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Perceived Spouse Responses to Pain: The Level of Agreement in Couple Dyads and the Role of Catastrophizing, Marital Satisfaction, and Depression

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Abstract

The primary objective of this study was to examine whether individuals with chronic pain ("participants") and their spouses agree on perceptions of solicitous, distracting, and punishing spouse responses to pain. The second aim was to examine the role of participant catastrophizing (a negative mental set about pain), participant and spouse marital satisfaction, and participant and spouse depression in participant perceptions of spouse responses, spouse perceptions of their responses, and agreement between participants and spouses. Individuals with chronic musculoskeletal pain and their spouses (*N*=108 couples) completed questionnaire packets. Examination of overall group averages (participants vs. spouses) indicated little or no differences between participant and spouse ratings. Examination of individual agreement in participant and spouse ratings indicated substantial *disagreement*. The proposed moderators predicted both participant and spouse perceptions and jointly made minor contributions to dyad agreement. Although neither participant nor spouse perceptions of spouse responses are necessarily a reflection of actual behavior, the lack of agreement in this study suggests it may not be valid to use only patient perceptions in research related to spouse responses.

Keywords

chronic pain; spouse responses; marital satisfaction; pain catastrophizing; depression

INTRODUCTION

Much of the research on the psychosocial aspects of chronic pain addresses only patient perceptions of key variables such as spouse responses to patient pain behavior. Researchers recognize the lack of significant other reports as a major weakness in studies (e.g., Kerns *et al*., 1990). In the current study, we were interested in the agreement between reports by individuals with chronic pain and their spouses regarding perceived responses to pain. Partner agreement (or lack of agreement) on key aspects of the pain experience could have important theoretical as well as clinical implications.

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Agreement on Spouse Responses to Pain

The limited past research on agreement or "congruence" between patient and spouse perceptions of spouse responses to pain is based only on tests of mean differences and has yielded inconsistent findings. Researchers have found that patients perceive fewer spouse solicitous responses or that there are no patient-spouse differences in perceptions of solicitousness (Cano *et al*., 2004b;Lousberg *et al*., 1992;Williamson *et al*., 1997). Further, the literature reports that patients perceive greater punishing respsonses than spouses perceive, or that there are no mean differences in perceptions of punishing responses (Cano *et al*., 2004b;Williamson *et al*., 1997). No differences between patient and spouse perceptions of distracting responses have been found (Williamson *et al*., 1997).

Neither patient-reported nor spouse-reported perceptions are necessarily a reflection of actual behavioral responses. However, if patients and spouses agree on their perceptions, this gives us some indication that these reports may be a more valid re-flection of behavior. In the current study, there was no gold-standard rating, rather we were interested in the overarching construct of "spouse responses," of which patient and spouse perceptions are components.

Pain Severity and Interference

Although the focus of the current study was on spouse responses to pain, we were also interested in comparing the level of agreement on perceptions of spouse responses to the level of agreement on perceptions of pain and pain interference. There is more research comparing patient and spouse perceptions of patient pain severity and interference in life activities due to pain (or a similar concept called pain related disability) than on patient and spouse perceptions of spouse responses to pain. The majority of past research reports that spouses typically overestimate patient pain (Cano *et al*., 2004b; Cremeans-Smith *et al*., 2003; Elliot *et al*., 1996; Miaskowski *et al*., 1997; Riemsma *et al*., 2000; Yeager *et al*., 1995), although a multilevel modeling study showed that there were no group differences between the individuals with pain and their spouses on perceptions pain severity (Cano *et al*., 2005). Moreover, spouses have been shown to overestimate disability associated with cancer pain (Elliot *et al*., 1996) and underestimate disability associated with musculoskele-tal pain (Cano *et al*., 2004b,2005).

Variables Associated with Perceptions and Agreement

Perceptions of spouse responses are subjective reports influenced by the way the respondent perceives and processes the information. Multiple factors including awareness of responses, emotions related to the responses, and motivation to respond likely affect perceptions of spouse responses, as well as agreement regarding the responses (Stone *et al*., 1999). However, the literature on perceptions of spouse responses has not thoroughly examined possible variables associated with perceptions and agreement. Research suggests that pain catastrophizing, marital satisfaction, and depression may be important factors affecting perceptions of spouse responses to pain. Pain catastrophizing, an exaggerated negative mental set related to actual or anticipated pain (Sullivan *et al*., 2001), has been shown to predict higher perceived punishing partner behaviors (Boothby *et al*., 2004), as well as increased patient perceptions of solicitous responses in patients with shorter pain durations (Cano, 2004).

Marital satisfaction may also influence perceptions of spouse responses to pain and agreement on these perceptions. Flor *et al*. (1987)found that spouse reported responses were positively correlated with patient marital satisfaction, but not related to spouse reported marital satisfaction. Marital satisfaction has also been found to moderate the relation between perceived significant other responses (particularly solicitousness) and pain severity; in fact, lower correlations between patient perceived significant other responses and pain severity were found when patients rated their marriage as less satisfactory (Flor *et al*., 1989;Kerns *et al*., 1990;Turk *et al*., 1992).

Depression has previously been related to spouse-patient agreement on pain related variables (Cano *et al*., 2004b; Cremeans-Smith *et al*., 2003). Cano *et al*. (2004)found greater differences between patient and spouse ratings of the patient's physical disability when the patient was depressed, compared to non-depressed patients. Cano *et al.* (2004b)also found that depression moderated congruence on spouse responses to pain such that, in couples in which the patient was not depressed, spouses reported more punishing responses than the patients perceived, whereas there were no differences in the mean ratings of punishing responses reported by depressed patients and their spouses.

Overall Differences and Congruence between Patients and Spouses

The research reviewed above examined 'congruence' between patient and spouse reports by comparing group averages. That is, congruence represents the bias (systematic over or underreporting) of patients relative to spouses in general, but does not refer to the correspondence that occurs in individual couples. Although examining group differences in ratings is important, the fact that the ratings of paired spouses and patients may be completely unrelated will not necessarily be reflected in the mean ratings from groups of patients and spouses. A test of mean differences, as well as a test of the extent two which the two raters covary is necessary (Snow *et al*., 2005). It is important to know which dyads are disagreeing, the direction of the disagreement within the couple, and the potential reason for the disagreement when it occurs. Overall group averages may obscure such associations (Cano *et al*., 2005). Moreover, the association (i.e., the correlation) between the two sets of ratings for individuals is relevant to scale validation. Although the scales used to measure spouse responses to patient pain have generally been found to have acceptable reliabilities, the validities of the scales have not received much attention.

The Present Study

The primary objective of the current study was to examine the agreement (defined by mean differences *and*the correlation between ratings) between individuals with chronic pain and their spouses on perceptions of spouse responses to the pain (i.e., solicitous, punishing, and distracting responses). To this purpose, we address both methodological and terminology issues. We hypothesized that there would be significant overall group differences on perceived spouse responses to patient pain. Second, we hypothesized that examination of the correlation between ratings would confirm that couples are not in agreement in their perceptions of spouse responses. We also explored whether individuals with chronic pain and their spouses showed agreement on ratings of pain severity and interference due to pain in order to make a comparison between agreement on spouse responses and agreement on pain severity and interference. If individuals with pain and their spouses are discordant on pain severity, interference due to pain, and each of the three types of spouse responses, this would indicate complete disagreement in couples. On the other hand, if there is disagreement in only one area (pain/pain interference vs. spouse responses), then it seems likely that the individuals with pain and their spouses are able to form similar perceptions on some level, but that there is something distinct about the areas in which they do not agree.

Another objective of the study was to examine the relations of catastrophizing, marital satisfaction, and depression with perceptions of pain-related variables. These characteristics, if related to perceptions of spouse behavior, may influence overall ratings given by the two groups. Of greater interest, however, was the degree to which agreement (correlation of scores) might be dependent upon catastrophizing, marital satisfaction, and depression. Earlier studies have not concurrently examined all of these variables, nor did they consider marital satisfaction and depression in both individuals with pain and spouses. We hypothesized that marital satisfaction, depression, and catastrophizing would be sig-nificantly related to ratings given

by individuals with pain and their spouses, and that agreement (as measured by the correlation) would be dependent on catastrophizing, marital satisfaction, and depression.

MATERIALS AND METHODS

Participants

Married individuals with chronic pain and their spouses (*N*= 108 couples) were recruited through newspaper advertisements in the Detroit, Michigan area. We will refer to the participant with pain as the "participant" and the participant that is the spouse as the "spouse," even though both people are legitimate participants in the study. "Participant" is meant to convey that our sample consisted of individuals with pain from the community (i.e., they are not necessarily seeking medical treatment for their pain). Subsets of this sample were previously reported in studies describing (1) the interactions of catastrophizing and pain participant perceptions of social support (Cano, 2004); (2) congruence between pain participant and spouse perceptions of participant pain and disability (Cano *et al*., 2005), and; (3) catastrophizing as it relates to depressive symptoms (Cano *et al*., 2005). None of the previous manuscripts reported the results of the current study which address (1) signifi-cant other reports of their responses to participant pain, as well as participant interference due to pain; (2) agreement between participant and spouse perceptions of spouse responses; or (3) potential moderating variables of agreement. Additionally, we utilized an analysis technique to answer our questions that has not been used previously.

Participants reported an average pain duration of 113.44 months (9.45 years, *SD*= 123.92 months) and an average pain severity of 3.77 out of 6 (*SD* = 1.07), which is considered moderate to severe. The most common self-reported pain conditions in the sample were osteoarthritis (*n*= 42, 44%), and spine problems such as scoliosis or degenerative disc disease (*n*= 31, 32%). Participants also reported pain due to other chronic muscle problems, post-surgical pain, and pain from fractures or bone spurs. While the most common sites for pain were low back (*n*= 41, 43%) and knee (*n*= 38, 40%), participants also reported pain in other areas such as the upper back and shoulders.

Fifty-eight participants (59.8%) were women. The mean age reported was 53.2 years (*SD*= 13.3) for participants and 53.5 years (*SD*= 13.5) for spouses. The participants and their spouses did not differ in age, $F(1,106) = 0.66$, $p = 0.80$, $\eta^2 = 0.00$, but the men in the sample, irrespective of being participants or spouses, were 1.8 years older, $F(1,106) = 9.45$, $p = 0.003$, $\eta^2 = 0.08$, than the women. Also, the duration of pain was significantly longer for the male participants, $F(1,106) = 4.10$, $p = 0.009$, $\eta^2 = 0.06$.

The entire sample (participants and spouses) consisted of 119 Caucasians (55.1%), 79 African-Americans (36.6%), 5 Hispanics (2.3%), 4 Asians (1.9%), 1 Native American (<1%) and 8 participants who reported other or multiple ethnicities (3.7%). Couples in the study have been married for an average of 20.31 years (*SD*= 16.44). Participants reported an average of 14.3 years of education (range = 9–21 years, *SD*= 2.65) and spouses reported an average of 14.4 years of education (range = 7–21 years, *SD*= 2.61). Forty participants with pain (37%) were employed full or part time, 26 (24.1%) were retired, 25 (23.1%) were unemployed, 11 (10.2%) were receiving disability or workman's compensation, and 3 (2.8%) responded "other."

Measures

West Haven-Yale Multidimensional Pain Inventory—The West Haven-Yale Multidimensional Pain Inventory—Section 2 (MPI, Kerns *et al*., 1985; MPI-Spouse Version, Kerns and Rosenberg, 1995) assesses participant and spouse perceptions of participant pain severity (3 items), interference from pain (9 items), and spouse responses to participant pain

(13 items). Participants rated pain severity and interference from pain using a 7-point Likert scale ranging from 0 (*Not at all severe or No change*)to 6 (*Extremely severe or Extreme Change*). Participants rated the frequency with which their significant others exhibited solicitous responses (6 items), punishing responses (4 items), and distracting responses (4 items) on a 7-point Likert scale ranging from 0 (*Never*)to 6 (*Very Often*). Significant others used the same scales to rate their perceptions of participant pain, interference due to pain, and the frequency with which they responded to participant pain with solicitous, punishing, and distracting responses. Consistent with Kerns *et al*. (1985), scores were calculated as an average of the item scores in each subscale. All subscales have demonstrated satisfactory internal consistency, test-retest reliability and discriminant validity in chronic pain patients, as well as convergent validity with other pain related measures (Kerns and Jacob, 1992;Kerns *et al*., 1985;Kerns and Rosenberg, 1995;Sharp and Nicholas, 2000).

Pain Catastrophizing Scale—The 13-item Pain Catastrophizing Scale (PCS; Sullivan *et al*., 1995) was used to assess various aspects of catastrophizing about pain. The PCS consists of one general factor and three correlated second-order factors: magnification, rumination, and helplessness (Sullivan *et al*., 1995;Van Damme *et al*., 2002). Participants are asked to rate how often they experience certain thoughts and feelings from each of the three domains when experiencing pain on a 5-point Likert scale ranging from 0 (*Not at all*)to 4 (*All the time*). Total scores are calculated as a sum of the item raw scores. The PCS has demonstrated high internal consistency (Cronbach's $\alpha = 0.91$) and high test-retest reliability over a 6 week period ($r = 0.78$) (Sullivan *et al*., 1995;Van Damme *et al*., 2002).

Dyadic Adjustment Scale—The 32-item Dyadic Adjustment Scale (DAS; Spanier, 1976) assesses relationship adjustment in married or cohabitating couples. Scores are calculated by summing the raw item scores, with higher scores indicating greater marital satisfaction and lower scores indicating greater marital discord. The DAS has demonstrated excellent inter-item reliability in clinic and community samples of married men and women (Cano and Vivian, 2003) and content and construct validity (Spanier, 1976).

Mood and Anxiety Symptom Questionnaire—The Mood and Anxiety Symptom Questionnaire (MASQ; Watson and Clark, 1991) contains 90 items which measure depressive and anxiety symptoms. Participants indicate how often they have experienced each symptom over the past week using a 5-point Likert scale ranging from 1 (*Not at all*)to 5 (*Extremely*). Scores are calculated by summing the item raw scores. The nonspecific depression subscale was used in the current study to assess depression. We did not use the anxiety subscale in the current study. The MASQ has demonstrated good convergent and discriminant validity, reliability, and a stable factor structure in student, community, and patient samples of adults (Watson *et al*., 1995a,b). The MASQ has also demonstrated a factor structure for chronic pain patients similar to that exhibited for other samples and has been shown to be useful for distinguishing depression in chronic pain populations (Geisser *et al*., 2006).

Demographics—Participants and spouses were asked to provide demographic information such as their age, gender, and type of pain experienced.

Procedure

Approval for this study was obtained by the Institutional Review Board at Wayne State University, where the data were gathered. Couples in which one person reports chronic pain were recruited through newspaper advertisements. Potential couples went through a telephone screening to determine that they met the following inclusion criteria: they were married or living together, both spouses were interested in participating, one partner reported chronic musculoskeletal pain, neither spouse was terminally ill, neither spouse was currently psychotic,

and both spouses had adequate cognitive functioning (i.e., 18 out of 20 points on verbal items from the Mini-Mental Status Examination (Folstein *et al*., 1975). Eligible couples came into the laboratory to sign informed consent forms, and complete questionnaires and interviews. Couples were paid $100 upon completion of the study.

Measurement and Statistical Procedures

Analyses of Agreement—For the purpose of examining agreement between participant and spouse ratings, the data were analyzed using two approaches: (1) Overall group differences between participant and spouse ratings were evaluated by applying a multivariate analysis of variance (MANOVA) to difference scores (participant rating minus spouse rating) for the following MPI scales: Pain Severity (SEV), Pain Interference (INT), Perceived Solicitousness (SOL), Perceived Punitiveness (PUN), and Perceived Distraction (DIS). MANOVA was used to provide a test of the multivariate null hypothesis that there would be no mean differences between participants and spouses on the five MPI subscales (i.e., mean differences are all 0). A multivariate test was used to control for the Type I error rate (Stevens, 1992). Subsequent univariate tests were conducted for the specific MPI subscales that were equivalent to paired difference *t*-tests. The differences between the average participant and spouse rating for a particular MPI scale were taken as the measure of agreement between the two groups of raters (participants and spouses). This analysis allowed us to determine the overall bias between the groups, i.e., systematic over- or underreporting of pain and spouse responses to pain by one group relative to the other. Positive differences indicated that the average participant rating was higher than the average spouse rating on a characteristic, and negative ratings meant that the average participant rating was lower than the average spouse rating; (2) The correlation was used as a measure of individual agreement in the participant and spouse ratings. While the test of mean differences are a function not only of the perceptions of the two groups, but also of group differences in central tendency and variability, the correlation coefficient provides an assessment of the linear association that is independent of group bias and differences in the means and variances of the scales used. The presence of a correlation between the two sets of scores (participants and spouses) implies there is individual agreement that is independent of randomness and the statistical properties of the scales. Higher correlations between the ratings indicate greater agreement between individual pairs of spouses and participants. Utilizing analyses at both the level of overall group averages and at the level of individual dyads allowed us to compare results between the two methods that have been used in other areas of research utilizing multiple raters and allow us to address methodological and terminology inconsistencies.

Multivariate Multiple Regression Model—We separately examined the relation between potential moderating variables and MPI ratings of participants and spouses to generate a better understanding of each groups' perceptions. We used a multivariate regression model to determine the predictive value of catastrophizing, marital satisfaction, and depression on participant MPI ratings and on spouse MPI ratings. Demographic variables were also explored as predictors of MPI ratings. LISREL 8.54 (Jöreskog and Sörbom, 1996a) was used to obtain maximum likelihood parameter estimates and fit statistics for the multivariate regression model. The goodness-of-fit statistic that is reported is a minimum fit function χ^2, and parameter modifications were evaluated with χ^2-difference tests.

We calculated partial correlations between the participant and spouse MPI subscale scores using the multivariate multiple regression model obtained from the LISREL. A comparison of the zero-order correlations to the partial correlations permitted an examination of the extent to which agreement was dependent on participant catastrophizing, participant and spouse marital satisfaction, and participant and spouse depression. The partial correlations represent the agreement between participant and spouse ratings when the combined effects of the 5 variables

are statistically controlled. A partial correlation that is significantly reduced in comparison to the zero-order correlation indicates that the relation represented in the zero-order correlation was due to, at least in part, the combined effects of the variables partialed out (participant catastrophizing, participant and spouse marital satisfaction, and participant and spouse depression).

Although several variables deviated significantly from normality, analyses in which these variables were transformed to achieve normality did not result in substantively different results. Consequently, analyses with the untransformed variables are reported. Most analyses were accomplished with version 13.0 of SPSS, and r, R^2, and partial $\eta^2$are reported as effect sizes.

RESULTS

Results of Descriptive Analyses

Table Ishows the mean scores for MPI, PCS, MASQ—Depression, and DAS scales for participants and spouses. Participant depression and catastrophizing (PCS) were also strongly related (r= 0.57, p< 0.001), and participant and spouse reports of their own level of depressive symptoms were inversely related to their own ratings of marital satisfaction (r= −0.35, p< 0.001 and r= −0.38, p< 0.001, respectively).

Results of Analyses of Mean Differences—These analyses allowed us to determine the overall bias between participants and spouses, i.e., systematic over- or under-reporting by participants, as a group, relative to spouses, as a group. The means and *SD*sof the difference between the average participant and spouse MPI ratings are shown on the right side of Table I. A multivariate analysis of variance (MANOVA) comparing the participant and spouse ratings for the five MPI subscales was significant, $F(5,103) = 4.52$, p= 0.001, η^2=0.18. As shown in Table I, subsequent univariate tests indicated that as a group, participants rated PUN and INT higher than spouses. However, the mean differences were small (less than half of a point) relative to the possible average score on each subscale (range 0 to 6) and the standard deviations were relatively large (range 1.22 to 1.92). The large standard deviations indicate that despite the small overall differences between participants and spouses as a group, rating discrepancies between individual pairs of participants and spouses are sometimes sizable.

In order to understand how many couples had lower and higher difference scores, we created histograms of the difference scores (participant score—spouse score) for each of the 5 MPI subscales. Using the Shapiro–Wilk normality test, the distributions of the difference scores for SOL, PUN, DIS, and INT did not differ significantly from normality (p< 0.05). The difference score for the majority of couples centered around 0, with fewer couples exhibiting more extreme differences in scores up to about positive or negative 5. Thus, most couples exhibited small or moderate differences in scores. The distribution of the difference scores for SEV differed significantly from normal (p< 0.05). The divergence from normality reflects a greater number of difference scores close to zero and a tendency for the spouse to report higher participant pain severity more frequently than participants.

Other univariate analyses conducted examined differences in participant and spouse reports of depression (MASQ- depression) and marital satisfaction (DAS) and these differences were minimal. Participants reported more depressive symptoms than spouses reported experiencing, $F(1,107) = 4.39$, p= 0.04, η^2= 0.04, but participant and spouse self-reports of depressive symptoms had a small correlation (r= 0.24, p= 0.012). Participant and spouse ratings of marital satisfaction were not signifi-cantly different from each other, $F(1,107) = 1.51$, p= 0.22, η^2= 0.01, and were well correlated (r= 0.56, p< 0.001).

Results of Correlation Analyses—These analyses allowed us to examine the individual agreement in participant and spouse ratings, independent of group bias. The first column of Table IIlists the relevant zero-order correlations between the MPI subscale scores. Correlations for SEV (r= 0.52, p< 0.001) and INT (r= 0.50, p<0.001indicate substantial agreement in terms of perceptions of pain severity and interference due to pain, but there was much less agreement as to the perceived spouse responses of PUN (r= 0.21, p= 0.03), SOL (r= 0.26, p= 0.006), and DIS (r= 0.18, p= 0.07).These correlations are considered relatively small (Cohen, 1988).

Results of Multivariate Multiple Regression Model: Contributions of Catastrophizing, Marital Satisfaction, and Depression to Patient and Spouse Perceptions of Spouse Responses We used LISREL to conduct a multivariate regression analysis to determine the predictive value of catastrophizing, marital satisfaction, and depression on participant MPI ratings and on spouse MPI ratings. Participant depression, participant marital satisfaction and participant catastrophizing were used to predict participant MPI ratings. Spouse depression, spouse marital satisfaction and participant catastrophizing were used to predict spouse MPI ratings. The multivariate regression model fit the data well; the covariance matrix predicted by the model did not differ significantly from the actual covariance matrix, $\chi^2(20, N= 108) = 14.80, p= 0.79$. Table IIIdisplays the standardized path coefficients for prediction of each dependent variable from the independent variables. Path coefficients are interpreted similarly to a regression coefficient. Path coefficients assess the degree of relationship between a predictor and a predicted variable after controlling statistically for the effects of other variables. Significance was determined for the unstandardized coefficients. Sex was not a significant predictor of any participant or spouse MPI ratings.

For participants, PCS scores were positively related to their SOL, SEV, and INT ratings. Participant marital satisfaction was a strong predictor of participant perceptions of spouse responses to their pain: participant marital satisfaction was inversely related to perceptions of punitive responses (PUN) and positively related to perceptions of solicitous responses (SOL) and distracting responses (DIS) (all $p$values < 0.001). Depression was positively related to PUN ratings for participants, and was also a positive predictor of self-ratings of pain severity (SEV) and pain interference (INT).

For spouses, participant PCS scores were positively related to spouse perceptions of DIS and SOL, but not to PUN. Participant PCS scores were also positively related to spouse perceptions of the participant's pain severity (SEV) and interference (INT). Spouse marital satisfaction showed a small inverse relation to their PUN ratings, and was also weakly inversely related to their perceptions of the amount of pain interference experienced by the participant. Spouse marital satisfaction was not related to SOL or DIS. Spouse depression was a strong positive predictor of PUN ratings.

These results suggest that catastrophizing, marital satisfaction, and depression share some similarities in their predictive value on MPI ratings of participants and spouses: participant PCS predicted both participant and spouse MPI ratings for SOL, SEV, and INT, and did not predict perception of punitive responses (PUN). However, both spouse and participant marital satisfaction, as well as spouse and participant depression, inversely predicts their own perception of punitive responding.

Results of Multivariate Multiple Regression Model: Contribution of Catastrophizing, Marital Satisfaction and Depression to Agreement We next calculated partial correlations between the MPI subscale scores using the multivariate multiple regression model obtained from the LISREL (reported in Table III). Partial correlations permitted an examination of the extent to which the small level of agreement that was present is dependent on participant catastrophizing, participant and spouse depression, and participant

and spouse marital satisfaction, which were shown in part 1 of the analyses to influence both participant and spouse ratings. The partial correlations, listed in the second column of Table II, were somewhat reduced in comparison to the zero-order correlations, $\chi^2(5, N = 108) = 11.59$, $p = 0.04$, suggesting that depression, marital satisfaction, and catastrophizing explain a small part of the agreement in ratings. However, the reduction in correlation (covariance explained) was significant only for PUN ($\chi^2(1, N = 108) = 5.64$, $p = 0.02$). None of the other four changes in participant-spouse correlations was significant. Because the portion of variance accounted for by the moderators was so small, we did not attempt to explore the unique contributions of each variable.

In summary, tests of mean differences indicated some group bias for PUN and INT, with participants perceiving greater punishing responses and pain interference than spouses. At the level of individual couples, participants and spouses did not agree substantially on any of the spouse responses to participant pain. Although the correlations for PUN and SOL were statistically significant, the correlations were small and reflect more disagreement than agreement between a particular patient and his or her specific spouse. On the other hand, couples reported considerable agreement on pain severity and interference, and it is clear from the partial correlations for SEV and INT that a substantial amount of participant-spouse concordance was *not*explained by catastrophizing, participant and spouse marital satisfaction, and participant and spouse depression.

DISCUSSION

Results indicate that the methodology used to determine “congruence” between participants and spouses has a sizeable influence over the conclusions drawn. When overall group differences are calculated, participants’ report of spouse responses are fairly consistent with spouse reports. However, the method of averaging all participant and all spouse ratings to compare groups can mask existing differences in individual pairs. Correlaitonal analyses revealed much less individual agreement on perceived spouse responses to pain behaviors (SOL, PUN, and DIS). It is equally important to note the substantial agreement between participants and spouses on ratings of participant pain severity and interference (SEV, INT) at the level of the dyad. The fact that couples can (and do) agree on certain pain-related variables argues that their disagreement on other variables is not just reflective of a general tendency to be dissimilar or to disagree.

The current study highlights methodoligical issues in the literature on spouse responses to pain. First, while the concordance on perceptions of pain severity and interference increase confidence in the standard method of assessing these variables, the lack of concordance on spouse responses to pain brings up questions about the traditional methods of assessing spouse responses. Researchers often imply that they are measuring actual spouse responses, when they are actually measuring *patient perceptions*of spouse responses. The low correlations between participant and spouse ratings suggest there is low construct validity for one or both of the versions of Section 2 of the MPI, which measures perceptions of spouse responses to pain. The low correlations also suggest that researchers utilizing only patient perception are probably *not*assessing “true” spouse responses or measuring spouse responses in such a way that patient and spouse would agree. Researchers need to emphasize whose perceptions they are using (pain participant only, spouse only, both pain participant and spouse) and how that might introduce measurement error or bias into their study. Researchers should consider the purpose of their findings when choosing a respondent. Perhaps pain sufferer and spouse reports are not simply more or less accurate, but are useful for different purposes. For example, when examining patient outcomes related to spouse responses, patient perception of spouse responses may be the appropriate measure. But, when testing interventions to modify spouse responses

or examining possible distortions in perceptions of spouse responses, it may make more sense to use spouse report or both patient and spouse report.

Second, a standard definition of "congruence" is needed. Some researchers delineated "congruent" and "non-congruent" couples by defining congruence on pain severity as choosing the same number on a Likert scale (Cremeans-Smith *et al.*, 2003; Riemsma *et al.*, 2000). Others defined congruence as the absence of significant differences between patient and spouse *group averages*on various pain related measures (i.e., Cano *et al.*, 2004b; Miaskowski *et al.*, 1997). The only other study to examine agreement at the level of individual dyads also referred to agreement assessed between paired partners as congruence (Cano *et al.*, 2005). The many uses of the word congruence may lead to confusion or inaccuracies in the literature. The more general literature on examining agreement between raters suggests that a test of mean differences as well as a test of the extent to which two ratings covary are necessary (Snow *et al.*, 2005). We concur that the determination of individual agreement in participant and spouse ratings of spouse responses to pain is meaningful.

We also focused on spousal agreement at the dyad level because of the related clinical and theoretical implications. It has been reported that participants from couples who agree on participant pain severity and interference report less fatigue and depression, and greater self-efficacy (Cremeans-Smith *et al.*, 2003; Miaskowski *et al.*, 1997). It is not known whether participant and spouse agreement regarding perceptions of spouse responses to pain would also be associated with meaningful patient outcomes. Moreover, research suggests that inclusion of the spouse in psychosocial treatments for chronic pain can lead to better outcomes relative to patient oriented therapies, although the results are mixed depending on the types of treatment used and the outcome variables examined (see Martie, 2005for a review). Our findings related to perceptions of spouse responses to patient pain and variables related to these perceptions can contribute to the development and improvement of treatments for chronic pain that incorporate spouses.

The Communal Coping Model of pain (CCM) asserts that individuals may cope with pain by attempting to get support from those around them, particularly, from significant others such as spouses (Sullivan *et al.*, 2001). Previous researchers have assessed patient perceptions of spouse responses to their pain to examine whether participants feel that their partner responds in a supportive manner, and results have been inconsistent (Boothby *et al.*, 2004;Cano, 2004;Giardino *et al.*, 2003). None of these studies assessed agreement between patient and spouse perceptions of these responses, and this may be a necessary next step in studies exploring the CCM using MPI ratings.

We also explored the predictive utility of certain participant and spouse variables on MPI ratings. Both participant and spouse depression predicted perceptions of punitive responding by the spouse (PUN). Additionally, both participant and spouse marital dissatisfaction predicted PUN. It seems that when participants or their spouses are depressed or dissatisfied with their marriage, they are aware of (or perceive) a punitive aspect of spouse behavior toward the participant. Since perceptions of punitive spouse responses have been associated with increased reports of patient pain severity, as well as physical and psychosocial impairment (Burns *et al.*, 1996;Schwartz *et al.*, 1996;Cano *et al.*, 2000, 2004a;Kerns *et al.*, 1990, 1991;Turk *et al.*, 1992), it appears that assessment of both participant and spouse depression and marital satisfaction may have clinical relevance.

Our results also extendCano's (2004)finding that catastrophizing was associated with patient perceptions of solicitous responses, in that the same relation was true in our sample for spouse perceptions. An unexpected finding was the lack of association between participant catastrophizing and perceptions of PUN responses for both participant and spouse. In a previous

study using musculoskele-tal chronic pain patients in outpatient treatment, Boothby *et al*.2004 found that patient catastrophizing predicted patient perceptions of punitive spouse responses to their pain. It was noted that patients who catastrophize may hold a general negative cognitive set, and may therefore be more likely to perceive their spouses behavior toward them as punitive. The present data argue against this interpretation and instead suggest that, at least in a community sample of individuals with chronic musculoskele-tal pain, participants who catastrophize actually perceive their spouses as *more*solicitous, and spouses see themselves as more solicitous and distracting. It is important to note that marital satisfaction, depression, and catastrophizing may influence perceptions of spouse responses, or perceptions of spouse responses may affect marital satisfaction, depression, and catastrophizing. Although the current research does not speak to the direction of these relations, the presence of associations between these variables and perceptions of spouse responses are clinically important.

Despite the association of catastrophizing, marital satisfaction, and depression with participant and spouse MPI responses, correlational analyses at the level of the dyad indicated that as a collection of variables, participant catastrophizing, participant and spouse marital satisfaction, and participant and spouse depression made very little difference in the level of agreement between participant and spouse. This study could be strengthened by including qualitative data regarding factors contributing to perceptions of spouse responses to pain such as emotions related to the responses, social influences, and motivation to respond.

This study focused on patients with muscu-loskeletal pain recruited from the community. It is possible that the present participant sample was different in nature from the clinical samples reported in other cited studies (i.e., Cano *et al*., 2004b). These participants may be different in the way they think about and deal with their pain. Participant-spouse agreement on pain-related variables might also depend upon the type of pain condition. Some pain conditions, such as chronic daily headache, cancer pain, or pain due to amputation or spinal cord injury, may be more “visible,” or perhaps more “justified” to the spouse.

There is value in studying agreement between raters, but there are limitations associated with studying agreement as a proxy for “reality.” A better way to assess the accuracy of our measures and agreement between participant and spouse may be through direct observation. However, using direct observation can be time consuming, and lead to dif-ficulties in creating scenarios to elicit natural participant pain behaviors and spouse responses. Further, actual behavior may not be as meaningful as perceptions of the behavior. In the absence of direct observation, examining agreement is one *indirect way*of assessing how well our common methods of measuring spouse responses reflect “true” behavior.

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Table I

Patient-spouse differences on questionnaire variables

Scales	Patients (*N*=108)			Spouses (*N*=108)			Patient-Spouse differences		
	M	SD	α	M	SD	α	M	SD	η^2
Predictors									
PCS	19.5	12.7	0.95						
MASQ- Depression	22.3	8.8	0.91	20.2	7.9	0.90			
MAT	111.1	20.1	0.92	112.4	17.3	0.93			
MPI Ratings									
Punishing responses	1.8	1.6	0.81	1.4	1.2	0.73	0.42*	1.75	0.06
Solicitous responses	3.8	1.5	0.84	4.0	1.3	0.82	−0.19	1.74	0.01
Distracting responses	2.7	1.6	0.76	2.8	1.4	0.77	−0.08	1.92	0.00
Pain severity	3.6	1.2	0.77	3.8	1.3	0.82	−0.14	1.22	0.01
Interference	3.5	1.5	0.93	3.1	1.4	0.92	0.43*	1.46	0.08

Note. PCS: Pain Catastrophizing Scale. MASQ: Mood and Anxiety Symptom Questionnaire. DAS: Dyadic Adjustment Scale. MPI: West Haven-Yale Multidimensional Pain Inventory.

* p=0.01.

Table II

Correlations and Partial Correlations of WHYMPI Ratings for Participants and Spouses

WHYMPI Scale	Correlations	Partial correlations
Punishing responses	0.21*	0.05†
Solicitous responses	0.26*	0.24
Distracting responses	0.18	0.15
Pain severity	0.52*	0.43
Interference	0.50*	0.41

*Note.*Partial correlations were obtained from multivariate regression analysis with depression, marital satisfaction, and pain catastrophizing as predictors. WHYMPI: West Haven Yale Multidimensional Pain Inventory.

* $p<0.05$ (significant correlation).

† $p<0.05$ (partial correlation is significantly different from correlation).

Table III

Standardized Path Coefficients for Multivariate Multiple Regression Prediction of Participant and Spouse WHYMPI Ratings from Depression, Marital Satisfaction, and Pain Catastrophizing

	Solicitous responses	Punishing responses	Distracting responses	Pain severity	Pain interference
Patient MPI Ratings					
Participant depression	0.04	0.20**	0.10	0.24*	0.36**
Participant marital satisfaction	0.39***	−0.55***	0.40***	0.02	−0.01
Participant pain catastrophizing	0.27*	−0.03	0.18	0.30**	0.27**
R^2	0.21	0.41	0.18	0.23	0.32
Spouse MPI Ratings					
Spouse depression	0.21	0.33***	0.01	0.14	−0.03
Spouse marital satisfaction	0.05	−0.27**	0.05	−0.01	−0.30**
Participant pain catastrophizing	0.23*	−0.03	0.31**	0.31**	0.28**
R^2	0.11	0.25	0.10	0.13	0.15

Note. Participant and Spouse scores for depression and marital satisfaction were obtained from the Mood and Anxiety Symptom Questionnaire and the Dyadic Adjustment Scale, respectively. Pain catastrophizing was assessed by the Pain Catastrophizing Scale. MPI: West Haven-Yale Multidimensional Pain Inventory.

* $p<0.05$.

** $p<0.01$.

*** $p<0.001$.