

Perceived Uncertainty, Spiritual Well-Being, and Psychosocial Adaptation in Individuals With Multiple Sclerosis

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Objective: To examine the role of spiritual well-being as a mediator and moderator between perceived uncertainty and psychosocial adaptation to multiple sclerosis (MS). **Participants and Design:** Fifty individuals (40 women, 10 men) diagnosed with multiple sclerosis. **Main Outcome Measures:** Self-report measures on illness uncertainty, spiritual (religious and existential) well-being, and psychosocial adjustment to illness were analyzed by a series of hierarchical multiple regression analyses. **Results:** Both uncertainty and spiritual well-being independently predicted psychosocial adjustment to MS after the influence of demographic and disability-related variables were considered. Spiritual well-being demonstrated a mediator effect but, mostly, failed to show a moderator effect. **Conclusion:** Spiritual well-being exerts an appreciable influence on adaptation to MS and also acts to mitigate the impact of uncertainty on adaptation. Rehabilitation psychologists may wish to consider its beneficial role as part of their clinical work.

Multiple sclerosis (MS), one of the most common disabling diseases of young adults, is an inflammatory demyelinating disorder of the central nervous system with an estimated prevalence of about 250,000–350,000 individuals in the United States (Devins & Shnek, 2000; Kalb, 1996; Schapiro, 1998). First symptoms usually appear at the young adult age, but the disease may also become evident later in life. The course of MS is highly variable and makes studies of etiology and possible mechanisms of treatment challenging. Because of MS's highly variable clinical course, individual outcomes cannot be reliably predicted. For many individuals, MS starts with a relapsing–remitting pattern with episodic exacerbations of neurological dysfunction, which remit completely or partially. Over the years, for most individuals, the disease develops into the secondary progressive form with accumulated disability (Lublin & Reingold, 1996).

Psychosocial Correlates of MS

The intrusion of MS is a highly stressful life event, with the potential of posing major challenges and obstacles to everyday functioning. Adaptation to MS requires not only an initial adjustment to the diagnosis of the condition, but also continuous efforts of readjustment due to the erratic nature of the symptoms (Matson & Brooks, 1977). The heterogeneous nature of MS introduces a wide array of challenges, many of which center around the stress engendered by the uncertainty and unpredictability of its course (Devins & Shnek, 2000). Associated problems, such as poor symptom control, fatigue, sexual dysfunction, social isolation, failed

efforts to manage medical crises, unsuccessful therapy, role strains, fear of symptom exacerbation, and physical deterioration despite adherence to the medical regimen, further contribute to uncertainty and counteract attempts at successful adjustment to MS (Minden & Schiffer, 1990; Strauss et al., 1984). Research, however, has suggested that spiritual and religious variables may attenuate the impact of uncertainty on psychosocial maladjustment (Brooks & Matson, 1982; Crigger, 1996).

Perceived Illness Uncertainty

Certainty and predictability of outcomes are valued in Western cultures. When individuals face chronic disabling conditions that have uncertain outcomes, they search for an illusory cure for their problems to counteract system breakdown (Mishel, 1990). Perceived uncertainty addresses how meaning is constructed for illness-related events (Mishel, 1988). As defined by Mishel (1981, 1997), it is the cognitive state created when the decision maker is unable to assign definite values to objects and events or is unable to accurately predict outcomes because sufficient cues are lacking. The subjective experience of uncertainty dominates the perceptual field when the features of the event are ambiguous, complex, unpredictable, and lack adequate information. Lazarus and Folkman (1984) emphasized the importance of uncertainty in coping and described a coping process in which appraisal is central. They suggested that ambiguity and the resulting uncertainty can generate stress and inhibit effective coping. This has led many researchers and theorists to view uncertainty as one of the greatest challenges in successful adaptation to chronic illness. Indeed, research with a variety of disease states has consistently demonstrated that chronically ill individuals who experience increased levels of uncertainty report diminished levels of overall adjustment to their condition (e.g., Brashers, Neigid, Reynolds, & Hass, 1998; Mishel, Hostetter, King, & Graham, 1984; Mullins, Chaney, Pace, & Hartman, 1997; Mullins et al., 2001; Neville, 1998; Sanders-Dewey, Mullins, & Chaney, 2001).

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The central role of uncertainty in adaptation to MS has also been examined in several studies. The cognitive appraisal of illness uncertainty in a sample of individuals with MS was reported by Mullins et al. (2001) to be uniquely related to psychological distress. Furthermore, illness uncertainty was reported by Wineman, Schwetz, Goodkin, and Rudick (1996) to be associated with diminished mood and hopefulness. In addition, Wineman, O'Brien, Nealon, and Kaskel (1993) noted that the greater the level of perceived uncertainty in a given situation, the higher the likelihood that individuals will interpret the effects of the illness as negatively affecting their mood states regardless of their level of functional capacity. Previous research with persons experiencing MS also has demonstrated that, although increased levels of uncertainty were associated with affectively driven coping strategies, lower levels of uncertainty were related to increased use of problem-focused coping methods (Wineman, Durand, & Steiner, 1994). Collectively, the extant data indicate that uncertainty is a prominent source of stress, placing the individual with MS at increased risk for emotional difficulties.

Spirituality and Religiousness: Conceptual and Measurement Issues

There is growing recognition among rehabilitation psychologists and researchers of the potentially important role played by the various dimensions of spirituality and religiousness in coping with stressful life events and adventitious disability (Kilpatrick & McCullough, 1999; Underwood-Gordon, Peters, Bijur, & Fuhrer, 1997). The differences and similarities between terms such as *spirituality* and *religiousness* and how they have been measured is a central issue. The Fetzer Institute (1999) stated that religiousness can be distinguished in that it involves a system of worship and doctrine that is shared within a group and thus has specific behavioral, social, doctrinal, and denominational characteristics. Specifically, religion offers beliefs about how one relates to that which is sacred or divine, with the aim to foster and nourish the spiritual life. In contrast, spirituality has been conceptualized as pertaining to the transcendent and addresses ultimate questions about life's meaning and purpose, which may or may not be theistic in nature. According to Stoll (1989), a belief in God can be integrated with meaningful life experiences, but individuals without a belief in God or a higher power can also have spiritual and meaningful experiences. Stanard, Sandhu, and Painter (2000) maintained that although religiousness pertains to an institutionalized set of beliefs and doctrines and is more compartmentalized, outerdirected (i.e., God), and public, spirituality refers to a transcendent relationship between the person and a higher being and is more innerdirected (i.e., subjectively experienced), universal, and personal.

Operationalizing and measuring spirituality and religiousness is a challenge because of the complex multidimensional character of the constructs. Moreover, because of the multifaceted nature of spirituality and religiousness (the Fetzer Institute, 1999, has identified 12 domains, including daily spiritual experiences, meaning, values, private religious practices, etc.), no practical measure could possibly address them all. To further complicate matters, efforts to address the association between spirituality-religiousness and physical or mental outcomes must also consider the various physiological (e.g., neuroendocrine), psychological (e.g., belief sys-

tems), social (e.g., family, social groups), and behavioral (e.g., lifestyle practices) pathways that link the two (Fetzer Institute, 1999). Although many established psychometrically sound scales exist to measure specific spiritual and religious facets of coping (e.g., Hood, Spilka, Hunsberger, & Gorsuch, 1996; Pargament, 1997; Stanard et al., 2000), criticisms of most of these instruments are that they seldom differentiate between the various facets of spirituality-religiousness and also lack normative data, thus limiting their clinical usefulness. Moreover, these instruments fail to provide empirical information on how the measurement of spirituality-religiousness relates to physical and mental health outcomes (Fetzer Institute, 1999; Stanard et al., 2000). The Spiritual Well-Being Scale (Ellison, 1983), adopted in the present study, is a widely accepted, frequently used tool that attempts to provide a general measure of spirituality, addressing both its religious and existential components.

Spiritual and Religious Coping

Although research on the relationships between general health and measures of spirituality and religiousness has often yielded mixed results, people with physical and life-threatening disabilities often find spirituality and religiousness to be valuable in coping with their conditions (Idler & Kasl, 1997; Kilpatrick & McCullough, 1999; Tix & Frazier, 1998). Spiritual and religious coping has been linked to higher levels of well-being in those with spinal cord injury (Decker & Schulz, 1985), less psychosocial distress after recovery from cardiac surgery (Ai, Dunkle, Peterson, & Bolling, 1997), greater overall mental health and positive well-being in individuals diagnosed with various forms of cancer (Ell, Mantell, Hamovitch, & Nishimoto, 1989), higher quality of life in women with breast and gynecological cancers (Colton, Levine, Fitzpatrick, Dodd, & Targ, 1999; Gioiella, Berkman, & Robinson, 1998), fewer depressive symptoms among medically hospitalized elderly patients (Koenig et al., 1992), and hardness in individuals diagnosed with AIDS (Carson & Green, 1992).

Religious beliefs and modes of coping, however, are not necessarily blueprints to successful adaptation to chronic illnesses and disabilities. Indeed, Jenkins and Pargament (1995), cautioned that religion could facilitate successful coping in some chronically ill people but hinder it in others. Furthermore, the nature of religious practice may play an important role in determining adaptation. In their study, Jenkins and Pargament, reported that "extrinsic religion" (i.e., using religion for personal and social ends) was not related to coping and psychosocial adjustment in cancer patients. The practice of "intrinsic religion" (i.e., committing to faith and spiritual goals), on the other hand, was associated with increased hope and lower levels of anxiety and hostility. In a wide-scale study of 557 older adults who were receiving inpatient medical services, Koenig, Pargament, and Nielsen (1998) found a strong yet dichotomized relationship between the use of religious coping and several outcome measures. Positive religious coping, as defined by such perceptions as divine benevolence, seeking spiritual support, and religious help and collaboration, was linked to better mental health and higher quality of life. In contrast, negative religious coping, as indicated by such beliefs as divine punishment, demonic powers, and passive deferral, was associated with poorer physical health, increased depression, and lower quality of life. Although these studies examined the main effects of using

spiritual and religious coping, a study by Tix and Frazier (1998) identified religious affiliation as an intervening variable that moderated stress among individuals facing kidney transplant surgery.

Only two published studies have addressed the impact of spirituality and religion as coping strategies in psychosocial adjustment to MS. A longitudinal study by Brooks and Matson (1982) involving 103 individuals in the middle to later stages of MS found religious beliefs and faith to be beneficial in coping with the illness. Religion, as a coping strategy, was the second most frequently endorsed strategy, only following the coping strategy of "accepting it." It should be noted that the measurement and classification of coping strategies in the Brooks and Matson study were not based on an instrument derived from stress-coping theory but from qualitative data generated from answers to an open-ended question, "What most helps you cope with MS?"

More recently, in a study involving 90 women with MS, Crigger (1996) found that spiritual well-being played a significant role in adaptation to uncertainty and was also associated with mastery, the latter representing the degree of successful adaptation. That study, however, (a) did not examine the mediating or moderating role of spirituality in linking uncertainty and adaptation, (b) did not differentiate between the religious and existential facets of spiritual well-being, (c) used the relatively obscure six-item mastery subscale of the Chronic Disease Assessment Tool (CDAT; Moody, 1990), and (d) did not employ an outcome measure that focuses on the multidimensionality of psychosocial adaptation to chronic illness and disability. Thus, the overarching goal of our study was to investigate the relations among perceived illness uncertainty, spiritual well-being, and psychosocial adaptation to MS.

Three specific research aims included (a) examining the unique contributions of illness uncertainty and spiritual well-being to psychosocial adaptation, (b) studying the role of spiritual well-being as a potential mediator between uncertainty and adaptation, and (c) studying the role of spiritual well-being as a potential moderator in the relationship between spiritual well-being and adaptation (see *Statistical Analysis* below for further discussion of these hypothesized relationships).

Method

Participants

A total of 50 (40 women, 10 men) nonhospitalized, chronically ill adults with physician-diagnosed MS volunteered to participate in the study. Participants ranged in age from 22 to 76 years ($M = 45.4$, $SD = 11.8$). All described themselves as Caucasian. Marital status categories included married (58%), single (18%), divorced (18%), widowed (4%), and separated (2%). Educational level was reported as bachelor's degree (44%), high school education (32%), master's degree (18%), and grade school education (6%). Of the participants, 46% were employed at the time of the study (full- or part-time). Duration of illness (i.e., time since diagnosis of MS) ranged from 1 to 34 years ($M = 10.9$, $SD = 8.7$). Religious affiliations encompassed Protestant (50%), Catholic (20%), Mormon (6%), Buddhist (4%), Native American-Indian beliefs (4%), and mixed (8%). The remaining 8% indicated that they did not belong to any organized religious group. Finally, 14% of the sample were treated with Betaseron at the time of the study, and an additional 42% and 14% were treated with Avonex and Copaxone, respectively.

Procedure

The sample of interest for this research included nonhospitalized chronically ill adults with MS. Exclusion criteria included (a) individuals younger than 21 years of age, (b) an MS diagnosis of less than 1 year, (c) individuals without a partner, and (d) the existence of an additional severe debilitating disease or a known terminal illness. To approach potential participants, an announcement was placed in the Oregon Chapter of the National Multiple Sclerosis Society's monthly publication, *MS Connection*. The Oregon Chapter is comprised of about 5,100 individuals with MS who are residents of either the state of Oregon or Southwest Washington. Readers interested in volunteering as participants for this study were instructed to phone a designated person. Callers were informed as to the purpose of the study and those agreeing to participate were mailed a participant packet that included a consent form (to be signed and returned in a separate envelope), a participant survey form, and the study's three principal measures. Of the initial pool of chapter members, 53 agreed to participate. Packets were distributed to these volunteers, and all were returned; one was discarded because of extensive missing data and another two were omitted because the respondents reported the presence of other severe concurrent illnesses. The final sample, therefore, included 50 individuals.

Measures

The following measures were included in the study.

Participant Survey Form. This form was used to obtain sociodemographic data and included questions on participants' age, gender, ethnic background, marital status, educational level, religious preference, duration of MS diagnosis, employment, and use of immunomodulating agents for disease control.

Mishel Uncertainty in Illness Scale (MUIS-Community Form [MUIS-C]; Mishel, 1981, 1997). The MUIS-C is a self-report, 23-item scale that measures four uncertainty-related factors (i.e., ambiguity, complexity, inconsistency, and unpredictability). The Community Form of the MUIS was developed for use with nonhospitalized patients. Respondents rate on a 5-point Likert-type scale their agreement (or disagreement) with each item. Responses to all items are totaled to yield a composite score. Higher scores reflect a greater level of uncertainty. The MUIS and MUIS-C have been used in over 200 health-related studies and have been consistently found to possess sound psychometric properties across several chronic and life-threatening diseases, including MS, cancer, post-polio, and rheumatoid arthritis (e.g., Mishel, 1981, 1997; Mishel et al., 1984; Mullins et al., 2001; Wineman, 1990). Studies of the scale's internal reliability (Cronbach's α) have reported moderate to high values ranging from .74 to .92 (Mishel, 1997). For the present sample, alpha had a value of .83.

Spiritual Well-Being Scale (SWB; Ellison, 1983). The SWB is a 20-item, self-report instrument that assesses spiritual well-being as a two-dimensional construct, Religious Well-Being (RWB; 10 items) and Existential Well-Being (EWB; 10 items). RWB refers to well-being as it relates to the concept of God (e.g., "I don't find much satisfaction in private prayer with God," "I believe that God is concerned about my problems"), whereas EWB addresses well-being as it relates to a sense of life purpose and satisfaction independent of religion (e.g., "I feel that life is a positive experience," "Life doesn't have much meaning").

Respondents indicate the extent to which they agree or disagree with each personal experience described. Six Likert-type response options are provided, ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). Responses to all items are totaled separately for each subscale (RWB and EWB). Higher scores reflect higher degree of perceived well-being. The scores for the two subscales may be totaled to yield an overall score (i.e., SWB). The correlation between the subscales has been reported to be .32 (Ellison, 1983).

The SWB and its two subscales have demonstrated excellent test-retest reliabilities (ranging from .86 to .96) as well as high coefficient alphas

(ranging from .78 to .89) (Ellison, 1983). For the present sample, alpha values were .98, .93, and .97, for RWB, EWB, and SWB, respectively.

Psychosocial Adjustment to Illness Scale–Self Report (PAIS-SR; Derogatis & Lopez, 1983). The PAIS-SR is a 46-item self-report, multidimensional measure designed to assess the psychological and social adjustment of medical patients in seven domains of psychosocial adjustment: health care orientation (eight items), vocational environment (six items), domestic environment (eight items), sexual relationships (six items), extended family relationships (five items), social environment (six items), and psychological distress (seven items). Respondents rate each item on a 4-point (0 to 3) scale of adjustment. Scores are then summed for each of the seven subscales separately, in which higher scores reflect poorer adjustment. An overall PAIS-SR score is also computed. Raw scores for each subscale and the PAIS-SR are then converted to *T* scores ($M = 50$; $SD = 10$).

The original PAIS instrument has been standardized for numerous medical populations, including patients with lung cancer, gynecological cancer, renal dialysis, acute burns, and essential hypertension (Derogatis & Fleming, 1996). Its PAIS-SR version has also been standardized for several medical populations, including patients with cancer, cardiac diseases, diabetes, and MS (Derogatis & Fleming, 1996). The PAIS-SR has demonstrated high internal consistency and low interscale domain correlations (mean domain intercorrelations of .28; Derogatis, 1986). For the present sample, alpha values ranged from .70 (health care orientation) to .89 (psychological distress), and domain intercorrelations ranged in value from .20 to .70, with a median of .45.

Statistical Analysis

The first aim of this study was accomplished first by estimating zero-order correlations among the study's variables and second by conducting a series of hierarchical multiple regression analyses (MRAs) to examine the effect of several predictor variables (i.e., selected sociodemographic characteristics, perceived uncertainty, spiritual well-being) on the outcome variable (psychosocial adaptation). More specifically, we sought to examine the unique contributions of perceived uncertainty and spiritual well-being to psychosocial adaptation to MS after controlling for personal, social, and disability-related variables.

The second aim (testing spiritual well-being as a mediator) was addressed using Baron and Kenny's (1986) and Holmbeck's (1997) models of mediation. The following conditions must exist for a variable to be identified as a mediator: (a) the predictor (i.e., perceived uncertainty) must be significantly correlated with the outcome variable (i.e., psychosocial

adaptation), (b) the predictor must also be significantly associated with the hypothesized mediator (i.e., spiritual well-being), (c) the hypothesized mediator must be significantly linked to the outcome variable, and (d) the effect of the predictor on the outcome variable decreases (it is no longer significant) after controlling for the mediator. The final step is normally accomplished by using simultaneous or hierarchical MRAs.

The third and final aim of the study (testing spiritual well-being as a moderator) was approached by examining whether the relationship between uncertainty and psychosocial adaptation depends on whether one scores high or low on spiritual well-being. The latter is typically analyzed by examining the magnitude of the interaction term (Uncertainty \times Spiritual Well-Being), following those of the main effects in hierarchical MRA.

Results

Prior to addressing the three research aims, zero-order correlations were calculated among the study's variables. Table 1 provides the correlation matrix for all variables, including the study's primary variables MUIS, RWB and EWB subscales of the SWB Scale, and the *T* standardized scores for the overall PAIS (PAIS-T) and Psychological Distress (PAIS-PD) subscale.

To address the first research question, we conducted six separate hierarchical MRAs to examine the unique contribution of MUIS, RWB, and EWB to the prediction of PAIS-T (Series 1) and PAIS-PD (Series 2) separately. Because of space limitations and the study's main focus on psychological adjustment to MS, we report findings only for the PAIS-T and PAIS-PD. Each MRA was comprised of four steps. In Steps 1–3, the contribution of biological (organismic) variables (i.e., age, gender) was first controlled (Step 1), followed by that of social variables (educational level, employment, marital status; Step 2), and finally disability-related variables (i.e., duration, use of medication; Step 3). In Step 4, the unique contribution of MUIS, RWB, and EWB to the two PAIS measures was examined.

Results indicate that the combined seven control variables contributed significantly to the prediction of PAIS-T scores, $R^2 = .40$, $F(7, 42) = 3.99$, $p = .01$. More specifically, of the three predictor sets, only the social-related variables (i.e., marital status, educational level, employment), $\Delta R^2 = .26$, $\Delta F(3, 44) = 5.63$, $p = .01$, contributed significantly to the variance in PAIS-T. The sets of

Table 1
Correlations Among Predictor and Outcome Measures Included in Study

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	—											
2. Gend	-.17	—										
3. Educ	.00	-.21	—									
4. Empl	.19	-.06	-.01	—								
5. Marit	-.14	-.18	.00	.13	—							
6. Durat	.64**	-.13	-.02	.24	-.21	—						
7. Medic	.01	.09	.12	-.14	.11	.03	—					
8. MUIS	-.11	.37**	-.10	.02	-.21	.06	-.04	—				
9. RWB	.12	-.11	.19	-.12	.03	-.09	-.09	-.47**	—			
10. EWB	.27	-.04	.06	-.15	-.12	-.04	-.01	-.49**	.75**	—		
11. PAIS-PD	-.35****	.15	-.08	-.03	.24	-.07	.00	.49**	-.52**	-.70**	—	
12. PAIS-T	-.03	-.24	.13	.24	.51**	.15	.08	.21	-.32****	-.63**	.60**	—

Note. Gend = gender; Educ = education; Empl = employment; Marit = marital status; Durat = duration of illness; Medic = use of immunomodulating agents for disease control; MUIS = Mishel Uncertainty in Illness Scale; RWB = Religious Well-Being; EWB = Existential Well-Being; PAIS-PD = Psychosocial Adjustment to Illness Scale, Psychological Distress; PAIS-T = PAIS Total Scale.

** $p < .05$, two-tailed. **** $p < .01$, two-tailed.

disability-related variables (duration, use of medication), $\Delta R^2 = .08$, $\Delta F(2, 42) = 2.68$, $p = .08$, and personal-related variables (i.e., gender and age), $\Delta R^2 = .06$, $\Delta F(2, 47) = 1.58$, $p = .22$, failed to contribute significantly to score on PAIS-T.

Next (in Step 4), the unique contributions of MUIS, RWB, and EWB to prediction of PAIS-T scores were examined. All three variables significantly and separately contributed to the prediction of PAIS-T scores. The three variables contributed separately between 9.5% and 18% to the variance in PAIS-T scores (for MUIS: $R^2 = .525$, $\Delta R^2 = .125$, $\Delta F[1, 42] = 10.98$, $\beta = .39$, $p = .01$; for RWB: $R^2 = .495$, $\Delta R^2 = .095$, $\Delta F[1, 42] = 7.93$, $\beta = -.33$, $p = .01$; and for EWB: $R^2 = .68$, $\Delta R^2 = .28$, $\Delta F[1, 42] = 38.17$, $\beta = -.59$, $p < .01$).

In the second series of MRAs, a similar procedure was applied when assessing the contribution of the three sets of control variables and the three study variables in predicting scores on the PAIS-PD domain. The combined seven control variables failed to contribute significantly to the prediction of PAIS-PD scores, $R^2 = .240$, $F(7, 42) = 1.92$, $p = .09$. The unique contributions of MUIS, RWB, and SWB to the prediction of PAIS-PD scores were then examined. Again, all three variables significantly and separately contributed to the prediction of PAIS-PD scores. The three variables contributed separately between 20% and 34% to the variance in PAIS-PD scores (for MUIS: $R^2 = .45$, $\Delta R^2 = .21$, $\Delta F[1, 42] = 16.10$, $\beta = .51$, $p < .01$; for RWB: $R^2 = .44$, $\Delta R^2 = .20$, $\Delta F[1, 42] = 14.83$, $\beta = -.47$, $p < .01$; and for EWB: $R^2 = .58$, $\Delta R^2 = .34$, $\Delta F[1, 42] = 33.41$, $\beta = -.64$, $p < .01$).

To address the second research question (RWB and EWB as mediators between uncertainty and adjustment), we conducted four separate series of regression analyses to examine the bivariate regression coefficient between each pair of variables, followed by an MRA to examine the mediating role of RWB and EWB separately for PAIS-T and PAIS-PD scores. Results indicated that the conditions necessary for testing the mediation effect of RWB and

EWB were met with one minor exception (the correlation between RWB and PAIS-T, $r = .21$, just failed to reach statistical significance, $p = .07$). We then conducted the four series of MRAs to examine if the strength of the associations between uncertainty and the two psychosocial adjustment outcomes diminished once the effect of spirituality (RWB and EWB, separately) was controlled for. Table 2 summarizes these findings.

RWB served as mediator in linking uncertainty with psychological adjustment (for both PAIS-T and PAIS-PD). It should be recalled that the initial association between MUIS and PAIS-T just failed to reach statistical significance. Partialling out the mediating effect of RWB, however, substantially reduced the correlation between the two (from .21 to .07). EWB also served as a mediator in linking uncertainty and each of the psychosocial adjustment measures. EWB, however, only demonstrated a partial mediation effect between predictor and outcome, because their initial association ($r = .49$) remained statistically significant ($r = .32$) after partialling out EWB's effect.

The third research question (RWB and EWB as moderators between uncertainty and adjustment) was addressed by adding to the earlier series of MRAs the interaction term between uncertainty and spirituality. Again, four MRAs were performed (two for each outcome measure). To eliminate potential multicollinearity effects between the two predictor and moderator main effect terms (MUIS and RWB–EWB scores) and the interaction term, both predictor and moderator were first “centered” (scores were converted to deviation scores from the sample mean; Aiken & West, 1991).

A moderator effect was only detected for one of the four interaction effects tested. EWB met the criteria for a moderator variable between MUIS and PAIS-T scores (for MUIS \times EWB, $\Delta R^2 = .053$, $\Delta F[1, 46] = 4.50$, $p = .04$). Specifically, scores on the EWB were first dichotomized into two groups around the distribution mean (high EWB > 46 , low EWB < 46). Regression

Table 2
Hierarchical Multiple Regression Analyses for Mediating and Moderating Effects of Study Variables

Mediation effect				
Outcome measure	Mediator variable	Predictor variable	Mediator–outcome zero-order r	R partial
PAIS-Total	RWB	MUIS	.21*	.07 (<i>ns</i>)
PAIS-Total	EWB	MUIS	.21*	-.15 (<i>ns</i>)
PAIS-PD	RWB	MUIS	.49*****	.23 (<i>ns</i>)
PAIS-PD	EWB	MUIS	.49*****	.32***
Moderation effect				
Outcome measure	Moderator variable	Predictor variable	R^2 two predictors–outcome	ΔR^2 interaction effect
PAIS-Total	RWB	MUIS, RWB	.11 (<i>ns</i>)	.05 (<i>ns</i>)
PAIS-Total	EWB	MUIS, EWB	.41*****	.05**
PAIS-PD	RWB	MUIS, RWB	.35*****	.001 (<i>ns</i>)
PAIS-PD	EWB	MUIS, EWB	.52*****	.00 (<i>ns</i>)

Note. Upper panel summarizes tests of mediation effects; lower panel summarizes tests of moderation effects. PAIS = Psychosocial Adjustment to Illness Scale; MUIS = Mishel Uncertainty in Illness Scale; RWB = Religious Well-Being; EWB = Existential Well-Being; PD = Psychological Distress.
* $p = .07$. ** $p < .05$. *** $p = .025$. **** $p < .01$. ***** $p < .001$.

analyses for MUIS and PAIS-T scores were then conducted for each group (high vs. low) separately. Inspecting slope, mean, and intercept parameters for both groups indicated that for the high-EWB group, increase in MUIS scores resulted in no change to PAIS-T scores ($\beta = .015$). However, for those in the low-EWB group, increase in MUIS scores resulted in decrease in PAIS-T scores ($\beta = -.30$). In other words, whereas no relationship was found between uncertainty and overall psychosocial adjustment in participants who scored high on EWB, increased uncertainty was associated with decreased psychosocial distress for those who scored low on EWB.

Discussion

This study sought to examine the relation among perceived uncertainty, spiritual well-being, and psychosocial adjustment in individuals diagnosed with MS. More specifically, the unique contribution of perceived uncertainty, as well as the unique, mediating, and moderating effects of spiritual well-being on psychosocial adjustment, were examined.

Results indicate that both uncertainty and the two domains of spiritual well-being (i.e., religious and existential) were uniquely and significantly linked to overall psychosocial adjustment (as measured by a composite of health, psychological, social, familial, and vocational domains) and also to a narrower index of psychological distress. Higher levels of perceived uncertainty and decreased reliance on spiritual well-being were associated with lower levels of psychosocial adaptation. Moreover, these findings were consistent even after controlling for the effects of personal, social, and disability-related variables. These findings are consistent with earlier research that had demonstrated positive relations between perceived uncertainty and depression (Wineman, 1990), decreased purpose in life (Wineman, 1990), negative emotionality (Wineman et al., 1994), and psychological distress (Mullins et al., 2001; Wineman et al., 1996).

Successful psychosocial adaptation is challenged when chronic illnesses and disabilities result in ambiguity about anticipated outcomes (Mullins et al., 2001). The uncertain illness trajectory in MS may compromise the individual's coping resources and ultimately the capacity to adjust successfully to the condition. Indeed, as Mishel's model of perceived uncertainty (Mishel, 1984) and Lazarus and Folkman's (1984) model of coping has suggested, psychological distress may ensue if the individual appraises an uncertain situation as taxing or exceeding his or her resources and endangering well-being.

The literature on the direct relation between spiritual well-being and measures of psychosocial adaptation to chronic illness is overwhelmingly consistent. As reported earlier, spiritual well-being was found to be associated positively with overall adjustment, hopefulness and quality of life in patients with chronic illnesses other than MS (Campbell, 1988; Carson, Soeken, Shanty, & Terry, 1990; Colton et al., 1999; Landis, 1996; Tuck, McCain, & Elswick, 2001). Our findings are consistent with these reports. Both subscales of the SWB (RWB and EWB) were significantly and negatively correlated with PAIS-T and PAIS-PD scores, similarly to the findings reported by the only other available study on spiritual well-being and psychosocial adaptation to MS (Crigger, 1996). It could be argued, then, that this ostensibly inherent coping resource of satisfaction, spiritual drive, and sense of purpose in

life, is positively linked to psychosocial adaptation to this condition.

When we examined the role played by spiritual well-being as a mediator between perceived uncertainty and psychosocial adaptation, several intriguing findings emerged from this study. First, both components of spiritual well-being (i.e., religious and existential) demonstrated mediator properties in attenuating the impact of uncertainty on psychosocial adjustment in this sample of people with MS. When its effect was controlled for, RWB demonstrated its mediating role by reducing the initial association (albeit marginal for MUIS and PAIS-T) between uncertainty and psychosocial adjustment. To a lesser extent, yet of substantial partial mediating properties, was the role played by EWB in reducing the association between uncertainty and psychosocial adjustment. Spiritual well-being may indeed bear certain resemblance to the concept of "fighting spirit" that has been extensively studied in the field of psychosocial adaptation to cancer (Nelson, Friedman, Baer, Lane, & Smith, 1989; Watson et al., 1988). The combined features of acceptance of the diagnosis, while at the same time optimistically challenging and confronting the disease, have been implicated as contributors to decreased levels of anxiety, depression, and generally to lowered psychological distress (Burgess, Morris, & Pettingale, 1988; Watson et al., 1994). It may be speculated, therefore, that a similar adaptive mechanism (e.g., coping strategy, coping resource, personality trait) may be at the root of successful adjustment to the unpredictable and uncontrollable vicissitudes associated with the progress of MS. Spiritual well-being, then, may be perceived not only as a potent predictor of psychosocial adjustment but equally as a mediator between a largely detrimental factor (uncertainty) in the lives of people with MS and successful adaptation. Furthermore, both aspects of spiritual well-being, namely the belief in religious commitment (which reflects both a more formalized institutional practice and externally oriented belief system) and the existential sense of life purpose and life satisfaction (which reflects both a less formalized state of transcendence and internally oriented belief system), were implicated in linking uncertainty and psychosocial adjustment.

A final aim of this study was to explore whether an interactive effect between uncertainty and spiritual well-being (i.e., SWB as a moderator) influences psychosocial adjustment to MS. By and large, spiritual well-being was not found to moderate the relationship in this sample. The exception to this conclusion was the role EWB played in moderating the relationship between uncertainty and global psychosocial adjustment. Unexpectedly, for participants who reported low EWB (but not high EWB) increased levels of uncertainty were associated with better overall psychosocial adjustment (lower PAIS-T scores). These findings, however, were not replicated for the psychological distress domain of the PAIS. The inconsistent nature of these findings with previous research gives rise to two possible explanations. First, participants who report lower levels of EWB may also avoid coping actively with the ramifications of their disease and tend to deny its very nature. Denial or avoidance then, as a correlate of diminished existential assertiveness, moderates the relation between uncertainty and adaptation. Indeed, Mishel (1988) argued that high levels of perceived uncertainty may prompt the person to create positive illusions about threatening events so that the detrimental effects of uncertainty are blocked. Individuals who rely more on denial of the uncertain future of their condition (of which positive illusions is a

central feature) also report being more content with their condition, thereby reporting increased, albeit pseudo, psychosocial adaptation. In the absence of any measures of denial or avoidance in this study, this explanation remains conjectural at best.

A second possible explanation for the discrepant findings may be partially found when examining age of participants. Inspection of the scatterplots containing data on (a) age and MUIS and (b) age and EWB, followed by curvilinear trend estimations, revealed a significant curvilinear trend for age and MUIS scores (quadratic curve, $R^2 = .13$), $F(2, 47) = 3.52$, $p = .04$, and a potent curvilinear trend for age and EWBT (but not RWBT) scores (quadratic curve, $R^2 = .11$), $F(2, 47) = 2.93$, $p = .06$. In the first case, participants in the middle-range age group (mostly 45–55 years of age) reported decreased levels of uncertainty. In the latter case, the same middle-range age group reported higher level of EWB. Furthermore, with the obviously high correlation between age and duration of MS ($r = .64$), it could be speculated that a complex and interactive set of relations exists between the personal variables of age and duration of condition and the psychological variables of uncertainty and existential well-being that influences psychosocial adaptation to MS. It could, in a similar vein, be conjectured that other factors not addressed in this study contribute to these intricate relations. These factors may include (a) denial or avoidance of future implications and uncertainties associated with a slowly progressive disease, (b) perceived social support (one form of objective social networking, namely marital status, was found to be significantly related to lower PAIS-T scores and was also associated, albeit nonsignificantly, with lower PAIS-PD and MUIS scores), and (c) truncated future time orientation, in which one's degree of general engagement with the future is compromised because of health-related barriers (Martz & Livneh, 2003).

The findings of this study must be interpreted with caution because of several limitations. First, the small sample size, ethnic homogeneity, mostly Christian religious affiliations, voluntary nature of participation, and restricted geographical area limit the generalizability of the findings. Second, all data were obtained by means of self-report measures. Despite the ensured anonymity of respondents, social desirability and other reactive confounds may have influenced participants' responses. Third, this study used a correlational design. In accordance, no proven causal inferences can be made concerning directionality of relations among study variables (e.g., psychosocial adjustment, here conceived as an outcome measure, may also influence degree of spirituality and perceived uncertainty).

Fourth, it could be argued that the EWB Scale assesses general well-being and thus reflects generic positive mental health rather than the intended spiritual domain. This concern, however, applies equally to most measures of spirituality. Indeed, it has been argued that spirituality could be regarded as one component of positive mental health (Maslow, 1971; Thoreson, 1998). The concern of criterion contamination is somewhat lessened in our study because the criteria adopted (the PAIS-T and PAIS-PD scores) are not generic measures of mental health (or impairment) but rather specific indicators of psychosocial adaptation to chronic illness (i.e., MS). Future research, however, should be directed at disentangling this potentially problematic overlap by using a less diluted measure of existential spirituality. Finally, in the present study, only seven participants (13%) met the criteria of "caseness" (T score > 62) for clinical levels of psychological distress (PAIS-

PD). Moreover, participants' facility at responding to all questionnaires coherently suggests that this sample is comprised mostly of individuals with nonimpaired cognitive capacity. The findings of this study may, therefore, be limited only to those individuals with MS who have successfully adjusted to their condition and, therefore, were able to access resources such as spiritual well-being. In light of these limitations, it is recommended that future research, in addition to securing larger and more heterogeneous groups of respondents, also (a) use longitudinal design to establish causal relations among measures of uncertainty, spiritual well-being, and psychosocial adaptation; (b) expand data collection methods to include structured interviews for a more personalized approach to uncovering spiritual coping modalities and efforts at psychosocial adaptation, as well as proxy-reporting measures (i.e., information obtained from family members and peers) to better document perceptions of psychosocial distress and adaptation; and (c) examine the contribution of other potential predictors and mediator-moderator variables (e.g., denial, future time orientation, self-concept, locus of control, emotion- and problem-focused coping strategies).

Despite the limitations noted above, two tentative clinical implications are warranted from the findings of this study. First, rehabilitation psychologists should be cognizant of the fact that a person's spiritual beliefs, values, perceptions, feelings, and ideas are intrinsically linked to religious, philosophical, cultural, ethnic, and life experiences (including those of loss, grief, and chronic illness). It is, therefore, important that the practitioner acknowledge that spirituality in a person's life can be a constructive force when facing life's challenges and difficulties. Furthermore, by assessing the importance of spiritual beliefs in their clients' lives, rehabilitation psychologists convey to their clients that these issues are acceptable topics that can be addressed throughout the rehabilitation and counseling process. The psychologist who respects the client's spiritual values and beliefs may indeed discover that therapeutic benefits can be accomplished through them.

Second, because uncertainty and spiritual well-being appear to exert both direct and indirect effects on psychosocial adaptation for people with MS, efforts should be made to address both. For example, rehabilitation practitioners should initiate concerted educational and clinical efforts directed at reducing clients' perceptions of uncertainty and ambiguity that stem from the onset of MS (Mullins et al., 2001). Moreover, having clients recognize the benefits inherent in the role played by a spiritual outlook and its success in ameliorating the detrimental effects of an uncertain future could enhance psychosocial adaptation to the disease.

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