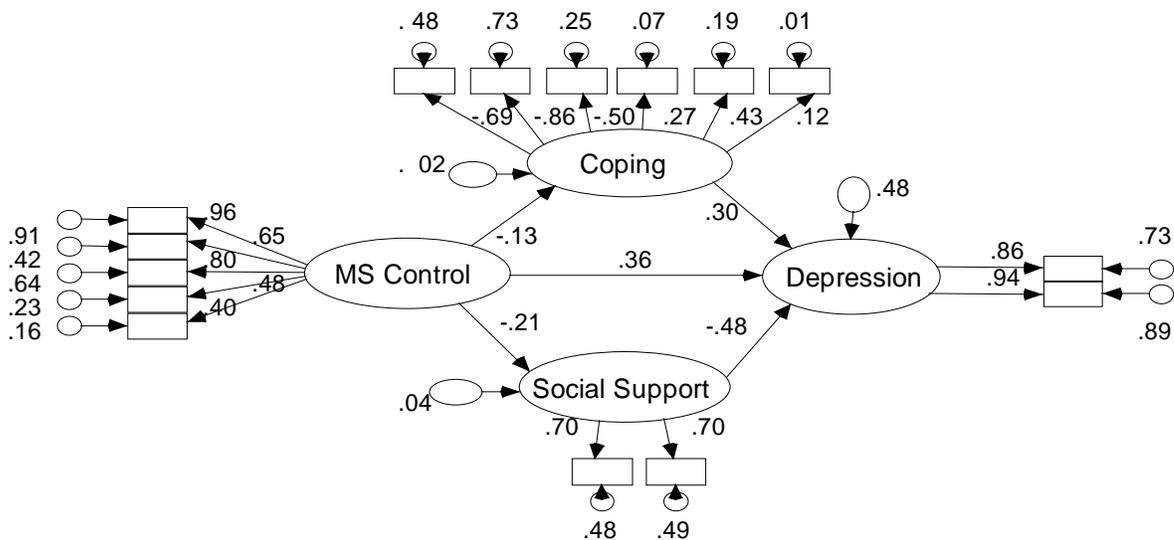
Figure 3. SEM Models with All Participants   83
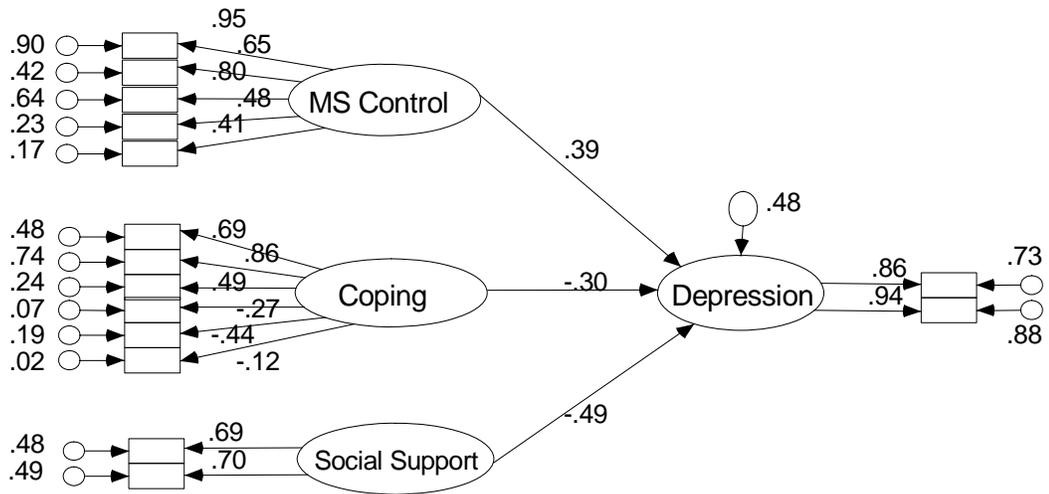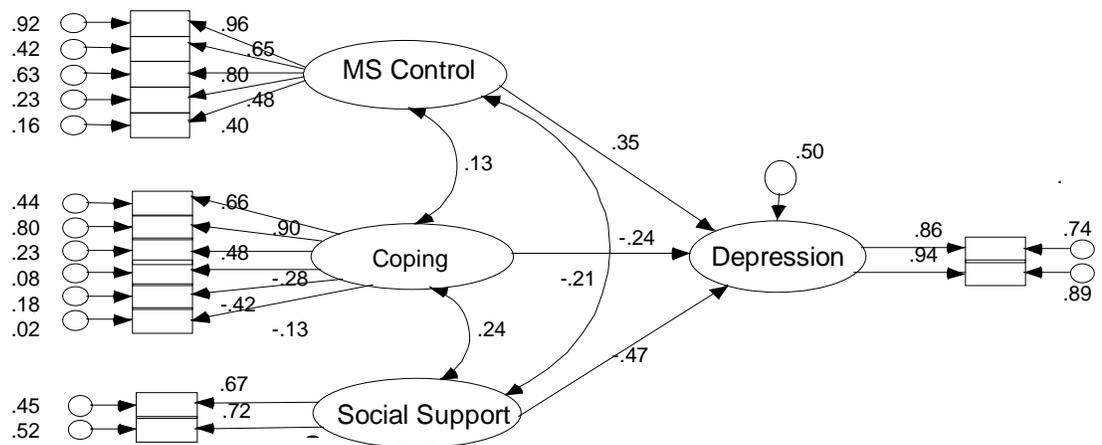
Model 1

Model 2
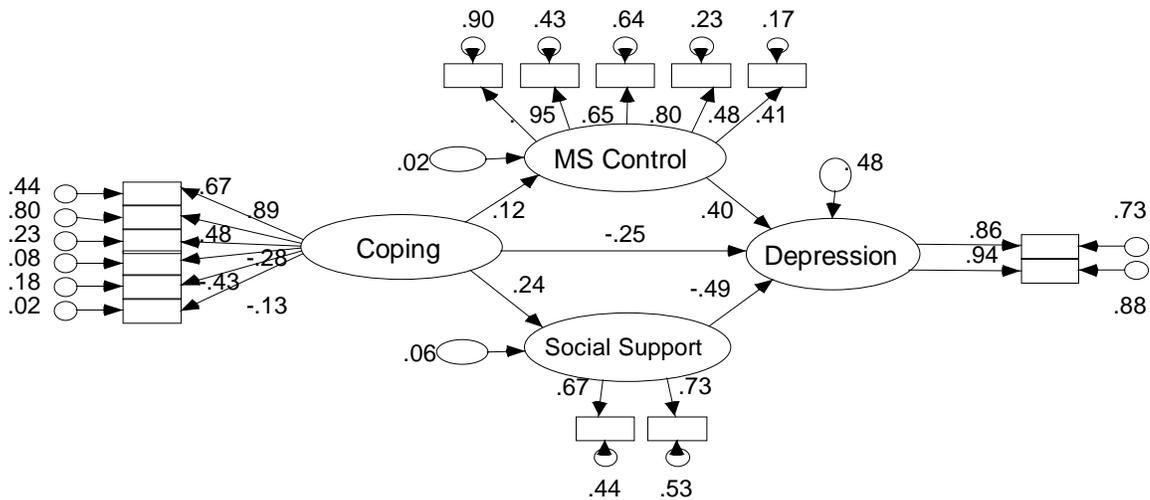
Model 3
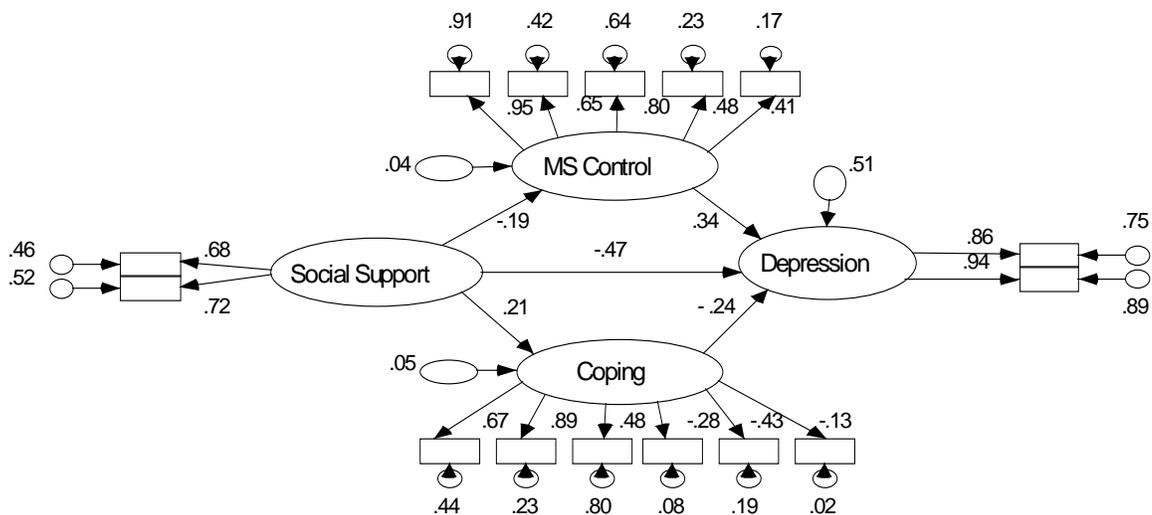
Model 4

Model 5

Table 6. Comparison of Goodness-of-fit measures for SEM Models					
	Chi-square	CMIN/*df*	CFI	IFI	RMSEA
Adequate Fit	P > .05	< 2	> .9	> .9	< .10
Model 1	131.75 .001	1.514	.894	.902	.055
Model 2	125.64 .002	1.496	.902	.910	.054
Model 3	128.46 .002	1.511	.898	.905	.055
Model 4	128.51 .002	1.512	.897	.905	.055
Model 5	127.92 .002	1.505	.899	.907	.055

Table 7. Comparison of Goodness-of-fit measures for SEM Models with Avoidant Coping indices removed					
	Chi-square	CMIN/*df*	CFI	IFI	RMSEA
Adequate Fit	P > .05	< 2	> .9	> .9	< .10
Model 1	71.38 .031	1.400	.947	.951	.049
Model 2	65.45 .048	1.364	.955	.958	.047
Model 3	67.12 .044	1.370	.953	.956	.047
Model 4	68.36 .035	1.395	.950	.953	.049
Model 5	68.56 .034	1.399	.949	.953	.049

3.4. Gender Differentials

The sample size for the males in this study (n = 17) was too small to allow for exploration of the data just from the men in this sample via a regression analysis. Therefore, exploratory correlation analysis (exploratory due to the small sample size) was conducted in order to discern the nature of the relationships between MS control, coping, social support, and depression for the men in this sample. Results indicated, with one exception, no MS control, coping, or social support measure correlated with either mood or evaluative measures of depression for men in this sample ($p \geq .18$). The item "MS is controlling my life" was positively correlated with negative evaluation (r = .54, p = .030). When the MS control measures are excluded from the analysis, the remaining associations are even more negligible ($p \geq .28$).

For women in this sample (n = 80), linear regression indicated one measure—number of social supports—significantly contributes to the prediction of depression (mood and evaluative measures combined; standardized beta coefficient = -.25, p = .048). Additionally, "MS is controlling my life" approached significance (standardized beta coefficient = .39, p = .053) in this regard. Given the beta coefficient represents a relationship with depression, the negative beta coefficient for number of social supports indicates beneficence, whereas the positive beta coefficient for "MS is controlling my life" indicates maleficence (**Table 8**).

As stepwise linear regression analysis is often reported in the literature to explain related gender-bias hypotheses, for the benefit of comparison with these studies, stepwise regression analysis results are reported here. According to this statistical procedure,

number of social supports, endorsement that "MS is controlling my life," and the combined Active Coping Index (active coping, planning, and suppression of competing activities) significantly accounted for 17% ($p = .001$), 13% ($p = .001$), and 9% ($p = .003$) of independent variance in depression, respectively. Negative standardized beta coefficients for number of social supports ($\beta = -.36, p = .000$), and the Active Coping Index ($\beta = -.31, p = .003$) indicate these measures represent beneficial construct domains for these women, as an increase in these domains is related to a decrease in depression. The positive standardized beta coefficient for "MS is controlling my life" ($\beta = .39, p = .000$) indicates endorsement of this statement is maleficent for women in this sample, as increased endorsement of this statement is related to an increase in depression (**Table 8**).

Significant correlations of measures of MS control, coping, and social support, to depression, for women in this sample are illustrated in **Table 9**. Endorsement of "MS is controlling my life" and "I am coping effectively with my MS" (reverse scored) were positively significantly associated with both mood ($r = .29, p = .009$ and $r = .33, p = 003$) and negative evaluations ($r = .33, p = .003$ and $r = .36, p = .001$), respectively. Planning and behavioral disengagement were also (negatively and positively, respectively) significantly associated with both mood ($r = -.24, p = .039$ and $r = .29, p = .012$) and negative evaluations ($r = -.35, p = .002$ and $r = .30, p = .009$), respectively. Finally, number of social supports and satisfaction with those social supports were also negatively significantly associated with both mood ($r = -.43, p = .000$ and $r = -.33, p = .004$) and negative evaluations ($r = -.40, p = .000$ and $r = -.34, p = .000$), respectively.

Correlations of measures of MS control for women in this sample (**Table 10**) mirrored that of the whole sample, as did correlations of social support and depression (**Table 12**). **Table 11** presents correlations of measures of coping for women in this sample. Compared with the whole sample, for the women in this sample, the avoidant coping indices almost globally (with one exception, see **Table 11**) lacked significant associations both with the active coping indices and with each other.

Finally, for the women in this sample, the SEM model analyses data output (**Figure 4**) generally mirrored that for the whole sample, but showed better overall fit regardless of model (**Table 13**). This suggests the models apply well for the women in this sample, but not necessarily for the men. As with the complete group sample, when the avoidant coping indices were removed from the SEM models, the goodness of fit indices for the all female sample suggested even better goodness of fit of the models to the data (**Table 14**).

Table 8. Correlation and Regression Results for Gender Bias				
For the men in this study, no MS control, coping, or social support measure correlated significantly with mood and evaluative measures of depression; *except* "MS is controlling my life" was correlated significantly positively with negative evaluation ($r = .54$, $p = .030$)				
The following results apply to the data from just the women in this study.				
Linear regression results			Standardized Beta Coefficient	Significance
Measure				
Number social supports			-.25	.048
"MS is controlling my life."			.39	.053
Stepwise linear regression results	R^2 Change	Significance	Standardized Beta Coefficient	Significance
Measure				
Number social supports	.17	.001	-.36	<.001
"MS is controlling my life."	.13	.001	.39	<.001
Active Coping Index	.09	.003	-.31	.003

Table 9. Significant Correlations of Measures of MS Control, Coping, and Social Support, to Depression, for Women		Depression Construct Measures	
Construct Name	Construct Measure	Mood	Negative Evaluation
MS Control	"MS is controlling my life."	.292 ** .009	.329 ** .003
	"I am coping effectively with my MS." (Reverse scored.)	.326 ** .003	.360 ** .001
Coping	Active Coping		-.230 * .049
	Planning	-.239 * .039	-.350 ** .002
	Suppression of Competing Activities		-.253 * .029
	Behavioral Disengagement	.286 * .012	.297 ** .009
Social Support	Number of social supports	-.427 ** .000	-.398 ** .000
	Satisfaction with supports	-.325 ** .004	-.338 ** .000
** Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).			

MSAI Items	1	2	3	4	5
Table 10. Correlations of Measures of MS Control for Women					
1. "MS is controlling my life."		.624** .000	.780** .000	.444** .000	.364** .001
2. "I would feel helpless if I couldn't rely on other people for help with my MS."		1	.506** .000	.356** .001	.328** .003
3. "No matter what I do, or how hard I try, I just cant seem to get relief from my MS symptoms."			1	.359** .001	.473** .000
4. "I am coping effectively with my MS." (Reverse scored.)				1	.084 .459
5. "It seems as though fate and other factors beyond my control affect my MS."					1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).

| Table 11. Correlations of Measures of Coping for Women						
Coping Measures	1	2	3	4	5	6
1. Active coping		.597** .000	.338** .003	-.094 .426	-.204 .082	.082 .487
2. Planning		1	.504** .000	-.179 .125	-.245* .034	.050 .670
3. Suppression of Competing Activities			1	.138 .237	-.110 .348	.147 .207
4. Denial				1	.080 .487	.203 .076
5. Behavioral Disengagement					1	.061 .600
6. Mental Disengagement						1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).
   Active coping domain measures: Avoidant coping domain measures

Table 12. Correlations of Measures of Social Support and Depression for Women		
	1	2
1. Number of social supports	1	.488 ** .000
2. Satisfaction with social supports		1

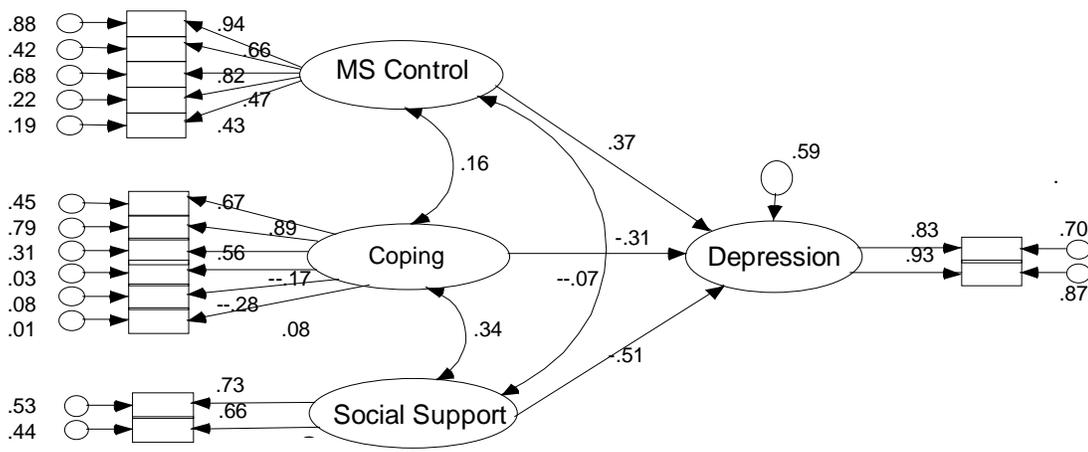|	1	2	3	4
1. Mood	1	.772 ** .000	.922 ** .000	.712 ** .000
2. Negative Evaluations		1	.958 ** .000	.649 ** .000
3. Mood and Evaluative Combined			1	.717 ** .000
4. BDI				1

** Correlation is significant at the .01 level (2-tailed).
 * Correlation is significant at the .05 level (2-tailed).
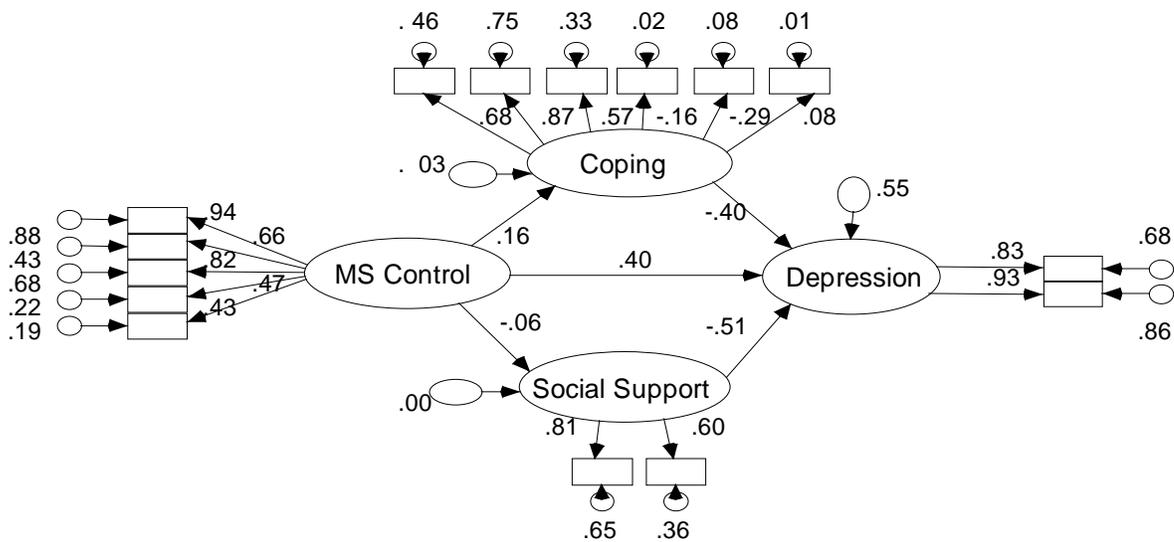
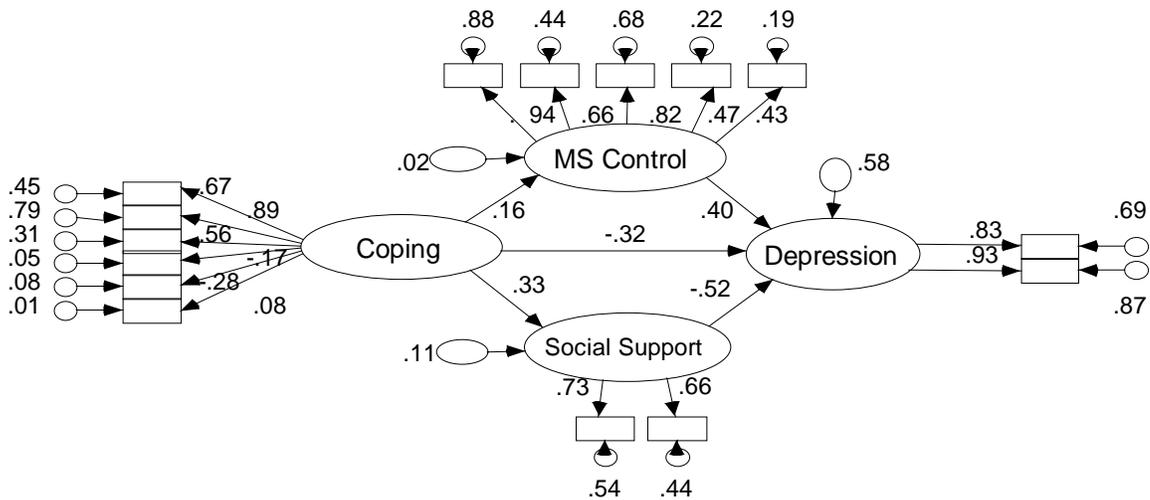Figure 4. SEM Models with Data for Women Only

Model 1
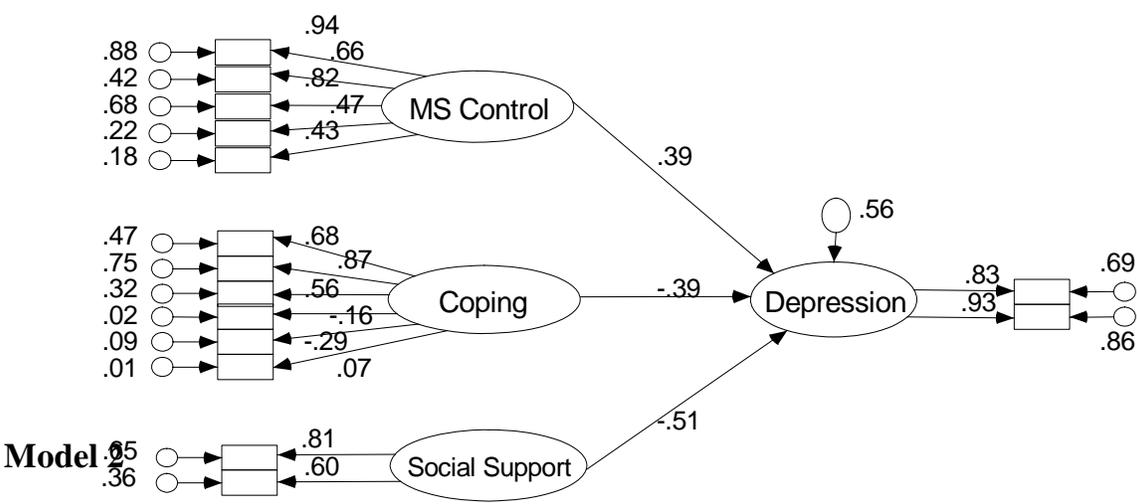
Model 2

Model 3
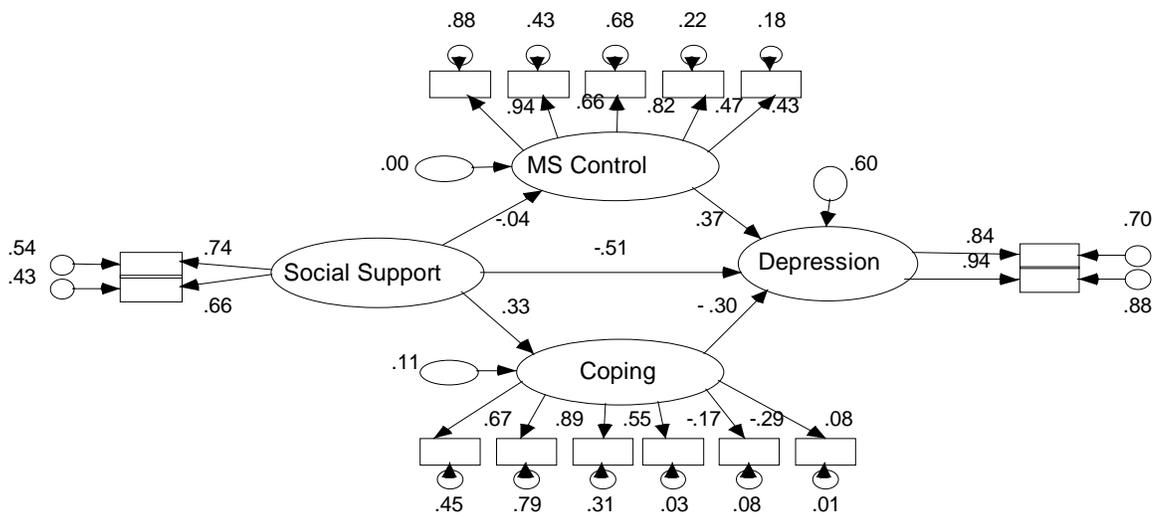
Model 4

Model 5

Table 13. Comparison of Goodness-of-fit measures for SEM Models for Women					
	Chi-square	CMN/*df*	CFI	IFI	RMSEA
Adequate Fit	P > .05	< 2	> .9	> .9	< .10
Model 1	94.48 .274	1.086	.976	.978	.024
Model 2	89.00 .334	1.059	.984	.986	.020
Model 3	92.90 .261	1.093	.975	.977	.025
Model 4	89.61 .345	1.054	.985	.987	.019
Model 5	85.00 .310	1.070	.981	.983	.022

Table 14. Comparison of Goodness-of-fit measures for SEM Models for Women with Avoidant Coping indices removed					
	Chi-square	CMIN/*df*	CFI	IFI	RMSEA
Adequate Fit	P > .05	< 2	> .9	> .9	< .10
Model 1	52.21 .427	1.024	.996	.996	.013
Model 2	46.77 .523	.974	1.00	1.004	.000
Model 3	50.33 .420	1.027	.996	.996	.013
Model 4	49.00 .538	.967	1.00	1.005	.049
Model 5	48.97 .474	.999	1.00	1.00	.000

CHAPTER 4

DISCUSSION

The present study was conducted to examine the relationship among MS control, coping, social support and depression. Consistent with hypotheses, and similar to what has been found in the literature with other neurologic populations, significant relationships were found between MS control, coping, social support and depression for individuals with MS. The best-fitting model in light of considerations for parsimony was that MS control, active coping, and social support all predicted independent significant amounts of variance in depression. Furthermore, the goodness of fit of this model to the data was further enhanced when the population sample was limited to women only.

Sample Characteristics I

As was noted previously, the mean scores and standard deviations for the demographic, disease-related variables, and depression measures identified in this sample were consistent with those of other MS sample populations currently represented in the literature (e.g., Arnett et al., 1999; Gulick, 2004; Jean, Paul, & Beatty, 1999; Mohr et al., 1999; Pakenham, 1999; Shnek et al., 1997; Steck, Amsler, Kappos, & Burgin, 2001; Wineman, 1990). This suggests the sample population used in the current study was similar in these ways to these other sample populations, and thus the findings may be generalizable to the MS population at large.

MS Control, Social Support, and Depression

Since both social support measures and four of five MS control measures were significantly associated with both depression measures, it is clear that a strong relationship exists between the domains of social support and depression, and MS control and depression. The strength of these specific relationships was further supported by SEM analysis whereby MS control and social support were shown to predict 15% and 24%, respectively, of the variance in depression. The amount of variance in depression independently predicted by social support further increased to 26% for the sample that included only women. Furthermore, the linear regression findings revealed that, for the all female sample, number of social supports was the best predictor of depression of all the construct measures, followed by "MS is controlling my life"—which was a significant predictor of depression for both women and men. This exemplifies the possible importance of social support in buffering against depression, particularly for women with MS, and of MS control in exacerbating depressive symptomology marked by depressive mood and negative evaluations for both women and men.

4.1. Coping and Depression

The nature of the relationship between active and avoidant coping domains, more generally, and depression, is not as clear as the nature of the relationship between a specific type of active coping, planning, and depression. Of the six coping measures, only planning was significantly associated with any of the depression measures (negative

evaluative symptoms only). Planning also consistently displayed the largest path coefficient of any coping measure in support of the coping construct. Furthermore, in the stepwise linear regression analysis, the Active Coping Index (in which planning is included) indicated coping accounted for 9% of the variance in depression for women.

Although Gulick (1995) and Arnett et al. (2002) demonstrated the frequent endorsement of planning as a coping technique by individuals with MS, and the literature on fatigue in MS supports the beneficial effect of planning in response to fatigue, future research may illuminate the nature of the relationship between planning and depression in MS. For example, it may be that planning reduces depression in MS via a reduction in interference of one's life caused by fatigue. Alternatively, it may be that individuals who utilize planning techniques in response to stress also utilize other adaptive coping and/ or cognitive techniques that similarly reduce depression for these individuals.

A better understanding of the relationship between active and avoidant coping and depression is achieved when consideration is given to the correlations within the coping construct domain (i.e. amongst the six coping measures). Whereas both depression measures were significantly correlated with one another, both social support measures were significantly correlated with one another, and three of the five MS control measures were significantly correlated with one another, the coping measures were not as uniformly significantly correlated to one another. Furthermore, the nature of the relationship of the coping measures to depression was both negative (Active coping) and positive (Avoidant coping). Although the three active coping domain measures (of which planning is included) were all significantly correlated with one another, and two of the

three avoidant coping measures were significantly correlated with one another, there was a lack of such correlations noted among one active and one avoidant coping measure.

Although most of the active and avoidant coping domain measures were inversely correlated with at least *one* measure from the converse domain, the measure of suppression of competing activities (active coping domain) was not significantly inversely correlated to any of the avoidant coping domain measures, and mental disengagement (which was not significantly correlated with any of the other coping measures from either the active coping or avoidant coping domains) was also not significantly inversely correlated to any of the active coping domain measures.

The lack of inter-correlation within the coping construct domain, compared with the other construct domains, suggests a lack of cohesiveness among the measures included in the coping construct, and, hence, offers a likely explanation for the weak correlation between summary measures of coping and depression in this study. It could be argued, however, that even if no coping measure was correlated with any other coping measure, each coping measure could still be independently significantly correlated with one or both of the depression measures, thereby rendering a stronger construct relationship between coping and depression than is currently indicated by the correlation analysis in this study.

In order to address whether gender differences in coping style affected the coping—depression relationship in this study, mean comparisons were made and it was found that men in this study had significantly higher denial coping mean scores than did women. Furthermore, men had a tendency to use more behavioral disengagement and mental disengagement techniques than women. However, given the small relative

sample size of men to women in this study (17:80), it is unlikely that this gender bias had a significant enough impact on the coping—depression relationship to affect the data to the magnitude displayed.

4.2. The Coping—Gender Differential

Interestingly, whereas the coping construct displayed a positive relationship with MS control in **Model 2 (Figure 3)** with both genders included, it also did so with the sample including women only (**Model 2, Figure 4**). However, whereas in the mixed gender sample the coping construct displayed a negative relationship with MS control in **Model 3 (Figure 3)**, it displayed a positive relationship with MS control in the sample including only women (**Model 3, Figure 4**). In this latter model, placing coping in a mediational role between MS control and depression in an all female sample did not change its polarity. The polarity between MS control and coping in this model was negative. Why this is the case for the all-female model and not for the mixed gender model may be suggestive of a stronger "beneficial" role of coping for women with MS than for men with MS.

Although the coping—gender differential may impact the coping—depression relationship, it is unclear in this study how this may be occurring in the MS population. Furthermore, if there is a global tendency for men with MS to use more avoidant coping techniques than women, it may be concealed by the high percentage of women represented in MS research, in general.

Interestingly, this particular gender differential for coping technique has not been reported in the "healthy" population at large, either in general or in specific types of stressful situations, when populations equivalent in social/ occupational roles are examined (Hamilton & Fagot, 1988; Ptacek et al., 1992; Rosario et al., 1988). However, in at least two "ill" populations (including individuals suffering from tension-type headaches and those receiving dialysis), females have been reported to use less active coping and more avoidant coping techniques than males (Lindqvist, Carlsson, & Sjoden, 1998; Rollnik et al., 2003). Granted, social/ occupational roles were not equated in the studies looking at "ill" populations, the number of participants in the dialysis study was small ($n = 60$), and tension headache and dialysis are not suggested to be conditions comparable to MS.

Gender differences in coping with MS may represent a unique phenomenon to this specific disease potentially related to the unpredictability of the disease course, or the gender bias inherent in the demographics of the MS population. For example, the unpredictability of MS, more than the disease-related symptoms themselves, may lead women and men to cope differently with the disease. Alternatively, the knowledge that MS affects women approximately 2-3 times more than men may lead women to cope differently than men with what may be construed as a female disease. For example, men with MS may exhibit more avoidant coping techniques than women with MS because they are distancing themselves from their disease experience due to the misconstrued notion that MS is a women's disease.

SEM Analyses Findings I

In instances where there is a weak inter-correlation within a given construct (in this case, coping) potentially veiled by a gender bias, SEM analysis is intrinsically helpful in elucidating the nature of the relationship between two whole constructs (in this case, coping and depression) with a lack of strong correlations between (and—in the case of coping—within) individual construct measures. SEM analyses allow for the consideration of multiple correlations at once, thereby allowing for an investigation of the nature of the relationships between and within the construct domains from a multiplicative perspective. And by removing men from the secondary SEM analysis, a gender differential in this regard may be inferred from the data.

The advantage of considering SEM analysis when exploring the relationship between the specific construct domains included in this study is further suggested by the weak correlations between the MS control, coping, and social support measures. Specifically, one MS control measure was significantly correlated with one social support measure and one coping measure. Two different MS control measures were significantly correlated with one different coping measure. Finally, one measure of social support was significantly correlated with another coping measure. Thus, although there was evidence of a relationship among all construct domains of interest in this study, correlation analyses suggested that this relationship may be weak and non-uniform within and between construct measures, indicating the need to regard construct measures individually while considering statistical theoretical models as a whole.

Although individual correlations between some of the demographic and disease-related variables and individual MS control, coping, and social support measures were

significant, since there were no significant correlations between any of the demographic and disease–related variables and the two depression measures, there was no reason to include any demographic or disease-related variables in the SEM models.

<u>Sample Characteristics II</u>

The lack of correlation between demographic and disease-related variables and depression measures is not surprising given the trend in the MS literature to indicate many non-existent or contrasting correlations in this regard. Two recent large self-report studies on depression and fatigue in MS ($n = 719$), and depression in MS ($n = 211$), reported a similar lack of significant correlations between demographic and disease-related variables, and depression in MS. The former study found no significant differences across age, gender, or duration of MS between the subjects with severe depressive symptoms and fatigue and those without; however, those with severe depressive symptoms and fatigue had a lower level of education, higher EDSS scores, and were more likely to have a secondary-progressive course of illness (Chwastiak et al., 2005).

Although it is possible that these latter demographic and disease-related variables were related exclusively to fatigue rather than depression, since fatigue and depression are often highly comorbid in MS populations (Siegert & Abernethy, 2005), this is likely not the case. More likely, these correlations have to do with the severity (both in terms of depression—31% had moderate to severe depression—and progressive disease course—48% had a progressive disease course) of the Chwastiak et al. sample, compared with the sample used in the present study.

It is also not surprising that the current much less depressed and less impaired (on average) sample did not show a correlation between EDSS, disease course, and level of education, given that the latter study noted previously (Forbes, While, Mathes, & Griffiths, 2006) involving a much less impaired population also found no significant differences across age, gender, disease course, or EDSS scores; however, duration of illness did seem to significantly impact level of depression, with the more depressed group having a slightly shorter illness duration (mean = 11.2 years compared with 15.6 years). Notably, the sample used in the current study had a mean illness duration (as opposed to a diagnosis duration) of 14.4 years. The comparably longer illness duration of the sample utilized in this study than in the Forbes et al. study, may explain why there was no significant correlation between illness duration and depression in this sample. For example, individuals who are newly diagnosed may be at greater risk for depression than are those who have been diagnosed with the disease for some time but are still experiencing a certain level and/ or type of functioning in their lives. As this level and/ or type of functioning declines, depression onset may be more likely, suggesting the relationship between disease duration and depression may be non-linear.

4.3. SEM Analyses Findings II

According to **Model 1**, MS control, coping, and social support independently predicted 15%, 9%, and 24% of the variance in depression, respectively. Notably, in SEM analysis, it is possible to appreciate the polarity of the path coefficient.

Specifically, as can be seen in **Model 1 (Figure 3)**, MS control is positively associated with depression, whereas coping and social support are negatively associated with depression. It should also be noted that in SEM, the polarity of these relationships does not necessarily remain constant. As theoretical relationships between constructs change, the polarity of the path coefficient may change, as well.

The change in the polarity of the relationship between coping and depression throughout the 5 models warrants further consideration. Since the coping construct includes measures with both positive and negative path coefficients, there are instances where coping relates as a "beneficial" construct overall (such as is demonstrated by the negative relationship with depression in **Models 1, 2, 4, and 5**), and other instances where coping appears as a "harmful" construct, as indicated by its positive relationship with MS control (**Model 2**) and its positive relationship with depression (**Model 3**). The change in polarity between coping and depression evidenced in **Model 3** is likely due to the impact of placing coping in a mediation role between MS control and depression. This makes sense theoretically if we consider the multiplicative impact of the strong positive relationship between MS control and depression, and the relatively weaker (previously negative) relationship between coping and depression. In this instance, the multiplicative impact of this mediation model has changed the polarity of the relationship between coping and depression.

Due to the complex nature of the relationship between coping and the other constructs, and the small path coefficients evidenced by the three Avoidant coping measures, the 5 SEM models were also analyzed without the avoidant coping measures (see **Table 7**). These analyses revealed better goodness-of-fit indices across all models.

Finally, the mediation models (**Models 3**, **4**, and **5**) displayed no evidence of mediation between any of the constructs was occurring.

4.4. The Social Support—Gender Differential

For the men in this sample, no social support measure correlated with either mood or negative evaluative measures of depression, while for women in this sample one measure—number of social supports—predicted a significant amount of variance in depression (mood and evaluative measures combined). The differential way in which social support appears to impact depression for men versus women with MS in this study is predictable given the findings reported previously: Better social support functioning and larger size of social support network were positively correlated to activities of daily living for women with MS more than for men with MS, (Gulick, 1994); lower social support significantly predicted higher depression in women with MS but not in men with MS (McCabe, McKern, & McDonald, 2004); and that women with MS, more then men with MS, reported getting more satisfaction from social support, generally (Wineman, 1990).

The hypothesis that satisfaction with social support might be more important than number of social supports in predicting depression in MS stemmed from reports by Harper et al. (1986) that, despite gender differences in reports of depression, women and men with MS reported equal quantities of social supports. Interestingly, there was also no significant difference in the mean number of social supports or satisfaction with social

supports for men and women in this study. Thus, the current findings, in light of the existing literature, may reflect the significance of the subjective importance of number of social supports to women compared with men, more than satisfaction with those social supports, though notably, these two measures of social support seem to be inextricably related.

Previous literature suggests some reasons why number of social supports may be more important to women than to men, in general. Noddings (1984) and Gilligan (1982) reported that women base more of their self-esteem on their social relationships than do men. Cross & Madson (1997) note that, "In general, men in the United States… construct and maintain an independent self-construal, whereas women… construct and maintain an interdependent self-construal." Previous research has reported that women, in general, get more support from children and friends than from spouses (Antonucci & Akiyama, 1987; Belle, 1982; Lowenthal & Haven, 1968). Interestingly, the notion that women may get equal, or more, satisfaction from giving social support than from receiving it, may complicate theories related to the gender-social support-depression relationship. Furthermore, it is unclear how these relationships may differ for individuals with MS, specifically.

The unique role of spousal support may also potentially complicate this relationship. Gulick (1994) noted that while men with MS report that the majority of their support comes from their spouses, women report that their support comes from multiple sources. Gulick (1995) further noted that men, but not women with MS, reported a less severe sense of lost support as a result of the disease process when they had a spouse. King & Arnett (2005) reported that depression was the best predictor of

either patient or significant-other rated dyadic adjustment, implying that in what may be a patient's greatest supportive relationship, greater levels of relationship problems were associated with higher levels of depression. The present study did not consider the role of spousal support, specifically, in exploring the impact of social support on depression. Future research exploring the differential impact of spousal support versus number of social supports on depression for women compared with men may enlighten our understanding of these relationships.

4.5. The MS Control—Depression Relationship

Notably, there was no statistical difference in mean scores for women and men in measures of MS control. Furthermore, exploratory correlation analyses for men indicated "MS is controlling my life" was the only measure to significantly correlate with a measure of depression (negative evaluative symptoms only). Likewise, for women in this sample, "MS is controlling my life" significantly accounted for 13% of the variance in depression via stepwise regression. Furthermore, for women in this study, endorsement that "MS is controlling my life" and "I am coping effectively with my MS" (reverse scored) was significantly associated with both mood and negative evaluative symptoms. Finally, all measures of MS control correlated significantly with measures of mood and negative evaluations *except* "I would feel helpless if I couldn't rely on other people for help with my MS." It is thought this latter item may be a poor choice of measure for present level of MS control due to its hypothetical/ contingent nature. Specifically, it

may be difficult for an individual with MS to accurately predict how they might feel if they could not rely on other people for help with their MS, if they currently do rely on people in this way. Regardless, these findings suggest the importance of the MS control-depression relationship for both men and women with MS.

MS Control

Of further interest is how the MS control construct relates to theoretically related constructs such as learned helplessness, attributional style, and disease uncertainty. Wineman, Schwetz, Zeller, & Cyphert (2003) recently reported that individuals with greater uncertainty about their disease were likely to experience less hopefulness and more negative moods. Notably, these patients ($n = 52$) all had a progressive form of the disease. However, Lynch, Kroencke, & Denney (2001) previously demonstrated that high levels of disease uncertainty independently predicted depression in a sample of 188 individuals with MS with variable disease courses. Furthermore, Kneebone and Dunmore (2004) reported that, in a sample of 495 persons with MS, negative attributional style was positively associated with depressive symptoms. Van der Werf, Evers, Jongen, & Bleijenberg (2003) and Shnek et al. (1997) both reported that higher levels of helplessness were associated with depressive mood in a sample of 89 and 80 MS patients, respectively. Finally, Shnek et al. reported that individuals with MS exhibited significantly greater levels of depression and helplessness and significantly lower levels of self-efficacy than did a comparably sized sample of individuals with the SCI. Shnek et al. hypothesized (as did the current study) that the unpredictable course of disease activity and the possibility of being affected by MS in many different ways may cause a differential reaction in this regard for individuals with MS compared with other chronic

disease populations. These findings, in addition to the current study's findings, suggest the need for future research to better ascertain how these theoretically unique constructs relate to one another, and how they may differentially impact depression for individuals with MS.

Findings for Women

For women in this sample, stepwise linear regression revealed number of social supports, endorsement that "MS is controlling my life," and the Active Coping Index significantly accounted for 17%, 13%, and 9% of the variance in depression, respectively. The SEM models with data from the women in this sample showed stronger goodness of fit with all goodness of fit indices than did the mixed-gender sample. This suggests the models apply well for the women in this sample, but not necessarily for the men. As with the mixed-gender sample, when the avoidant coping indices were removed from the SEM models, the goodness of fit indices for the all female sample suggested even better goodness of fit of the models to the data. It should be noted that with the all female sample, the Chi-square goodness of fit index also suggested "significant" goodness of fit of the data with all the models.

4.6. The Best Model

Given the strong, comparable goodness of fit indices of all the models—with or without avoidant coping, and with or without males in the sample—**Model 1** qualifies as the best model because it is most parsimonious; it was made more so by using an all

female sample and eliminating the avoidant coping measures. The canon of Occam's razor dictates that, all else being the same, the simplest explanation for the construct relationships should prevail. **Model l**, which suggests that MS control, coping, and social support all independently contribute to depression in this population, is the simplest model and, therefore, the best fitting model of those tested. This model illustrates how poor social support (few social supports), ineffective coping (lack of planning in response to stress), and strong feelings of MS control (a belief that "MS is controlling my life") may lead to depression in individuals with MS—specifically, women with MS.

Theoretical and Practical Implications

Clinical implementation of these findings suggests psychotherapy with a focus on improving social support (particularly the number of social supports) and coping (particularly planning in response to stress), and reducing feelings of MS control (particularly the belief that "MS is controlling my life") may prove invaluable in (theoretically) preventing and lessening depression in individuals with MS (specifically women with MS). An alternative formulation of **Model 1** is that depression may lead to a lack of social support (particularly few supports), poor coping (particularly lack of planning), and strong feelings of MS control (particularly the belief that "MS is controlling my life"), which may continue to fuel the depression. This alternative conceptualization suggests that once individuals (specifically women) with MS become depressed, they may lose social support, cease coping effectively, and endorse a belief in MS control, leading to worse depression. This latter scenario also supports the utilization of psychotherapeutic treatment targeted at improving social support and coping, and reducing feelings of MS control in this population.

As the cross-sectional nature of these data precludes making causal statements, future longitudinal studies exploring the causality of these relationships, and treatment outcome studies looking at the effect on depression of improvement in MS control, coping, and social support, will further enlighten our understanding of the interactions between, the directional nature of, and the importance of, these construct relationships in individuals with MS. Psychotherapy and psycho-education in this regard would allow MS patients a noninvasive way of potentially improving their mood while living with an unpredictable, unstable neurological disease. With the lifetime prevalence rate of depression being approximately 50% in this population, continued research in this domain (Joffe et al., 1987; Minden, Orav, & Reich, 1987), and ongoing psychotherapeutic intervention for persons in need is critical.

Study Limitations

There are additional limitations to this study that should be noted. The small number of men in this study (n = 17), while representative of the MS population at large, does not do statistical justice towards elucidating the nature of these construct relationships for males with MS. Future MS research should strive to include a larger number of men to help better elucidate these gender differences.

A criticism that may be applied to our coping measure is that it may be difficult to clearly interpret. Beatty et al. (1998) noted that having MS patients rate their coping style in response to specific stressors is problematic because how different patients identify and respond to different stressors may have little in common with how they would actually cope with them. Furthermore, Jean et al. (1997) noted that individuals with MS endorse more emotion-focused coping strategies in response to disease-related

stressors than in response to general stressors. Granted, in this study, individuals with MS endorsed more problem-focused (i.e., active) than emotion-focused (i.e., avoidant) coping in response to a specific (albeit, hypothetical) disease-related stressor. Future studies may chose to use a technique to assess coping that asks about ways individuals *actually* coped with disease-related *and* non disease-related stressors.

A final limitation in this study involves the continuous measure of depression used. Although the use of this measure allowed for consideration of depression across the full range of depression scores, it precluded a categorical comparison of clinically depressed individuals with non-clinically depressed individuals. Specifically, this is problematic because self-report measures of depression are suggested to measure generalized emotional distress in addition to depression, thus rendering them as non specific markers for depression (Coyne & Schwenk, 1997). Current study findings, therefore, may be more descriptive of general emotional distress, including depression.

4.7. Conclusion

Although the existing literature shows that a relationship between MS control, coping, social support, and depression is likely, the present study clarified the nature of these relationships, their importance to predicting depression in MS, and the relative importance of each construct in this regard. Furthermore, this study unveiled how gender was interacting with these construct relationships in an MS sample. Finally, this study

defined and refined the MS control, coping, and social support measures of best use in this population, and strengthened the understanding of the relationship between MS control, coping, and social support by using more optimal measures to explore these relationships. Future studies exploring the causal relationship between these constructs will be helpful in determining the best course of psychotherapeutic intervention for improvement in mood in this population.

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