

Predictors of dyadic adjustment in multiple sclerosis

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Because multiple sclerosis (MS) is usually diagnosed between the ages of 20 and 50, a time during which most people begin serious relationships, dyadic adjustment for MS patients is a salient issue. However, little is known about factors that might contribute to dyadic adjustment problems in MS. In the present study, we predicted that MS patients showing evidence of three common sequelae of MS – depression symptoms, fatigue and cognitive dysfunction – would be most likely to display problems with dyadic adjustment. Sixty-four MS patients and 49 significant others were assessed. Patient-reported dyadic adjustment was significantly (P at least <0.05) associated with depression ($r = -0.48$) and fatigue ($r = -0.31$), but not cognitive functioning. Significant other-reported dyadic adjustment was significantly associated with patients' depression ($r = -0.38$), fatigue ($r = -0.30$) and executive functioning impairments ($r = 0.37$). Stepwise regression analyses revealed that depression was the only significant predictor of dyadic adjustment, regardless of whether significant other (r^2 change = 0.16) or patient-reported (r^2 change = 0.22) dyadic adjustment was used as the criterion variable. If depression leads to dyadic problems in MS patients, treatment of depression may result in improved dyadic adjustment. Conversely, if dyadic problems contribute to depression in MS, then treatment of dyadic problems may lead to relief from depression in these patients. Multiple Sclerosis (2005) 11, 1–8

Key words: caregiver; cognitive impairment; depression; dyadic adjustment; fatigue; marriage; multiple sclerosis; neuropsychology

Introduction

Multiple Sclerosis (MS) is a neurodegenerative disease of the central nervous system (CNS). Demyelinating lesions often distort or prevent normal neurologic transmission. Because the disease can attack anywhere within the CNS, the symptoms are variable and complex. MS patients experience motor and sensory deficits as well as impairments in cognitive and emotional functioning. Disease course is unpredictable and chronic with most patients experiencing decline in neurologic functioning over time. The onset of MS is usually in early adulthood.^{1,2}

Many features of MS could hypothetically lead to trouble in a marriage or with a significant other. Because the onset of the disease is in early adulthood, a time when many people begin serious relationships, it is especially important to study how MS affects patients' relationships. Surprisingly, relatively little is known about how problems associated with MS might contribute to dyadic maladjustment. Given the demonstrated importance of social support to the wellbeing of MS patients,³ understanding how the disease contributes to what is most individuals' greatest source of social support is critical. In the present study, we explored the association between

dyadic adjustment and three common sequelae of MS: depression, fatigue and cognitive dysfunction.

Depression has been found to affect up to 50% of MS patients in some cross-sectional studies.⁴ Furthermore, a study by Sadovnick *et al.* reported that the frequency of depression in MS patients is seven times greater than that of the general population.⁵ Given that depression has been shown to be associated with dysfunctional relationships in other populations,⁶ one goal of the present study was to examine the relationship between dyadic adjustment and depression in MS. Because MS patients are more likely to be depressed than healthy individuals, their relationships may be more likely to suffer. In one MS study, Gilchrist and Creed found that depression in MS was related to general social stress.⁷ Given this general link to social stress, it is not unreasonable to suggest that depression may be related to more specific social stresses such as marital or significant other stresses.

Most MS patients rate fatigue as their most troublesome symptom.⁸ Many patients report feeling tired most of the time and that this fatigue often disrupts their daily life. Fatigue affects as many as 90% of MS patients and 40% consider it their worst symptom.⁹ Almost half of MS patients report feeling tired every day.¹⁰ Knight *et al.* examined MS symptomatology and caregiver burden and found that patient fatigue was rated as the third greatest contributor to stress on the caregivers.¹ Furthermore, this high amount of caregiver stress was shown to be associated with the caregiver/significant other relationship.¹ Thus, the fatigue experienced by MS patients may create stress and negatively affect their dyadic relationships. A study of caregiver distress by O'Brien found that the caregiver or significant other reported experiencing more

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stress when the patient exhibited a need for physical help.¹¹ Similarly, Deatruck *et al.* found that fatigue affected maternal support and physical affection, something which may, in turn, create distress in a marital or significant other relationship.¹² Because caregivers exhibit more stress with fatigued patients, dyadic relationships may suffer.

Along with fatigue, cognitive impairments are common, and characterize about 50% of MS patients.² Cognitive domains commonly affected by MS include executive functioning, memory recall, attention, and speeded processing.² Given the dialectical nature of interpersonal relationships, these cognitive handicaps might be likely to affect relationships. Gilchrist and Creed found that cognitively impaired MS patients reported more social stress than those who were cognitively intact.⁷ These investigators speculated that patients' social stress could be due to limited social skills secondary to the cognitive impairment of these patients. Related to this speculation was the finding that 75% of significant other caregivers agreed that patients' problems in cognitive functioning had an adverse impact on their interactions with them. Another study reported that cognitively impaired patients were rated significantly more dependent in their activities of daily living than cognitively intact patients.¹³ Additional studies have examined cognitive impairments and their association to relationship distress.^{7,11} O'Brien reported caregivers as believing cognitive impairment altered the quality of their relationship with their MS-afflicted significant other.¹¹ Moreover, cognitive deficits have also been found to be associated with deterioration of significant other relationships.⁷

Rodgers and Calder concluded that MS patients have a more difficult time in dyadic relationships than people without MS.¹⁴ Patients who suffer from MS have many new problems to which they must adjust. Patients must adapt to symptoms of the disease in order to maintain a high quality of life. However, as noted above, these problems not only affect the MS patients, but likely affect spouses or caregivers as well. For this reason, examining the relationship between common MS symptoms and marital functioning may help to elucidate how these symptoms might affect one or both of the partners. Underscoring the importance of this topic, an 18-month longitudinal study from the UK by Coles *et al.*¹⁵ found a 21% annual incidence of divorce in their sample of 19 married MS patients. The annual incidence of divorce in the general population in the UK ranges from 2.4 to 3.1%; in the USA the range is 4.0–4.1%.¹⁶

Limitations of existing studies

As shown, although a number of studies have separately shown that depression, fatigue or cognitive dysfunction are related to dyadic adjustment in MS, to our knowledge no existing study has examined the possible contribution of all three factors to dyadic adjustment in the same study. Furthermore, studies examining depression and dyadic adjustment in MS have used measures of depression that include symptoms of depression that overlap with MS symptoms (e.g., sleep disturbance, fatigue, sexual

dysfunction). Because of the potential confound of neurovegetative depression symptoms with MS symptoms, the present study will define depression using only depression symptoms that do not overlap with MS symptomatology.

Although fatigue is known to be disruptive to relationships generally, its specific relation to dyadic adjustment in MS has not been directly studied. Attempts to examine fatigue with dyadic adjustment generally consider the impact of fatigue on the caregiver or the patient, but exclude consideration of the relationship. Thus, an important goal of the present study was to examine the relationship between fatigue and dyadic adjustment in MS.

Researchers who have examined cognitive impairment relating to dyadic adjustment in MS have come up with some intriguing results. However, prior work has not divided cognition further to examine discrete cognitive domains, and has typically examined perceptions of cognitive dysfunction in patients rather than measuring it objectively. The current study will base cognitive disability entirely on objective cognitive assessment measures and then divide measures into cognitive domains commonly affected in MS: speeded attention/working memory, executive planning and memory. To our knowledge, no existing study has examined the relationship between these specific and objectively measured cognitive domains and dyadic adjustment in MS.

Current study

In summary, the purpose of the current study was to examine the association of depression, cognitive impairment and fatigue with dyadic adjustment in MS. By examining several possible contributors to dyadic adjustment in the same study, we hoped to obtain a clearer understanding of the key factors associated with dyadic adjustment in MS. The central hypothesis of this study is that depression, fatigue and cognitive impairment in MS will all be related to dyadic adjustment, whether rated by patients or significant others. An exploratory component of the study is to examine the relative contribution of each factor to marital adjustment.

Materials and methods

Participants and procedure

Participants in this study were recruited from outpatient clinics and support groups in eastern Washington in the USA. Sixty-four MS patients completed the dyadic adjustment measure. Diagnoses and MS course types were assigned by board-certified neurologists based on established guidelines for research protocols in MS.^{17,18} Duration of illness from symptom onset, diagnosis and neurological disability¹⁹ were also assessed. None of the participants were experiencing a clinical exacerbation at the time of the evaluation. Patients were excluded if they had a history of drug or alcohol abuse, any nervous system disorder besides MS, or a learning disability. Patients were also excluded if they had visual or motor impairments that

would significantly alter test administration procedures, or if they were unable to come to one of our testing centres. Forty-nine significant others of patients in the present study participated, most of whom were spouses. The significant others of the remaining 15 patients chose not to participate in this study. All participants provided informed written consent and were treated in accordance with the ethical standards of the American Psychological Association.

Each patient was first administered a semi-structured psychosocial interview by a doctoral student in clinical psychology followed by the neuropsychological testing. The neuropsychological testing involved measures of cognitive functioning, fatigue, and depression. Patients and significant others completed the dyadic adjustment measure as part of a questionnaire packet sent out to participants approximately one week before the scheduled neuropsychological testing. Patients also completed the fatigue measure at this time.

Measures

Composites of the following speeded attention/working memory, executive planning and memory measures were created by summing z-scores and then creating mean z-score values. All z-scores were calculated using the mean and SD from the total MS sample.

The following four neuropsychological tests were used to assess speeded attention/working memory.

*Paced Auditory Serial Addition Test (PASAT)*²⁰ The PASAT requires patients to listen to single-digit numbers and add each number to the immediately preceding number. This test measures working memory and speeded attentional functioning. The dependent variable was the number of correct responses out of 120 possible across the 2-s and 3-s versions of the test.

*Symbol Digit Modalities Test (SDMT)*²¹ The SDMT is a measure of speeded attention involving scanning, visual tracking and working memory.²² We used the oral version of the test in order to avoid any motor writing problems that might impede patients' performance. The total correct in 90 s was used as the dependent variable.

*Visual Elevator subset from the Test of Everyday Attention (TEA)*²³ The TEA is comprised of various tests of attention. The current study used the Visual Elevator subtest to measure patients' attentional switching/speeded processing abilities. This test is timed and has examinees determine which floor of an elevator they are on based on a series of up or down arrows. The elevator begins on the first floor and moves one floor in the direction the arrow presents. Participants say aloud which floor they believe the elevator is on. There are 40 total switches of directions across 10 trials. The dependent variable used was the time per correct switch of directions.

*Reading Span Test*²⁴ This test measures working memory capacity. It requires participants to read a sentence aloud presented in a booklet; the primary task requires them to

keep track of and recall single, one-syllable, words presented after the end of each sentence. Whenever participants are shown a blank card, they are instructed to try and recall all end words presented since the presentation of the previous blank card. Participants are first required to recall two words on each of three different practice trials consisting of two sentences each. Following this, the test blocks begin with three, two-sentence trials, followed by three, three-sentence trials and so on up to a maximum of three, six-sentence trials. The total number of words participants correctly recalled on the task was used as the dependent variable.

The following neuropsychological test was used to assess executive planning.

*Tower of London (TOL)*²⁵ We used a modified TOL measure from the Colorado Neuropsychology Tests battery (CNT)²⁵ as our measure of executive planning ability. The task was presented on a computer monitor and involved six task trials, in addition to one demonstration trial and one practice trial. The stimuli for the task consisted of five pegs and five coloured beads. Participants used a mouse to move beads in a window on the left of the screen (working area) until they achieved the arrangement in the window on the right (goal position). Each trial began with a different goal position. There was no time limit on the task but participants were encouraged to achieve the goal position as quickly, and in as few moves, as possible. All participants were able to complete the task and none suffered from gross motor impairment that would have interfered with their ability to move the mouse. Scoring indices were the number of moves per trial and time per trial, and were combined using z-scores into one summary index, so higher values reflected worse performance on this index.

The following neuropsychological tests were used to assess long-term memory.

*California Verbal Learning Test (CVLT)*²⁶ & *Story Subtest from the Rivermead Behavioural Memory Test (RBMT)*²⁷ The CVLT is a word-list learning task involving the initial presentation of five trials of the same 16 words. The Story subtest involves the presentation of a brief story that participants are asked to recall immediately and then after a delay. Raw scores for total recall on trials 1–5 from the CVLT,²⁶ and total story ideas recalled from two of the Story subtests were transformed to z-scores and combined to form a single index.

The following measures were administered in questionnaire format.

*Dyadic Adjustment Scale (DAS)*²⁸ The DAS measures the quality of a relationship with a significant other. Although this measure consists of four subscales, because the internal consistency of the entire measure is very high (Cronbach's alpha = 0.96),²⁸ we used the overall score for both patients and significant others as dependent variables. Higher scores on the DAS represent better dyadic adjustment.

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*Fatigue Impact Scale (FIS)*¹⁰ The Fatigue Impact Scale consists of 40 questions that assess the perceived impact of cognitive, physical and social fatigue. The patients rate their fatigue from 0 to 4, with higher values representing greater fatigue. The dependent variable used was the total FIS score.

*Chicago Multiscale Depression Inventory (CMDI)*²⁹ This measure is divided into separate scales measuring mood, negative evaluative and neurovegetative symptoms. To circumvent the problem of possible neurovegetative symptom-MS symptom overlap, the dependent variable for depression excluded the neurovegetative subscale and included only the combined mood and evaluative subscales of the CMDI.

Results

Table 1 illustrates the demographic and illness characteristics of the sample. Patients' depression was correlated most strongly with patient-rated dyadic adjustment ($r = -0.48$, $P < 0.05$), but was also significantly associated with significant other-report of dyadic adjustment ($r = -0.38$, $P < 0.05$). High levels of fatigue were also associated with low levels of the patients' ($r = -0.31$, $P < 0.05$) and significant others' ($r = -0.30$, $P < 0.05$) dyadic adjustment. Finally, patient executive functioning difficulties were associated with lower levels of significant other-rated ($r = 0.37$, $P < 0.05$) but not patient-rated ($r = 0.13$,

$P < 0.05$) dyadic adjustment. No significant associations were found between either dyadic adjustment rating and the speeded attentional/working memory or long-term memory indices.

The MS course types did not differ significantly on either DAS index. Additionally, the only demographic/illness variable correlated with either patient or significant other DAS score was diagnosis duration with patient rating ($r = 0.27$, $P < 0.05$). As such, it was controlled for where relevant in the following analyses. Regression analyses were conducted that included the variables that displayed significant zero-order correlations with the dyadic adjustment indices. Accordingly, in the stepwise regression analysis with patient DAS as the dependent variable, diagnosis duration was entered at the first step, and the CMDI Mood + Evaluative scale index and FIS total score were entered in a stepwise fashion at step 2. The results of this analysis are shown in Table 2 and reveal that, after accounting for diagnosis duration, only the CMDI Mood + Evaluative scale index significantly predicted patient DAS, accounting for 22% unique variance. In the stepwise regression analysis with significant other DAS as the dependent variable, the CMDI Mood + Evaluative scale index, FIS total score and summary index from the Tower of London were entered as predictor variables. As with the patient DAS analysis, only the CMDI Mood + Evaluative index predicted significant variance in the significant other DAS score, accounting for 16% of the variance in this variable (See Table 2).

Post hoc analyses were also conducted to evaluate whether depression symptoms still accounted for significant variance in dyadic adjustment after fatigue was accounted for in the case of patient DAS ratings, and after fatigue and executive planning were accounted for in the case of significant other DAS ratings. A hierarchical regression analysis was conducted with patient DAS rating as the dependent variable and diagnosis duration entered at step 1, FIS total score at step 2 and CMDI Mood + Evaluative index at step 3. As shown in Table 3, the CMDI Mood + Evaluative index remained as a statistically significant independent predictor, accounting for 13% of patient-rated DAS variance after FIS total score was accounted for. Another regression analysis was conducted with significant other DAS rating as the dependent variable and both FIS total score and TOL index entered at step 1, and CMDI Mood + Evaluative index entered at step 2. In contrast to the patient-rated DAS analyses, the CMDI Mood + Evaluative index was no longer a significant predictor of significant other DAS score after fatigue and executive functioning had been entered into the equation (See Table 3).

Discussion

The present study was designed to evaluate the extent to which fatigue, depression symptoms and cognitive dysfunction predicted dyadic adjustment in MS. Results partially supported predictions. In particular, we found that higher levels of depression and fatigue significantly

Table 1 Summary of participant characteristics

Variable	Mean	SD
CMDI Mood + Evaluative Scale	40.7	15.2
Age	46.5	8.1
Education	14.7	2.2
WAIS-R IQ estimate	104.0	7.8
Kurtzke (1983) EDSS	4.7	1.5
Symptom Duration (years)	14.3	9.9
Diagnosis Duration (years)	7.0	5.4
Dyadic Adjustment Scale (patient)	111.6	23.0
Dyadic Adjustment Scale (sig. other)	113.4	18.5
CMDI Mood <i>t</i> -value	49.7	9.6
CMDI Evaluative <i>t</i> -value	51.5	14.5
	<i>n</i>	%
Sex		
Males	15	23
Females	49	77
Clinical course		
Relapsing-remitting	41	64
Secondary progressive	16	25
Primary progressive	6	9
Progressive relapsing	1	2
Diagnostic category		
Clinically definite	58	91
Clinically probable	3	5
Lab-supported definite	3	5

For most variables, $n = 64$.

The *t*-scores for the CMDI Mood and Evaluative scales were derived using values from the nondepressed control group in the article by Nyenhuis *et al.*²⁹

Table 2 Regression analyses illustrating predictors of patient and significant other Dyadic Adjustment Scale Scores

Variable	<i>B</i>	<i>SEB</i>	β	R^2	<i>adjR</i> ²	ΔF	<i>P</i> -level	
Dependent variable: patient's DAS (<i>n</i> = 64)								
Step 1								
Diagnosis duration (years)	1.06	0.46	0.25	0.07	0.06	0.07	4.81	<0.05
Step 2								
CMDI Mood + Eval	-0.66	0.20	-0.43	0.29	0.27	0.22	18.81	<0.001
Step 3								
Fatigue Impact Scale	-0.04	0.08	-0.07	0.29	0.27	0.00	<1.0	ns
Dependent variable: spouse's DAS (<i>n</i> = 37)								
Step 1								
CMDI Mood + Eval	-0.25	0.36	-0.17	0.16	0.14	0.16	6.76	<0.05
Step 2								
Tower of London Index	5.32	3.22	0.27	0.22	0.18	0.06	2.58	ns
Step 3								
Fatigue Impact Scale	-0.11	0.12	-0.20	0.24	0.18	0.02	<1.0	ns

B, unstandardized beta coefficient; *SEB*, standard error of *B*; β , standardized beta coefficient; R^2 , multiple R^2 ; *adjR*², adjusted R^2 , a value that represents an estimate of the amount of shrinkage in R^2 likely to occur upon cross-validation; Δr^2 , change in r^2 ; ΔF , change in *F*-value; *P*-level, significance level of ΔF .

predicted worse dyadic adjustment in our sample, whether this adjustment was rated by patients or significant others. Overall, cognitive dysfunction was a weaker predictor of dyadic adjustment than fatigue or depression. Of the cognitive domains examined, only executive planning deficits were associated with poorer dyadic adjustment, and only when that adjustment was rated by significant others. Executive dysfunction was not associated with dyadic adjustment when patients made these ratings. Additionally, neither patient- nor significant other-rated dyadic adjustment was significantly related to problems with speeded attentional/working memory or long-term memory dysfunction.

When fatigue, depression symptoms and cognitive dysfunction were considered together, only depression symptoms emerged as a significant predictor of dyadic adjustment, regardless of whether that adjustment was rated by patients or significant others. In the case of patient ratings of dyadic adjustment, depression symptoms remained as a significant predictor of dyadic adjust-

ment even after accounting for the contribution of fatigue. In contrast, depression symptoms no longer significantly predicted significant other ratings of dyadic adjustment after fatigue and executive functioning were accounted for. These results suggest that depression symptoms are the best predictor of dyadic adjustment in MS, regardless of whether dyadic adjustment ratings are made by patients or significant others. Furthermore, these data show that depression is a robust predictor of patient-rated dyadic adjustment, but not significant other-rated dyadic adjustment after the contribution of executive functioning and fatigue to dyadic adjustment are considered.

Several conceptualizations of our data are possible. First, it may be that depression and fatigue cause problems in dyadic relationships. Patients who experience high levels of fatigue and depression may be less able to engage in effective and productive marital relationships. Patients who are fatigued and depressed may be less responsive to and more dependent upon significant others. Less responsiveness by patients and the greater relationship demands

Table 3 Regression analyses examining depression as an independent predictor of Dyadic Adjustment Scale scores after accounting for other relevant variables

Variable	<i>B</i>	<i>SEB</i>	β	R^2	<i>adjR</i> ²	ΔF	<i>p</i> -level	
Dependent Variable: patient's DAS (<i>n</i> = 64)								
Step 1								
Diagnosis duration (years)	1.06	0.46	0.25	0.07	0.06	0.07	4.81	<0.05
Step 2								
Fatigue Impact Scale	-0.04	0.08	-0.07	0.16	0.14	0.09	6.67	<0.05
Step 3								
CMDI Mood + Eval	-0.66	0.20	-0.43	0.29	0.26	0.13	11.12	<0.005
Dependent variable: spouse's DAS (<i>n</i> = 37)								
Step 1								
Tower of London Index	5.32	3.22	0.27	0.23	0.18	0.23	4.99	<0.05
Fatigue Impact Scale	-0.11	0.12	-0.20					
Step 2								
CMDI Mood + Eval	-0.25	0.36	-0.17	0.24	0.17	0.01	<1.0	ns

B, unstandardized beta coefficient; *SEB*, standard error of *B*; β , standardized beta coefficient; R^2 , multiple R^2 ; *adjR*², adjusted R^2 , a value that represents an estimate of the amount of shrinkage in R^2 likely to occur upon cross-validation; Δr^2 , change in r^2 ; ΔF , change in *F*-value; *P*-level, significance level of ΔF .

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placed upon significant others may, in turn, create resentment and conflict in the relationship, something that is likely to result in poorer overall relationship adjustment. Alternatively, it may be that poor dyadic adjustment leads to both greater depression symptoms and fatigue in patients. Patients with more troubled marital relationships may be more likely to become depressed. Additionally, greater difficulty in the marital relationship may result in greater levels of fatigue in patients because of the greater level of effort required by patients to address issues that arise in that relationship. Another possible model is that some third variable may cause fatigue, depression and poor dyadic adjustment. For example, financial difficulties and employment problems that arise as a result of MS may cause both depression and relationship difficulties. O'Brien reported that increased financial burden often occurs in MS families because MS patients often have a difficult time keeping stable employment.¹¹ Alternatively, the greater demands placed upon families of patients due to patients no longer being able to carry out their usual day-to-day tasks may result in relationship conflict and depression. In turn, the latter may result in greater fatigue, both in terms of fatigue being a symptom of depression but also in terms of greater relationship conflict requiring more day-to-day effort and resulting in fatigue. Another possible third variable is sexual dysfunction. Problems with the sexual aspect of the marital relationship are commonly reported by both MS sufferers and their spouses. These sexual difficulties may lead to both marital dissatisfaction and depression.⁸ Murray and Deatrack *et al.* report that MS patients often have difficulty caring for their children.^{8,12} As such, a third variable that might account for the associations found in the current study is childcare difficulty, something that may lead to both marital relationship difficulties and depression. Patients who are less able to care for their children may experience depression at the loss of their ability to perform this important parental function. In turn, the greater demands placed on spouses of patients could lead to increased marital conflict. Given these myriad causal possibilities among these variables, a longitudinal study would perhaps be the best way to tease out the most valid model proposed so that the temporal evolution of these difficulties could be evaluated more systematically. Given the salience of depression symptoms relating to dyadic adjustment in the present study, a treatment outcome study that involves treatment of depression and its subsequent effect on dyadic adjustment would most directly evaluate whether patient depression actually caused dyadic adjustment in MS. To evaluate whether the causal direction was reversed, dyadic adjustment could be the focus of treatment and its subsequent effect on patient depression evaluated. Figure 1 illustrates several possible causal relationships among the variables examined.

Of the three variables examined, cognitive difficulties displayed the weakest relationship with dyadic adjustment. Of the cognitive domains examined, only executive planning was a significant predictor of dyadic adjustment and only when the latter was rated by significant others.

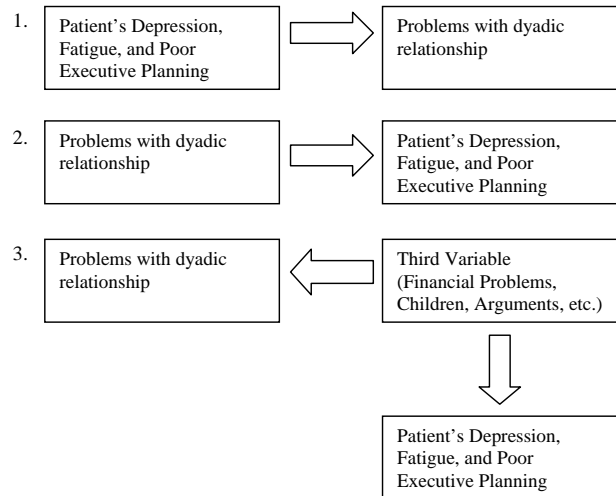


Figure 1 Possible causal relationships among dyadic adjustment and other relevant variables.

Although, because of the correlational nature of the study clear causal inferences are precluded, it may be that executive difficulties displayed by patients result in relationship problems from the significant other's perspective. Executive difficulties in patients may increase the demands placed upon significant others for planning and organizing day-to-day activities for patients, something that might be expected to decrease relationship satisfaction disproportionately in those significant others. Such a conceptualization could explain why executive deficits in patients were significantly associated with significant other- but not patient-rated dyadic adjustment in the present study. Of course, it is possible that the causal relationship is reversed, with relationship difficulties resulting in executive impairments in patients. This conceptualization is less appealing, however, because it is more difficult to see how such a causal connection could play out. That said, it is certainly possible that relationship difficulties could lead to depression, which in turn might compromise executive functioning.

One unexpected relationship we found was that longer diagnosis duration was associated with better dyadic adjustment. It may be that, as patients and their spouses have time to adapt to the new demands that the disease places on both of them, their relationship improves.

There are limitations to our study. First, the preeminence of depression symptoms as a predictor of dyadic problems could be explained by a response bias in patients influencing both their report of depression symptoms and dyadic adjustment. Negative cognitive biases have been shown to be a central feature of depression syndromes.³⁰ As such, patients with these biases may be likely to rate anything about themselves, including dyadic functioning, as more negative than it is in reality. However, the fact that patient depression symptoms were also significantly related to significant other reports of dyadic adjustment makes this interpretation less appealing. Nonetheless, the relationship between patient-rated dyadic adjustment and depression was somewhat higher than between significant other-rated

dyadic adjustment, so response biases of patients may have played some role in this difference.

A second limitation is that we did not use a clinician rating or diagnostic criteria to diagnose depression. As such, we did not study the syndrome of depression but depression symptoms. The outcome of our study may have been different if interviewer/observer depression ratings had been made and it is possible that our depression index was simply tapping into different degrees of generalized emotional distress.

A third limitation of our study is that there were an uneven number of participants in the MS patient versus significant other groups. As such, the results for these two groups were not completely comparable. Nonetheless, all of the significant others who participated were significant others of patients who also participated in the present study, even if the reverse was not true. A related limitation is that we did not study the agreement between dyads, *per se*, but perceptions of dyadic adjustment separately in patients and their significant others. Future studies could examine the issue of dyadic adjustment more directly by including behavioural observations of dyadic interactions in MS patients and their significant others.

In summary, our study revealed that depression symptoms, fatigue and executive dysfunction all predicted dyadic relationship problems in MS patients. Depression symptoms were the most robust predictor of both patient-rated and significant other-rated dyadic problems. Although causal conclusions are precluded given the correlational nature of our data, if depression causes dyadic problems in MS, treatment of depression may be likely to improve functioning of the marital relationship. Given research suggesting that depression is under-recognized and often undertreated in MS,³¹ its robust relationship with dyadic functioning provides another justification for better recognition and treatment of this common difficulty in this patient group. Additionally, given the extremely high divorce rate among MS sufferers relative to the general population, anything that might improve the marital relationship, such as treatment of depression, would be worth pursuing. Future research with a longitudinal design and treatment outcome component to it will likely shed greater light on the precise causal relationship between relationship problems and depression symptoms, fatigue and executive dysfunction in MS. Because lack of social support has been shown to be one of the greatest risk factors for depression in MS,³ and the dyadic relationship is likely to be central to the social support available to many patients, gaining a better understanding of factors that underlie this most critical element of social support is likely to pay substantial dividends in ultimately improving the quality of life in these patients.

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