

# Spouse Depression and Disease Course Among Persons With Rheumatoid Arthritis

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**Objective.** To examine the role of spouse mood in the disability and disease course of persons with rheumatoid arthritis (PWRA).

**Methods.** A total of 133 married PWRA completed questionnaires, including the Rheumatoid Arthritis Disease Activity Index and the Disabilities of the Arm, Shoulder, and Hand, assessing PWRA arthritis disease activity and disability, respectively, at 2 time points 1 year apart. In addition, both PWRA and their spouses completed the Center for Epidemiologic Studies Depression Scale, a standardized community measure of depression at both time points.

**Results.** Multiple regression analysis revealed spouse depressive symptoms at initial assessment to be predictive of followup PWRA disability and disease activity, even after controlling for initial levels of PWRA depression, disability, disease activity, age, number of years married, education, disease duration, and employment. Specifically, higher levels of spouse depression predicted worse disease course over a 1-year period for PWRA, as indicated by higher reports of subsequent PWRA disability and disease activity.

**Conclusion.** Our findings highlight the key role played by the spouse in PWRA disease course, and point to the importance of including the spouse in clinical interventions. Implications for theory, research, and treatment are discussed with a focus on examining pathways through which spouse depressive symptoms may affect PWRA disease course and disability.

## INTRODUCTION

The emotional well-being of persons with rheumatoid arthritis (PWRA) has been found to play a critical role in disease course and disability. Mood is predictive of arthritis-related pain, fatigue, and stiffness (1). The effects of mood can be long lasting, since a single episode of depression predicts subsequent rheumatoid arthritis (RA)—re-

lated pain levels (2), and those patients with current depression combined with a past history of depression are at particularly high risk for poor disease course (3). Even within the course of a day, PWRA mood predicts changes in pain from morning to evening (4).

A second key psychosocial factor in PWRA disease outcomes is close relationships (5,6), although the path through which close relationships may exert their influence on PWRA health is little understood (7). Considering the previously discussed literature, one path through which close relationships may impact PWRA disease course and disability is mood. Prospective research (8) on more than 5,000 married couples found that spouses of those with higher baseline levels of depression were themselves more likely to report subsequent depression. Although there have been no studies examining such mood contagion effects among couples where one member has RA, it is reasonable to expect, given the findings on the role of mood in RA disease course, that spouse mood is one path through which close relationships affect PWRA disease course.

Schwartz and colleagues found a positive relationship between negative spouse mood and PWRA pain (9). However, their study was cross-sectional, so it remains unclear whether PWRA pain affects spouse mood, or whether spouse mood impacts PWRA disease course, or both. This limitation of past research is highlighted by the recent

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assertion by Ruiz et al that they could find no prospective studies examining spousal characteristics as predictors of PWRA health and well-being (10). They argued that employing prospective study designs would strengthen future research, allowing for the examination of causal issues. A further limitation of such research is that it has relied primarily on the PWRA perception of the spouse. With the notable exception of Sterba et al (11), examining couple illness perception congruence on psychological adjustment in women with RA, there is a dearth of research that actually involves the spouse, rather than relying solely on PWRA perceptions of spouse mood and behavior. Recently, Keefe and Porter (7) argued for simultaneously collecting data from both PWRA and the spouse, painting a more complete picture of the important interactions at play within the dyad.

Following these recommendations, we examined the prospective relationship between spouse depression and RA disease course, with PWRA and their spouses separately completing initial and 1-year followup questionnaires that included assessment of depression and health status. In addition, PWRA also completed a set of standardized measures of RA-related disease activity, pain, and functional ability. The effects of spouse depressive symptoms on PWRA disease activity and disability were examined, and it was hypothesized that increased spousal depression would be predictive of subsequent PWRA disease activity and disability, even after controlling for initial PWRA depression and disease activity.

## SUBJECTS AND METHODS

**Subjects.** Subjects were recruited as part of a larger study investigating concordance of PWRA and partner perceptions of PWRA pain, fatigue, and disability (12). Only those procedures and measures used in the current study are discussed here. Participants were eligible if they were diagnosed with RA by a physician, and the time since diagnosis exceeded 6 months. PWRA and their partners were  $\geq 19$  years of age and cohabiting for  $\geq 1$  year. Partner status was defined as being married or maintaining a common-law relationship. Exclusion criteria included an inability of either partner to comprehend written English. Participants were recruited through physician contacts and advertisements, as well as through PWRA advocacy groups and community recruitment postings. The interested persons contacted a researcher to request questionnaires.

Members of the couple were mailed 2 sets of questionnaires that they each completed independently. Participants' names were entered into lottery drawings for prizes valued between \$50 and \$500. Participants were followed up via telephone if questionnaires had not been received within 14 days after they were mailed. If questionnaires were incomplete, followup phone calls were made in order to obtain missing information. Research was carried out in compliance with the Helsinki Declaration and approval was granted by the University of British Columbia Ethics Board.

Of the 275 eligible couples that were sent initial ques-

tionnaires, 226 (82%) returned both PWRA and partner questionnaires within a week of each other. Of those, 4 couples were excluded due to missing data ( $n = 222$ ). Of the 226 participants surveyed in the initial questionnaire, 211 consented to being contacted with the followup questionnaires. Two persons did not participate in the followup because their spouses had died, and 11 couples could not be contacted because they had moved. Of the 211 questionnaires, 135 were returned by at least the PWRA. Of those returned, 2 were excluded due to excessive missing data. When compared using independent-sample *t*-tests, those participants who completed both initial and followup questionnaires did not differ significantly ( $\alpha$  level = 0.05) on study variables or demographics, with the exception of ethnicity (all 7 Chinese PWRA completed initial questionnaires only) and employment status (more PWRA who completed initial questionnaires only were employed full time and less were retired).

The final sample consisted of 133 couples in which both the PWRA and partner had completed the initial questionnaire and at least the PWRA had completed the followup questionnaire. PWRA were predominantly female (72.9%), white (96.2%), and ranged in age from 29 to 86 years (mean  $\pm$  SD 62.35  $\pm$  12.65 years). Spouses were mostly male (71.4%), white (95.5%), and ranged in age from 28 to 86 years (mean  $\pm$  SD 63.26  $\pm$  12.70 years). Initially, participants had been married (94%) or cohabiting (6%) with their partner for a mean  $\pm$  SD time of 33.4  $\pm$  15.71 years (range 1–62 years.) At followup, rates of marriage decreased to 92.7% due to 2 incidences of death and 1 divorce. On average, PWRA were diagnosed a mean  $\pm$  SD 12.8  $\pm$  11.3 years prior, with durations ranging from 1–44 years. Most participants (85%) and spouses (87.2%) had completed high school. At the time of the initial questionnaire, 28.6% of participants were employed outside the home (60.5% full time), with the rest being either homemakers (14.3%), retired (41.4%), or on leave due to disability (13.5%). Of the spouses, 46.6% were employed (83.9% full time), with the remainder being homemakers (5.3%), retired (44.4%), or on disability (0.8%).

**RA disease activity.** Symptoms of RA, including pain, swelling, tenderness, stiffness, and fatigue, were measured using the Rheumatoid Arthritis Disease Activity Index (RADAI) (13). Participants indicated symptom severity for the present day by using a 0–10 numerical rating scale (where 0 = no pain and 10 = very severe pain). These ratings were averaged and summed together with ratings of joint pain producing a score that indicated worse outcomes for higher scores. Participants indicated the specific joints in which they felt pain that day by marking the severity of the pain in each joint (mild, moderate, or severe). Cronbach's alpha coefficients were equivalent for both the initial and followup measurements ( $\alpha = 0.89$ ). The RADAI has strong convergent validity, correlating with clinical assessments and health questionnaires (14).

**Physical limitations.** Disabilities of the Arm, Shoulder, and Hand (DASH) was used to assess multidimensional aspects of physical limitations, including pain, weakness,

Table 1. Descriptive and bivariate correlations between DASH, RADAI, and depression\*

	1	2	3	4	5	6	7	8
1 PWRA DASH time 1	–							
2 PWRA DASH time 2, n = 130	0.78†	–						
3 PWRA RADAI time 1	0.67†	0.52†	–					
4 PWRA RADAI time 2, n = 131	0.44†	0.64†	0.56†	–				
5 PWRA depression time 1	0.42†	0.28†	0.46†	0.12	–			
6 Spouse depression time 1, n = 132	0.19‡	0.28†	0.18‡	0.26†	0.23†	–		
7 PWRA depression time 2, n = 130	0.24†	0.30†	0.28†	0.22‡	0.69†	0.31†	–	
8 Spouse depression time 2, n = 121	0.18‡	0.22‡	0.16	0.18‡	0.27†	0.72†	0.29‡	–
Mean ± SD	37.18 ± 21.00	35.63 ± 20.95	4.03 ± 2.30	3.62 ± 2.17	13.78 ± 9.83	9.74 ± 8.54	11.69 ± 9.04	8.46 ± 8.03

\* DASH = Disabilities of Arm, Shoulder, and Hand; RADAI = Rheumatoid Arthritis Disease Activity Index; PWRA = persons with rheumatoid arthritis.  
†  $P < 0.01$ .  
‡  $P < 0.05$ .

tingling, and stiffness (15). The measure assesses the range of physical challenges people with RA experience. Responses ranged from 1 (no difficulty) to 5 (unable), and scores were calculated by subtracting 1 from the mean of all 30 items and then multiplying by 25. Higher scores indicate greater disability. Reliability was high at both time points ( $\alpha = 0.97$ ); the DASH has known validity and reliability (16).

**Depressive symptoms.** Depressive symptoms were measured for both PWRA and partners using the Center for Epidemiologic Studies Depression Scale (CES-D) (17). The CES-D is a widely used measure of depression specifically for community populations. Participants responded to each item in terms of the past week on a scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time). Four positive items were reverse coded and then summed with the remaining 16 items. Cronbach's alpha coefficients were calculated for both PWRA ( $\alpha = 0.89$ ) and spouses ( $\alpha = 0.87$ ). The CES-D demonstrates good internal consistency across diverse population subgroups and has good test-retest reliability (17–21).

## RESULTS

**Univariate analyses.** Distributional properties of study variables were assessed for departures from normality, and potential outliers were examined to determine the degree of influence exhibited. Initially, PWRA reported mean  $\pm$  SD scores for the RADAI and DASH as  $4.03 \pm 2.30$  and  $37.18 \pm 21.00$ , respectively (Table 1). At followup, mean  $\pm$  SD RADAI and DASH levels of PWRA had decreased significantly to  $3.62 \pm 2.17$  and  $35.63 \pm 20.95$ , respectively. Initially, the mean  $\pm$  SD CES-D scores for PWRA were  $13.78 \pm 9.83$ , while mean  $\pm$  SD CES-D scores for partners

were  $9.74 \pm 8.54$ . At followup, mean  $\pm$  SD CES-D scores for PWRA and their partners were  $11.69 \pm 9.04$  and  $8.46 \pm 8.03$ , respectively. Paired  $t$ -tests comparing initial and followup levels of study variables revealed higher initial levels of PWRA disease activity and depressive symptoms:  $t(130) = 2.07$ ,  $P < 0.05$  and  $t(129) = 2.78$ ,  $P < 0.05$ , respectively. Similarly, spouses evidenced higher initial levels of depressive symptoms than at followup:  $t(120) = 2.18$ ,  $P < 0.05$ . Initial and followup levels for PWRA DASH scores were not found to be significantly different:  $t(129) = 1.04$ ,  $P > 0.10$ . Paired  $t$ -tests also indicated that CES-D scores were significantly higher for PWRA when compared with their spouses both initially:  $t(131) = 4.03$ ,  $P < 0.001$ , and at followup:  $t(119) = 3.24$ ,  $P < 0.01$ . Finally, no sex differences were found in initial or followup levels on the CES-D ( $P > 0.10$ ).

**Bivariate analyses.** Not surprisingly, scores on initial measures for each of the study variables (Table 1) were highly and significantly positively correlated with scores on the same measures at followup ( $r = 0.78$ ,  $P < 0.01$  for DASH;  $r = 0.56$ ,  $P < 0.01$  for RADAI). As expected, outcome measures of disability and RADAI were also highly and significantly intercorrelated both initially ( $r = 0.67$ ,  $P < 0.01$ ) and at followup ( $r = 0.64$ ,  $P < 0.01$ ). In line with previous research (22), PWRA CES-D scores at time 1 were positively and significantly related to both initial ( $r = 0.42$ ,  $P < 0.01$ ) and followup ( $r = 0.28$ ,  $P < 0.01$ ) measures of disability and initial levels of RADAI ( $r = 0.46$ ,  $P < 0.01$ ). Finally, initial spouse CES-D scores were directly related to both PWRA outcome variables initially ( $r = 0.19$ ,  $P < 0.05$  for DASH;  $r = 0.18$ ,  $P < 0.05$  for RADAI) and at followup ( $r = 0.28$ ,  $P < 0.01$  for DASH;  $r = 0.26$ ,  $P < 0.01$  for RADAI), as well as PWRA CES-D scores at both time points ( $r = 0.23$ ,  $P < 0.01$  for initial;  $r = 0.31$ ,  $P < 0.01$  for followup).

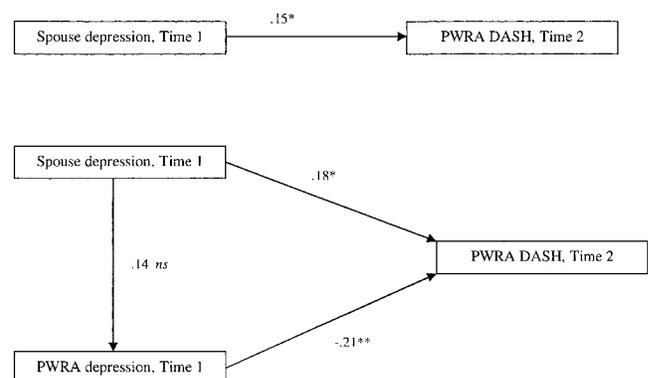
	PWRA DASH time 2			PWRA RADAI time 2		
	b	SE	$\beta$	b	SE	$\beta$
Step 1						
PWRA DASH time 1	0.74	0.07	0.75†			
PWRA RADAI time 1				0.62	0.08	0.65†
Sex‡	-7.15	2.99	-0.15§	-0.53	0.38	-0.11
PWRA CES-D time 1	-0.11	0.13	-0.05	-0.04	0.02	-0.18¶
R <sup>2</sup> Δ	0.64†			0.37†		
Step 2						
PWRA DASH time 1	0.72	0.07	0.73†			
PWRA RADAI time 1				0.60	0.08	0.64†
Sex‡	-6.58	2.93	-0.14§	-0.47	0.39	-0.10
PWRA CES-D time 1	-0.17	0.13	-0.08	-0.05	0.02	-0.21§
Spouse CES-D time 1	0.40	0.14	0.16§	0.05	0.02	0.18¶
R <sup>2</sup> Δ	0.02†			0.03†		

\* Age, years married, employment, disease duration, and education were included in all analyses, but the results are not presented (all  $P > 0.10$ ). DASH = Disabilities of the Arm, Shoulder, and Hand; RADAI = Rheumatoid Arthritis Disease Activity Index; PWRA = persons with rheumatoid arthritis; CES-D = Center for Epidemiologic Studies Depression Scale.  
†  $P < 0.001$ .  
‡ Female = 1, male = 2.  
§  $P < 0.01$ .  
¶  $P < 0.05$ .

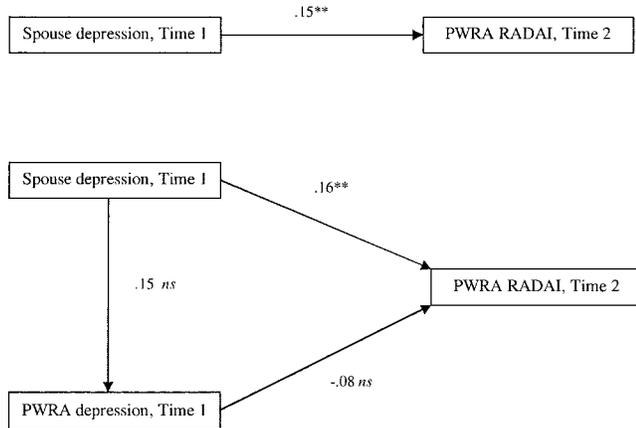
**Hierarchical multiple regression models.** *Spouse depression and DASH.* Hierarchical multiple regression analysis was conducted, predicting the physical function of the PWRA's upper extremities at followup from PWRA sex, and initial levels of partner depressive symptoms, PWRA depressive symptoms, PWRA physical functioning, age, years married, education, disease duration, and employment (Table 2). Together these predictors accounted for a significant portion of variance in followup levels of PWRA physical functioning:  $R^2 = 0.64$ ,  $F[7,121] = 30.19$ ,  $P < 0.001$ , with an adjusted  $R^2 = 0.62$ . The addition of initial levels of spouse depressive symptoms in the second step significantly increased the proportion of explained variance:  $R^2\Delta = 0.02$ ,  $P < 0.001$ . As predicted, above and beyond sex and initial levels of PWRA depressive symptoms and physical functioning, initial levels of spouse depressive symptoms made a unique and significant contribution to the prediction of the PWRA's physical functioning at followup:  $\beta = 0.16$ , 95% confidence interval (95% CI) 0.05–0.27,  $t(121) = 2.91$ ,  $P < 0.01$ . The interaction term “sexXspouse” depressive symptoms was added to the model. However, sex did not moderate the relationship between spouse depressive symptoms and PWRA disability ( $P > 0.10$ ). Followup mediational analyses (23), which examined the possibility that the path through which spouse depressive symptoms impacted PWRA disability and disease activity was via the changes in PWRA depressive symptoms, were nonsignificant (Figure 1).

*Spouse depression and RADAI.* Hierarchical multiple regression analysis was conducted predicting RA disease activity at followup from PWRA sex, and initial levels of PWRA disease activity, PWRA and partner depressive symptoms, age, years married, education, disease duration, and employment (Table 2). Together these predictors accounted for a significant portion of variance in followup levels of PWRA disease activity:  $R^2 = 0.37$ ,  $F[7,122] =$

10.06,  $P < 0.001$ , with an adjusted  $R^2 = 0.33$ . The addition of initial levels of spouse depressive symptoms in the second step significantly increased the proportion of explained variance:  $R^2\Delta = 0.03$ ,  $P < 0.001$ . Initial levels of spouse depressive symptoms made a unique and significant contribution to the prediction of the PWRA's disease activity at followup, controlling for sex and initial levels of PWRA depressive symptoms and disease activity:  $\beta = 0.18$ , 95% CI 0.04–0.33,  $t(122) = 2.39$ ,  $P < 0.05$ . The interaction term “sexXspouse” depressive symptoms was added to the model; however, sex did not moderate the relationship between spouse depressive symptoms and PWRA disease activity ( $P > 0.10$ ). As mentioned above, initial PWRA depressive symptoms were directly and positively related to both initial and followup measures of disease activity at the bivariate level. At the multivariate level, decreases in initial PWRA depressive symptoms



**Figure 1.** Mediation test of persons with rheumatoid arthritis (PWRA) depression on the relationship between spouse depression and PWRA disability using the Disabilities of the Arm, Shoulder, and Hand (DASH). \* =  $P < 0.05$ ; \*\* =  $P < 0.01$ ; ns = not significant.



**Figure 2.** Mediation test of persons with rheumatoid arthritis (PWRA) depression on the relationship between spouse depression and PWRA disease activity using the Rheumatoid Arthritis Disease Activity Index (RADAI). \*\* =  $P < 0.01$ ; ns = not significant.

were predictive of increases in followup levels of PWRA disease activity, holding sex, initial spouse depressive symptoms, initial PWRA disease activity, age, years married, employment, education, and disease duration constant:  $\beta = -0.21$ ,  $t(121) = -2.64$ ,  $P < 0.01$ . Multicollinearity between initial PWRA depressive symptoms and initial PWRA disease activity may account for the change observed in the direction of the beta from positive to negative for PWRA depressive symptoms when comparing the direction of the relationship found at the bivariate with the multivariate level. This may be a function of negative suppression since such suppression is more frequent under conditions of high correlation between predictors (24). Tzelgov and Henik note that high intercorrelations among predictors are not necessarily indicative of unstable regression coefficients (24). Given this, it would be premature to dismiss the surprising relationship we have found between PWRA depression and PWRA health outcomes out of hand, yet replication is called for prior to drawing the conclusion that the association is veridical.

Although PWRA depressive symptoms were included in the present models as a control variable only, it should be noted that Paulhus et al have argued for relying on the bivariate coefficient for interpretation in such situations (25). Finally, as with our findings reported above using DASH scores as indicators of PWRA disability, we conducted followup mediational analyses (23). We examined the possibility that the path through which spouse depressive symptoms impacted PWRA disability was via changes in PWRA depressive symptoms, and these mediational tests were again nonsignificant (Figure 2).

## DISCUSSION

The central findings from the current study suggest that spouse depressive symptoms play a key role in PWRA disease course, and importantly, that this effect holds even after controlling for PWRA depression, disability, disease activity, age, number of years married, education, disease duration, and employment. More specifically, higher lev-

els of spouse depression predicted worse disease course over a 1-year period for PWRA, as indicated by reports of higher subsequent PWRA disability and disease activity.

There is a large amount of literature indicating a role of social relationships in health (7–11), and in particular a key role for close relationships. However, the pathways through which close relationships exert their influence on health and well-being are unclear. Although a positive perception of the spouse is associated with health benefits (26), the possibility exists that these positive perceptions lie in the eye of the beholder, and have little to do with the spouse himself or herself. Because we obtained reports from both members of the couple, rather than relying solely on the RA patients' perceptions of their partners, our findings provide support for a role for the spouse, and not just perceptions of the spouse, specifically via spouse depressive symptoms, in disease outcomes.

There are 3 theoretical models that should be considered in interpreting the interrelationship in mood between members of a couple. First, drawing on a model of mood contagion (27), it is possible that spouses' depression could "infect" PWRA, increasing their own depressive symptoms and therefore impacting RA disease course. Second, depression in both partners may coexist due to assortative mating. Evidence suggests that depressed individuals may select a similarly depressed mate (28,29). Despite these possibilities, by controlling for initial levels of PWRA depression, and by ruling out PWRA depression as a potential mediator of the relationship between spouse depressive symptoms and PWRA outcomes, our findings suggest that spouse depression makes a unique and direct contribution to the prediction of PWRA disease course and disability that is not entirely through its effect on PWRA depression. Although our findings are consistent with these models in that spouse depressive symptoms and PWRA depressive symptoms were significantly associated both at the same point in time and across time, our findings suggest that the relationship of spouse depressive symptoms with PWRA health outcomes is not due solely to either assortative mating or mood contagion. Our results indicate that above and beyond the interrelationship of depressive symptoms between spouses, spouse depressive symptoms are playing a role in PWRA disease course.

A third, and perhaps most useful, model for understanding the association between spouse and PWRA mood is a care-giving model in which chronic disease impacts the well-being of both an ill person and his or her care-giving partner. Several studies have found that spouses caring for persons living with chronic pain have increased rates of depressive symptoms (9,30). For example, in an examination of the ways in which arthritis affects the spouse, verbal and nonverbal expressions of pain from women with osteoarthritis predicted poorer psychological well-being in their care-giving husbands (31). This large amount of literature on care giving for persons with chronic disease focuses on the impact of the disease on the caregiver. However, the question remains as to the path through which spouse-caregiver depressive symptoms might impact PWRA health outcomes.

Spousal provision of support may be one key path through which spouse depression impacts PWRA disease

course and disability. When spouses are depressed they may be less likely to provide satisfactory support to PWRA (32). Satisfaction with support from the spouse has been found to affect PWRA well-being by impacting the type of coping utilized by PWRA (33,34), with those PWRA reporting satisfaction with social support tending to put more effort into their coping (34) and to engage in coping that is more adaptive (33). In addition, Holtzman et al found that satisfaction with spouse support among PWRA enhanced the efficacy of coping in reducing RA pain (34). Further, Holtzman and DeLongis found that PWRA satisfaction with spouse support tended to disrupt the vicious cycle between pain and catastrophizing, which often plagues those with chronic pain (5,6). In a similar vein, spouse criticism may be a path through which spouse depression impacts PWRA disability and disease course. Coyne and Benazon have argued that depressed persons have a tendency to be critical and hostile toward their spouses (35). Manne and Zautra found PWRA with highly critical spouses were more likely to display maladaptive coping strategies and exhibit poorer psychological adjustment (33). These researchers did not examine the effect of spouse criticism on PWRA disease outcomes. However, taken together with other studies showing a link between PWRA coping and disease course (4,5,36), it seems reasonable to posit that a cascade of events may occur in which depressed spouses may criticize PWRA, who in turn then cope poorly with their pain and disability, which may result in a more negative disease course. Research that assesses this full set of factors in both members of the dyad is needed.

Generalizability of our findings is limited by the homogeneity of our sample, which consisted primarily of well-educated, married, heterosexual Canadian couples of European descent. In addition, our sample was composed disproportionately of couples in which the wife has RA, reflecting sex differences in the prevalence of RA in the general population. Given that RA disproportionately affects women, the role of patient and the role of wife tend to be confounded in couples research on RA (37). Sex differences exist in both stress processes (38,39) and depression (40). Further, women are more likely to serve in the caregiver role (41), and female caregivers tend to report more health problems (42) and greater distress (43) than do male caregivers. However, we found no sex differences in depression or in the effects of spousal depression on PWRA outcomes. It is possible that we simply did not have the power to detect sex differences in these processes, and future research with a larger sample, particularly with larger numbers of husbands with RA, may detect differences in these processes. Similarly, due to the homogeneity of our sample, we were unable to examine how cultural or other lifestyle factors might influence the processes we have described here. Yet, there is good reason to expect such factors make a difference in dyadic processes (44).

Although our findings suggest a key role for the spouse in PWRA disease course, whether these findings can be translated into effective clinical interventions has yet to be seen (45). Our findings do however highlight the importance of looking beyond the individual as the treatment unit, suggesting the utility of seeing the dyad as the treat-

ment unit instead. Martire et al suggest couple interventions could reduce stress and critical attitudes in spouses, therefore providing indirect benefits to their ill partners (46,47). Interventions that target only PWRA depression and strategies for coping with the disease may not be sufficient in the presence of a depressed spouse. Whether depressed spouses are unable or unwilling to provide much needed support to the PWRA, or whether their depressed mood affects PWRA outcomes in some other way, is yet to be determined. However, the mood and mental health of the marital partner or other key members of the family may be critically important to consider in developing more effective and evidence-based treatments.

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## AUTHOR CONTRIBUTIONS

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be submitted for publication. Dr. DeLongis had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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## REFERENCES

1. Schanberg LE, Gil KM, Anthony KK, Yow E, Rochon J. Pain, stiffness, and fatigue in juvenile polyarticular arthritis: contemporaneous stressful events and mood as predictors. *Arthritis Rheum* 2005;52:1196–204.
2. Fifield J, Tennen H, Reisine S, McQuillan J. Depression and the long-term risk of pain, fatigue, and disability in patients with rheumatoid arthritis. *Arthritis Rheum* 1998;41:1851–7.
3. Zautra AJ, Parrish BP, van Puymbroeck CM, Tennen H, Davis MC, Reich JW, et al. Depression history, stress, and pain in rheumatoid arthritis patients. *J Behav Med* 2007;30:187–97.
4. Newth S, DeLongis A. Individual differences, mood, and coping with chronic pain in rheumatoid arthritis: a daily process analysis. *Psychol Health* 2004;19:283–305.
5. Holtzman S, DeLongis A. One day at a time: the impact of daily spouse support on pain, negative affect and catastrophizing among individuals with rheumatoid arthritis. *Pain* 2007; 131:202–13.
6. Sullivan MJ, Thorn B, Haythornthwaite JA, Keefe F, Martin M, Bradley LA, et al. Theoretical perspectives on the relation between catastrophizing and pain. *Clin J Pain* 2001;17:52–64.
7. Keefe FJ, Porter L. Pain catastrophizing in the context of satisfaction with spousal responses: new perspectives and new opportunities [editorial]. *Pain* 2007;131:1–2.
8. Siegel MJ, Bradley EH, Gallo WT, Kasl SV. The effect of spousal mental and physical health on husbands' and wives' depressive symptoms, among older adults: longitudinal evidence from the health and retirement survey. *J Aging Health* 2004;16:398–425.
9. Schwartz L, Slater MA, Birchler GR, Atkinson JH. Depression in spouses of chronic pain patients: the role of patient pain and anger, and marital satisfaction. *Pain* 1991;44:61–7.
10. Ruiz JM, Matthews KA, Schulz R, Scheier MF. Does who you

- marry matter for your health? Influence of patients' and spouses' personality on their partners' psychological well-being following coronary artery bypass surgery. *J Pers Soc Psychol* 2006;91:255–67.
11. Sterba KR, DeVellis RF, Lewis MA, DeVellis BM, Jordan JM, Baucom DH. Effect of couple illness perception congruence on psychological adjustment in women with rheumatoid arthritis. *Psychol Health* 2008;27:221–9.
  12. Lehman AJ, Pratt D, DeLongis A, Collins J, Shojania K, Koehler B, et al. Do spouses know how much fatigue and pain their partners with rheumatoid arthritis experience? Implications for social support [abstract]. *Arthritis Rheum* 2006;54 Suppl:S303–4.
  13. Stucki G, Liang MH, Stucki S, Bruhlmann P, Michel BA. A self-administered Rheumatoid Arthritis Disease Activity Index (RADAI) for epidemiologic research: psychometric properties and correlation with parameters of disease activity. *Arthritis Rheum* 1995;38:795–8.
  14. Fransen J, Langenegger T, Michel BA, Stucki G. Feasibility and validity of the RADAI, a self-administered rheumatoid arthritis disease activity index. *Rheumatology (Oxford)* 2000;39:321–7.
  15. Hudak PL, Amadio PC, Bombardier C, Boland A, Fischer T, Flatow EL, et al. Development of an upper extremity outcome measure: the DASH (Disabilities of the Arm, Shoulder, and Hand). *Am J Ind Med* 1996;29:602–8.
  16. Beaton DE, Katz JN, Fossel AH, Wright JG, Tarasuk V, Bombardier C. Measuring the whole or the parts? Validity, reliability, and responsiveness of the disabilities of the arm, shoulder and hand outcome measure in different regions of the upper extremity. *J Hand Ther* 2001;14:128–46.
  17. Radloff LS. The CES-D scale: a self-reported depression scale for research in the general population. *Appl Psychol Meas* 1977;1:385–401.
  18. Aneshensel CS, Clark VA, Frerichs RR. Race, ethnicity, and depression: a confirmatory analysis. *J Pers Soc Psychol* 1983;44:385–98.
  19. Fava GA. Assessing depressive symptoms across cultures: Italian validation of the CES-D self rating scale. *J Clin Psychol* 1983;39:249–51.
  20. Roberts RE. Reliability of the CES-D scale in different ethnic contexts. *Psychiatry Res* 1980;2:125–34.
  21. Ross CE, Mirowsky J. Components of depressed mood in married men and women: the Center for Epidemiologic Studies Depression Scale. *Am J Epidemiol* 1984;119:997–1004.
  22. Dickens C, McGowan L, Clark-Carter D, Creed F. Depression in rheumatoid arthritis: a systematic review of the literature with meta-analysis. *Psychosom Med* 2002;64:52–60.
  23. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* 1986;51:1173–82.
  24. Tzelgov J, Henik A. Suppression situations in psychological research: definitions, implications, and applications. *Psychol Bull* 1991;109:524–36.
  25. Paulhus D, Robins RW, Trzesniewski KH, Tracy J. Two replicable suppressor situations in personality research. *Multivariate Behav Anal* 2004;39:303–28.
  26. Coyne JC, DeLongis A. Going beyond social support: the role of social relationships in adaptation. *J Consult Clin Psychol* 1986;54:454–60.
  27. Joiner TE, Katz J. Contagion of depressive symptoms and mood: meta-analytic review and explanations from cognitive, behavioral, and interpersonal viewpoints. *Clin Psychol Sci Pract* 1999;6:149–64.
  28. Mathews CA, Reus VI. Assortative mating in the affective disorders: a systematic review and meta-analysis. *Compr Psychiatry* 2001;42:257–62.
  29. Maes HH, Neale MC, Kendler KS, Hewitt JK, Silberg JL, Foley DL, et al. Assortative mating for major psychiatric diagnoses in two population-based samples. *Psychol Med* 1998;28:1389–401.
  30. Romano JM, Schmaling KB. Assessment of couples and families with chronic pain. In: Turk D, Melzack R, editors. *Handbook of pain assessment*. 2nd ed. New York: Guilford; 2001. p. 346–61.
  31. Stephens MA, Martire LM, Cremeans-Smith JK, Druley JA, Wojno WC. Older women with osteoarthritis and their caregiving husbands: effects of pain and pain expression on husbands' well-being and support. *Rehabil Psychol* 2006;51:3–12.
  32. Benazon NR, Coyne JC. Living with a depressed spouse. *J Fam Psychol* 2000;14:71–9.
  33. Manne SL, Zautra AJ. Spouse criticism and support: their association with coping and psychological adjustment among women with rheumatoid arthritis. *J Pers Soc Psychol* 1989;56:608–17.
  34. Holtzman S, Newth S, DeLongis A. The role of social support in coping with daily pain among patients with rheumatoid arthritis. *J Health Psychol* 2004;9:677–95.
  35. Coyne JC, Benazon NR. Not agent blue: effects of marital functioning on depression and implications for treatment. In: Beach SR, editor. *Marital and family processes in depression: a scientific foundation for clinical practice*. Washington (DC): American Psychological Association; 2001. p. 25–43.
  36. Keefe FJ, Abernethy AP, Campbell LC. Psychological approaches to understanding and treating disease-related pain. *Annu Rev Psychol* 2005;56:601–30.
  37. Revenson TA, Abraido-Lanza AF, Majerovitz SD, Jordan C. Couples coping with chronic illness: what's gender got to do with it? In: Revenson TA, Kayser K, Bodenmann G, editors. *Couples coping with stress: emerging perspectives on dyadic coping*. Washington (DC): American Psychological Association; 2005. p. 137–56.
  38. Zwicker A, DeLongis A. Men and women, husbands and wives: gender differences in stress and coping. In: Chrisler J, McCreary D, editors. *Handbook of gender research in psychology*. New York: Springer Publishing. In press.
  39. Jordan C, Revenson TA. Gender differences in coping with infertility: a meta-analysis. *J Behav Med* 1999;22:341–58.
  40. Hagedoorn M, Sanderman R, Bolks HN, Tuinstra J, Coyne JC. Distress in couples coping with cancer: a meta-analysis and critical review of role and gender effects. *Psychol Bull* 2008;134:1–30.
  41. DeLongis A, O'Brien TB. An interpersonal framework for stress and coping: an application to the families of Alzheimer's patients. In: Stephens MA, Crowther JH, Hobfoll SE, Tennenbaum DL, editors. *Stress and coping in later life families*. Washington (DC): Hemisphere; 1990. p. 221–9.
  42. Vitaliano PP, Zhang J, Scanlan JM. Is caregiving hazardous to one's physical health? A meta-analysis. *Psychol Bull* 2003;129:946–72.
  43. Lutzky SM, Knight BG. Explaining gender differences in caregiver distress: the roles of emotional attentiveness and coping styles. *Psychol Aging* 1994;9:513–9.
  44. McGoldrick M, Giordano J, Garcia-Preto N, editors. *Ethnicity & family therapy*. New York: Guilford; 2005.
  45. Coyne JC, Stefanek M, Palmer SC. Psychotherapy and survival in cancer: the conflict between hope and evidence. *Psychol Bull* 2007;133:367–94.
  46. Martire LM, Schultz R, Keefe FJ, Rudy TE, Starz TW. Couple-oriented education and support intervention: effects on individuals with osteoarthritis and their spouses. *Rehabil Psychol* 2007;52:121–32.
  47. Lanza AF, Revenson TA. Social support interventions for rheumatoid arthritis patients: the cart before the horse. *Health Educ Q* 1993;20:97–117.