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**A STEPPED APPROACH TO EXAMINE THE DYADIC INFLUENCE OF PAIN  
COMMUNICATION ON THE PSYCHOSOCIAL ADJUSTMENT OF KNEE  
OSTEOARTHRITIS PATIENTS AND THEIR SPOUSES**

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## ABSTRACT

Spouses of chronic pain patients are seldom accurate regarding patients' level of pain and functional limitations. Spouse accuracy regarding the pain experience of older patients has been shown to be psychologically and relationally beneficial for both members of the dyad. However, lessor known are the factors that may lend spouses to understand chronic pain patients' pain or the potential psychosocial benefits of spouses' understanding for both dyad members. The primary aim of this project was to fill these gaps using a sample of 152 couples ( $N = 304$ ) managing one dyad member's knee osteoarthritis (OA).

Reis and Shaver's interpersonal process model of intimacy (1988) and Bandura's self-efficacy theory (1977) guided the stepped approach used to study pain communication (i.e., patient self-efficacy for pain communication, patient disclosure about pain, and patient and spouse perception of spouse understanding of patient pain) and psychosocial adjustment (i.e., marital satisfaction and depressive symptomatology) in a sample of OA patients and their spouses. Patients with a higher level of self-efficacy for communicating pain were expected to be more likely to disclose their pain-related experiences to their spouse (H1). Higher pain disclosure was expected to be associated with increased marital satisfaction for only those patients who feel understood in their pain (H2). Lastly, using dyadic modeling, it was anticipated that patients and spouses who reported increased levels of spouse understanding patient pain would report, and have a partner who reports, greater marital satisfaction (H3a) and lesser depressive symptoms (H3b).

Results partially confirmed hypotheses. Patients with a higher efficacy for communicating their pain to their spouse tended to disclose more of their pain to the spouse. Contrary to hypothesis, patients who felt more understood in their pain and disclosed more were not more satisfied in their marriages. Additionally, results suggested that patients who feel more

understood by their spouse report, and have spouses who report, higher levels of marital satisfaction. Neither patient nor spouse perceptions of spouse understanding had an influence on depressive symptomatology for patients or spouses. In sum, results suggest the complexity of patient pain disclosure and highlight the importance of patient perceptions of spouse understanding for both dyad members' relational well-being. Theoretical implications and avenues for future research are discussed.

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## Chapter 1

### Literature Review

Osteoarthritis (OA), not only a highly debilitating chronic condition, is the most prevalent joint disease in the United States (Zhang & Jordan, 2010). Characterized by joint pain, stiffness, and swelling (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2016), OA is often associated with increased functional limitations (Ling et al., 2003). Hip and knee OA are among the most deleterious types of arthritis as they are jointly ranked as the 11<sup>th</sup> highest cause of disability across North America, Latin America, Asia, Europe, and Africa (Cross et al., 2014). The prevalence of OA is expected to steadily increase as a result of the growth in number of older adults (Zhang & Jordan, 2010). A recent systematic review concluded that the annual direct (e.g., hospitalization), indirect (e.g., absenteeism), and medication costs per patient with OA peaked at \$21,335, \$29,935, and \$1,100 respectively (Xie et al., 2016). The same review found that patients' health-rated quality of life was consistently low across all studies (Xie et al., 2016).

Fortunately, healthy behavior changes can improve function, pain, and mobility among knee OA patients (Messier et al., 2004) and can be influenced by married partners (Martire et al., 2013; Jackson, Steptoe, & Wardle, 2015). Specifically, Martire and colleagues (2013) found that spouses' daily activity level and provision of autonomy support (as opposed to pressure) predict knee OA patients' greater physical activity. Additionally, increased support provision to a spouse with arthritis is cross-sectionally and longitudinally related to patients' lower psychological distress (Sherman et al., 2006; Benka et al., 2012) and greater functional ability (Benka et al., 2012).

Unfortunately, patients have reported that their marital relationship has been negatively impacted by their chronic pain (Flor, Kerns, & Turk 1987; Maruta, Osborne, Swanson, & Halling,

1981). Additionally, spouses of pain patients have been found to report low rates of marital satisfaction and high levels of depressive symptomatology (Flor et al., 1987). On a more positive note, spouse accuracy regarding patient pain has been shown to be associated with greater well-being for the patient (Cremeans-Smith et al., 2003) and better spouse support (Martire et al., 2006). Taken together, these results suggest that the poor relational and emotional correlates for couples managing one dyad member's chronic pain may be a result of communication barriers related to patient pain.

Although married arthritis patients are more likely to turn to their spouse, as opposed to other network members, for condition-related support (Strough, McFall, & Schuller, 2010; Figueiredo, Fries, & Ingram, 2004), spouses tend to overestimate arthritis patients' pain (Martire et al., 2006; Lehman et al., 2011; Riemsma, Taal, & Rasker, 2000; Cremeans-Smith et al., 2003) and functional disability (Riemsma et al., 2000). This lack of understanding is problematic because spouses' greater accuracy regarding patients' levels of pain is associated with better well-being for women managing OA (Cremeans-Smith et al., 2003) and less stress from providing help for spouses of arthritis patients (Martire et al., 2006). One potential explanation for these findings is that spouses who have an accurate understanding of a patient's condition may feel more equipped to provide necessary support. The primary purpose of the current study was to assess the associations between aspects of pain-related communication and psychosocial adjustment among OA patients and spouses.

### **The Interpersonal Process Model of Intimacy**

A recognized yet relatively understudied model in research on chronic pain in couples (Cano & Williams, 2010), the interpersonal process model of intimacy, proposes intimacy as an outcome of ongoing self-disclosure and partner understanding (Reis & Shaver, 1988). Reis and

Shaver describe intimacy as a dynamic process that occurs between partners who have influence over each other's emotions and actions. Of critical importance to this model is for the disclosure to be of personally relevant information (Reis & Shaver, 1988). This component was emphasized in later work suggesting that emotional self-disclosure is a stronger predictor of intimacy than self-disclosure of facts or other information (Laurenceau, Barrett, & Pietromonaco, 1998). Chronic pain patients tend to report their pain as a stressful experience that is a personal and central component of their lives (Perri & Keefe, 2008). Therefore, OA-related disclosure can be conceptualized as personally relevant and examined using the intimacy model.

Disclosure alone, however, may not be a sufficient predictor of intimacy or related outcomes. For example, individuals may share self-revealing information with their spouse and in turn receive criticism, hostility, or blame. Spouses also may be uncomfortable with hearing about OA patients' pain. Therefore, it is proposed in the intimacy model that those who disclose must feel understood, validated, and cared for by the listener for intimacy to occur (Reis & Shaver, 1988; Reis & Patrick, 1996). Reis and colleagues (2004) termed these reactions from the listener as perceived partner responsiveness (PPR) and considered them critical for the development and maintenance of intimate relationships. Cutrona and colleagues (2007) have supported this notion through their work addressing spousal responses to emotional, non-health related disclosures. Specifically, they found that spouses' responses that did not meet the support expectations of the discloser were associated with lower marital satisfaction due in part to the disclosers' perception of less sensitivity from their spouse (Cutrona et al., 2007).

### **Self-efficacy and Disclosure**

Before intimacy can occur, the discloser may need to feel confidence, or efficacy, in disclosing self-revealing information. Self-efficacy, as originally introduced by Bandura (1977) is

a domain-specific construct that is associated with both behavioral and psychological outcomes. Bandura's theory suggests that maintaining higher efficacy within a specific domain can determine if, how much, and how often behaviors in that domain will be enacted (1977).

### ***Self-efficacy for Pain Communication***

An extension of Bandura's self-efficacy theory, specific to patients experiencing pain, is self-efficacy for pain communication (Porter, Keefe, Wellington, & de Williams, 2008). Enhanced self-efficacy in a particular domain is associated with better health in areas influenced by behaviors in that domain (Bandura, 1977). Therefore, increased self-efficacy for communicating pain may have mental and emotional health benefits for OA patients and their spouses. The budding literature in this field has found that OA patients' higher self-efficacy for pain communication is associated with better physical symptoms and psychological adjustment to the condition (Porter et al., 2008). Further, in a study of breast cancer patients, greater self-efficacy for communicating pain to the husband was associated with higher quality-of-life and lower pain interference (Edmond et al., 2013). Additionally, OA patients' self-efficacy for pain communication has been shown to be associated with lower negative affect for spouses (Porter et al., 2008).

### ***Pain Related Disclosure***

OA patients who tend to hold back disclosing pain or other arthritis-related concerns to their spouse also report increased depression, anxiety, and pain catastrophizing (Porter et al., 2008) as well as decreased marital satisfaction (Zhaoyang, Martire, & Stanford, in press). Additionally, greater self-efficacy for communicating breast cancer symptoms has been found to

be inversely related to holding back symptoms from a spouse or partner (Edmond et al., 2013). Disclosure and holding back have been noted as unique forms of communication (e.g., Manne, Badr, Zaider, Nelson, & Kissane, 2010; Porter, Keefe, Hurwitz, & Faber, 2005; Porter et al., 2009); however, these findings suggest that patients' self-efficacy to communicate pain may be associated with their own rates of disclosure. Referring to Bandura's original work, it is clear that perceptions of self-efficacy can directly influence behaviors (1977). Therefore, as patients believe that they can effectively communicate the pain they are experiencing it is likely that they will disclose their pain more often. This is important to address in couples, as previous work has shown a positive association between pain disclosure and marital satisfaction in chronic pain patients (Newton-John & de Williams, 2006). However, this study only addressed the frequency of communication and not spouses' actual understanding of patients' pain. The positive influences of self-efficacy for pain communication on patients' mental and physical well-being as well as holding back symptoms from a spouse have been demonstrated; however, the association with reports of disclosure has not yet been examined.

### **The Role of Spouse Understanding in the Intimacy Process**

Previous work has found that spouses correctly understand chronic pain patients' thoughts and feelings a mere 10% and 12% of the time, respectively (Leonard, Issner, Cano, & Williams, 2013). Patients also tend to report that their pain is not well understood by their spouses (Herbette & Rimé, 2004). Unsurprisingly, spouses have been observed to be more inaccurate regarding patients' levels of pain interference or physical function if either dyad member reports a high level of difficulty with illness-related communication (Lyons, Jones, Bennett, Hiatt, & Sayer, 2013). Although spouses' inaccuracy regarding patients' pain is commonly observed, the

relational implications of spouses' understanding of the patients' pain experience have received less empirical attention.

Patients of spouses who overestimate their pain tend to perceive receiving more problematic, as opposed to helpful, support from their spouse (Lehman et al., 2011). Such support is likely to be best given or received in the context of a relationship that embodies patient disclosure that is reciprocated with understanding, care, and validation (e.g., Reis & Shaver, 1988). Therefore, as the interpersonal process model of intimacy suggests, higher levels of patient pain disclosure may be associated with greater intimacy for patients who report high levels of spouse understanding. Previous studies support this and have found that higher reported PPR (i.e., feeling understood, validated, and cared for) was a strong indicator of greater intimacy for both patients and spouses and was an observed mediator of self-disclosure and perceived intimacy among breast cancer patients and their husbands (Manne et al., 2004). The role of spouse understanding as a moderator of the relationship between pain-related disclosure and marital satisfaction, however, has not yet been examined among knee OA couples.

### **Relational and Emotional Well-being Implications of Spouse Understanding for both Partners**

Undoubtedly, chronic conditions require an adjustment that may be difficult for couples to manage. Greater invalidation of patients' pain (e.g., responding with contempt) has been associated with lower marital satisfaction for both patients and spouses (Leong, Cano, & Johansen, 2011). One study found that patient and spouse reports of spouses' punishing responses (e.g., responding with anger or frustration) to patients' pain were associated with lower marital satisfaction and higher levels of depressive symptomatology for both partners (Pence, Cano, Thorn, & Ward, 2006). Conversely, previous research has linked felt support to increased marital

satisfaction for lupus patients as well as their caregiving spouses (Fekete, Stephens, Mickelson, & Druley, 2007). Taken together, these findings suggest that spouses' understanding of patient pain may enhance the marital satisfaction of both partners.

Patient and spouse psychological well-being may also be influenced by spouse understanding of patient pain. Among couples managing one dyad member's lupus, feeling emotionally supported was associated with fewer depressive symptoms for both dyad members (Fekete et al., 2007). In relation to spouse understanding of pain, Cremeans-Smith and colleagues (2003) found that greater spouse accuracy regarding the patient's pain level was associated with better well-being for the patient. Furthermore, patient mental health is better when spouse perceptions of functional disability match patient reports (Riemsma et al., 2000). Similarly, overestimating spouses have poorer mental health (Riemsma et al., 2000) and report increased burden from providing help (Martire et al., 2006). These findings suggest that the costs of a chronic condition to patient and spouse psychological well-being may be substantially lessened if spouses have a greater understanding of patients' pain.

### **Interdependence**

Exposure to a spouse's suffering is associated with increased physiological (Monin et al., 2010), psychological (Monin & Schulz, 2009), and relational (Monin & Schulz, 2009) distress. However, a substantial amount of research on couples overlooks the interdependence of the patient's pain experience through either failing to measure, or analyze, both patients and spouses. Duncan and colleagues labeled the practice of focusing on one dyad member *pseudo-unilaterality* (1984) and its limitations have been noted by experts in the field of dyadic analyses (Kenny, Kashy, & Cook, 2006). In the current study, the dyad was treated as the unit of analysis through use of the Actor Partner Interdependence Model (APIM; Kenny et al., 2006). This statistical

method of analysis accounts for the interdependence between patients' and spouses' scores by simultaneously estimating the association between one's own predictor and one's own outcome (i.e., an actor effect) and the association of one's own predictor and the other dyad member's outcome (i.e., a partner effect). This test was accomplished in this study by asking patients and spouses parallel questions addressing how well they understand (spouse) or feel understood by the spouse (patient) regarding the pain experience of the patient.

### **The Current Study**

The current project aimed to understand the precursors and dyadic influences of pain communication on psychosocial adjustment (i.e., marital satisfaction and depressive symptomatology) for married couples. This aim was accomplished through application of Bandura's theory of self-efficacy (1977) as well as Reis and Shaver's interpersonal process model of intimacy (1988) as a guide to understand the influences of patient self-efficacy for pain communication, patient pain disclosure, and patient and spouse perceptions of spouses' understanding of patient pain on couples' psychosocial adjustment. Three questions were asked to address this aim.

$RQ_1 =$  Does patients' self-efficacy for communicating OA pain to their spouse predict their level of disclosing pain-related experiences to their spouse?

$RQ_2 =$  Do patient perceptions that spouses understand their OA pain moderate the relationship between patient pain disclosure and their own marital satisfaction?

$RQ_3 =$  Do patient and spouse reports of spouse understanding of patient pain influence their own, and their partners', psychosocial adjustment?



## Hypotheses

The corresponding hypotheses were as follows.

$H_1 =$  Patients' greater self-efficacy for communicating their pain experience to their spouse will be associated with more pain disclosure to the spouse.

$H_2 =$  Greater pain disclosure will be associated with higher marital satisfaction for only those patients who report a high level of feeling understood by their spouse.

$H_3 =$  Greater ratings of spouse understanding (as reported by both the patient and the spouse) will be associated with one's own (actor effect) as well as one's partner's (partner effect) greater marital satisfaction (H3a) and lesser depressive symptoms (H3b).

## **Chapter 2**

### **Method**

#### **Study Design**

Presented data are from a larger observational project that included in-person interviews, physical performance tests, self-administered packets, daily diary assessments, and accelerometry. The interviews, packet completion, and diary assessments were conducted at three time points over an 18-month period (i.e., T1: baseline, T2: 6-months post-baseline, T3: 18-months post-baseline). The daily diary assessments were collected at three time points (i.e., morning, afternoon, and evening) for the first 22 days immediately following the T1 interview. The accelerometry data were also collected during those 22 days. Further details regarding the study's methods can be found elsewhere (Martire et al., 2013). The current analyses focused solely on the data collected from the in-person interview and packet at T1.

#### **Data Collection Procedure**

Participants were recruited from research registries for rheumatology clinics through flyers distributed by the University of Pittsburgh staff and faculty, and by word of mouth. Of the initial 606 couples screened for eligibility, 221 couples declined participation. The most frequent reasons for refusing to participate were lack of interest ( $N = 87$  couples) and a family member's illness ( $N = 55$  couples). A total of 223 couples were not eligible to participate and the most common reasons were lack of OA in the knee ( $N = 55$  couples) or having knee OA pain that was mild ( $N = 47$  couples). The total sample at T1 was 152 couples (i.e., 304 participants).

Trained research staff interviewed patients and spouses in participants' homes. Of the initial 152 enrolled couples, approximately 94% ( $N = 143$ ) and 89.5% ( $N = 136$ ) of couples participated in the T2 and T3 follow-up interviews. The most common reasons for not completing the follow-up interviews were participants' health issues, lack of time, or inability to be contacted. For participation in this study, each participant was compensated up to \$225 (\$25 for each completed interview and up to \$150 for the daily diary assessments).

## **Participants**

The eligibility criteria for the study included: patients having a diagnosis of knee OA by a physician, experiencing knee pain of moderate or greater intensity, being at least 50 years of age, and being married or in a long-term relationship (self-defined) wherein they shared a residence with their partner. The exclusion criteria included patients having a comorbid diagnosis of fibromyalgia or rheumatoid arthritis (RA), patients having a plan to undergo hip or knee surgery within the following 6 months, and patients or spouses requiring the use of a wheelchair to get around. Couples were also excluded if the spouse reported the need for assistance with personal care activities, or at least moderate arthritis pain. Both partners were also required to be free of any impairment that would hinder their ability to understand questions and provide responses in English. Participants' cognitive functioning was assessed through their accuracy in answering questions about the current date, day of the week, their age, and their date of birth. Of the 152 couples enrolled, 3 were same-sex couples. Additional demographic information for the sample at T1 is provided in Table 2-1.

Table 2-1. Demographic Characteristics at T1.

Variable	Patients <i>M</i> (SD) or %	Spouses <i>M</i> (SD) or %
Age	65.4 (9.8)	65.1 (11.5)
Caucasian Race	87%	86%
Male sex	43%	58%
Years of education	16 (2.0)	15.84 (2.1)
Years of knee OA	12.9 (11.2)	
Annual income	\$40,000-59,000	
Years married/ in a marriage-like relationship (self-defined)	34.0 (16.7)	

*Note.* *N* = 152 couples. *M* = Mean. SD = Standard Deviation.

## Measures

Marital satisfaction was the only measure that was administered through an in-person packet which participants completed independently at T1. All other measures were collected during the T1 in-person interview. Descriptive information and reliability statistics for all measures are provided in Table 2-2.

Table 2-2. Descriptive Statistics for Key Variables and Sociodemographic Characteristics at T1.

	Variable	<i>M</i>	SD	Range	$\alpha$
Patient	1. Self-efficacy for Pain Communication	81.12	25.21	10-100	.96
	2. Pain Disclosure	11.28	4.33	5-20	.89
	3. OA Severity	35.08	14.80	3-82	.94
	4. Marital Satisfaction	39.64	6.22	0-50	.88
	5. Spouse Understanding Patient Pain	71.97	24.38	10-100	.90
	6. Depressive Symptomatology	6.57	5.22	0-30	.82
	7. Age	65.4	9.8	50-95	—
	8. Income	\$49,000-50,000		\$10,000-\$80,000+	—
Spouse	9. Spouse Understanding Patient Pain	59.48	21.65	15-100	.76
	10. Marital Satisfaction	39.06	6.42	0-50	.87
	11. Depressive Symptomatology	5.97	4.57	0-30	.77

*Note.* *N* = 152 couples. *M* = Mean. SD = Standard Deviation.

The items used to capture self-efficacy for pain communication and perceptions of spouse understanding were administered together as part of one scale created by Porter and colleagues that was labeled self-efficacy for pain communication (2008). The items were measured on a scale from 10 (very uncertain) to 100 (very certain). Upon close examination of the 7 items in this original scale, it appeared that the scale was measuring two distinct constructs. Specifically, the last four items of the patient measure complement the four items in the spouse measure and pertain to the patients' perceptions of spouses' *understanding* of the patients' pain, rather than self-efficacy. Therefore, the 7 items were factor analyzed using principle component analysis with Direct Oblimin (Oblique) rotation. Analyses were conducted using SPSS version 23.0 (IBM Corp., Armonk, NY) and results are presented in Table 2-3 along with the wording of each item.

As shown in Table 2-3, the results of the exploratory factor analysis indicated a two-factor solution corresponding with the constructs of self-efficacy and understanding. Item 3 cross-loaded on both factors and therefore was not included in either measure. The two-factor solution was chosen as the final solution and the factors were relabeled "self-efficacy for pain communication" and "spouse understanding of patient pain."

Table 2-3. Exploratory Factor Analysis for Patient Pain Communication Items.

Item	Factor Loadings		Communality
	Factor 1: Self-efficacy for Pain Communication	Factor 2: Spouse Understanding of Patient Pain	
... you can let your spouse know how much pain you are having	-0.007	<b>0.977</b>	0.947
... you can let your spouse know how much your pain is bothering you	0.001	<b>0.968</b>	0.939
... you can let your spouse know what s/he can do to help you with your pain	0.499	0.401	0.641
...your spouse understands how much pain you are having	<b>0.894</b>	0.022	0.823
...your spouse understands how much your pain bothers you	<b>0.823</b>	0.129	0.817
...your spouse understands what s/he can do to help you with your pain	<b>0.914</b>	-0.069	0.768
...your spouse will respond to your pain in a way that meets your needs	<b>0.859</b>	-0.065	0.678
Eigen Value	4.628	0.985	
% of Total Variance	66.107	14.077	
Total Variance		80.185	
Component Correlation		0.576	

### *Patient Self-efficacy for Pain Communication*

An example item from this measure is: “how certain are you that you can let your spouse know how much your pain is bothering you.” Scores were averaged across the two items to create the scale.

### ***Spouse Understanding of Patient Pain***

An example item from the 4-item measure for spouse understanding of patient pain, from the patients' perspective, is: "how certain are you that your spouse understands how much pain you are having?".

The spousal measure which captured the level of spouse understanding of patient pain mirrored the patient's 4-item measure. For example, one item was, "I am certain I know how much pain my spouse is having." The scores were averaged.

### ***Patient Pain Disclosure***

The amount of patient pain disclosure was measured with an established 5-item measure (Stephens, Martire, Cremeans-Smith, Druley, & Wojno, 2006). Using a scale from 1 (rarely or none of the time) to 4 (most or all of the time), a sum score was created to assess the extent to which patients verbally shared their pain experience with their spouse in the past month. An example item asked patients how often they had "shared worries about the pain" with their spouse.

### ***Marital Satisfaction***

Marital satisfaction was measured through the established 10-item Dyadic Satisfaction subscale of the Dyadic Adjustment Scale (Spanier, 1976) and included items such as intimacy (e.g., "Do you kiss your spouse?") and general happiness (e.g., "In general, how often do you think that things between you and your partner are going well?"). A summed score was created for patients and for spouses.

### *Depressive Symptomatology*

The measure used to capture depressive symptomatology for both patients and spouses was the 10-item version of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; Andresen, Malmgren, Carter, & Patrick, 1994). This is an established measure that prompts participants to respond to ten statements referring to how they felt or behaved within the past week. An example item is “I felt that everything I did was an effort.” Questions were asked on a four-point scale (0 = rarely 3 = most of the time) and were summed.

### *Covariates*

Potential covariates to be included in the models consisted of multiple sociodemographic variables as well as patient OA severity. The demographic variables considered included: age, race, sex, years of education, patient’s duration of OA, combined annual income, years of marriage (or self-defined marital relationship), and patients’ severity of OA. Race was a dichotomous variable that characterized participants as being either Caucasian or not. The severity of the patient’s OA was measured through an established scale, the Western Ontario McMaster Universities Osteoarthritis Index (WOMAC; Bellamy, Buchanan, Goldsmith, Campbell, & Stitt, 1988) that has been widely used in samples of knee OA patients. This scale assesses multiple aspects of OA severity such as: pain, stiffness, and physical difficulty. Age was coded in years and income was coded in six categories starting at < \$5,000 and increased in increments of \$10,000 with the highest possible response being > \$80,000.



## Data Analysis

First, to establish which covariates to include in the models, bivariate correlations were examined between sociodemographic variables and the outcome measures for patients and spouses (i.e., patient disclosure, and patient and spouse marital satisfaction and depressive symptomatology). The correlations among key variables and the included covariates for patients and spouses are provided in Table 2-4. The covariates included in the final models were selected on both empirical and conceptual bases. For H1 (patient self-efficacy predicting patient pain disclosure), patients' level of OA severity was included to account for its potential influence on patients' amount of pain disclosure to their spouse. This was based on research showing that chronic pain sufferers who report greater pain severity tend to be more likely to disclose their pain-related distress to their spouse (Cano, Leong, Williams, May, & Lutz, 2012) and other research showing an inverse relationship between disclosure and breast cancer pain (Figueiredo et al., 2004). Additionally, the correlation between patients' OA severity and disclosure was statistically significant ( $r = .28, p < .01$ ) and further supported including this variable as a covariate in the model. No other sociodemographic variables were associated with pain disclosure.

Table 2-4. Pearson Bivariate Correlations Among Key Variables and Sociodemographic Characteristics at T1.

Variable	1	2	3	4	5	6	7	8	9	10
1. Self-efficacy for Pain Communication	—									
2. Pain Disclosure	.21*	—								
3. OA Severity	-.18*	.28**	—							
PT 4. Marital Satisfaction	.23**	.14	-.11	—						
5. Spouse Understanding Patient Pain	.58**	.27**	-.12	.48**	—					
6. Depressive Symptomatology	-.17*	.14	.45**	-.18*	-.13	—				
7. Age	-.21*	-.12	-.07	.18*	-.04	-.05	—			
8. Income	.05	-.04	-.20*	.19*	-.01	-.20	-.01	—		
9. Spouse Understanding Patient Pain	.18*	.21**	.12	.28**	.32**	.09	-.10	-.02	—	
SP 10. Marital Satisfaction	.12	-.04	-.09	.62**	.33**	-.19*	.21*	.16*	.19*	—
11. Depressive Symptomatology	.02	.03	.09	-.29**	-.07	.22*	-.00	-.30**	-.10	-.35**

Note. PT = Patient report. SP = Spouse report. \* $p \leq .05$ . \*\*  $p \leq .01$ .

For H2 (spouse understanding as a moderator of patient pain disclosure and marital satisfaction), patient age and income were included as covariates. There were significant bivariate correlations between patients' marital satisfaction and their age ( $r = .18, p < .05$ ) as well as income ( $r = .19, p < .05$ ).

Actor Partner Interdependence Models (APIMs) provide a way for researchers to separate out the actor and partner effects of dyadic data that are expected to be interdependent in nature. This is a stringent test and without sufficient power may produce null findings. Therefore, in testing H3, it was decided to include a single covariate into each APIM. For the model addressing marital satisfaction as the outcome, patients' and spouses' reports of depressive symptomatology

were added as covariates. For the model addressing depressive symptomatology, marital satisfaction was statistically controlled for. Empirical reasoning supported this decision as reports of marital satisfaction and depressive symptomatology have consistently been found to be associated among married couples (Cano, Weisberg, & Gallagher, 2000; Druley, Stephens, Martire, Ennis, & Wojno, 2003; Walker, Isherwood, Burton, Kitwe-Magambo, & Luszcz, 2013; Ross, Ranby, Wooldridge, Robertson, & Lipkus, 2016). In addition, previous work using the current sample has also included marital satisfaction as a covariate for modeling depressive symptomatology due to the high correlation between the variables (Polenick, Martire, Hemphill, & Stephens, 2015).

Tests of non-independence between patients' and spouses' outcome scores (marital satisfaction and depressive symptomatology) were completed as a precursor to APIM (Kenny et al., 2006). This was done by calculating partial correlations between the partners' scores on the outcome (marital satisfaction or depressive symptomatology) while controlling for the predictors (spouse understanding of patient pain) from both dyad members. A significant partial correlation would confirm that the scores between patients and spouses were non-independent and that dyadic data analysis was appropriate.

A series of multiple regression analyses using SPSS version 23.0 (IBM Corp., Armonk, NY) were used to test H1 and H2. APIMs using Mplus version 6.1 (Muthén & Muthén, 1998-2010) were used to test H3. The a priori level of statistical significance was set at  $p < 0.05$  for all analyses.

Multiple linear regression analyses were used to examine the associations between patients' self-efficacy for communicating pain and their self-reported pain disclosure (H1). The equation to test H1,

$$Disclosure = \beta_0 + \beta_{1SE} + \beta_{2S} + \varepsilon$$

was modeled as the prediction of patient pain disclosure as a function of self-efficacy for pain communication ( $SE$ ), while controlling for the patients' severity of OA ( $s$ ), and error in the model ( $\epsilon$ ).

Moderated regression analyses were used to test H2 which addressed how perceptions of pain understanding from the spouse may moderate the relationship between patients' pain disclosure and their own marital satisfaction at T1. Prior to creating the product term between disclosure and spouse understanding of patient pain, these variables were grand-mean centered by subtracting the sample mean from patients' scores. The equation,

$$\text{Marital Satisfaction} = \beta_0 + \beta_{1disc} + \beta_{2spund} + \beta_{3disc*spund} + \beta_{4a} + \beta_{5inc} + \epsilon$$

was tested to predict marital satisfaction as a function of patient pain disclosure ( $disc$ ), spouse understanding of patient pain ( $spund$ ), and the interaction between these variables ( $disc*spund$ ) while controlling for patients' age ( $a$ ), the couple's combined income ( $inc$ ), and error in the model ( $\epsilon$ ).

The final hypotheses (H3a and H3b), which addressed the associations between spouse understanding and psychosocial adjustment (i.e., marital satisfaction and depressive symptomatology), were tested using APIMs. Patient and spouse depressive symptomatology were the covariates for the model predicting marital satisfaction. Additionally, both dyad members' reports of marital satisfaction were included as covariates for the model predicting depressive symptomatology. Structural equation modeling was the method by which these associations were tested. Missing data were managed using full information maximum likelihood estimation with robust standard errors (Maas & Hox, 2004).

## Chapter 3

### Results

#### Preliminary Analyses

Prior to testing hypotheses, descriptive and correlational analyses were conducted. Table 2-2 provides descriptive statistics for all variables included in analyses. Patients, on average, tended to report high levels of self-efficacy for pain communication ( $M = 81.12$ ,  $SD = 25.21$ ). With a potential range of 5 to 20, patients reported, on average, a moderate amount of pain disclosure ( $M = 11.28$ ,  $SD = 4.33$ ). On average, patients reported a moderate to high level of spouse understanding ( $M = 71.97$ ,  $SD = 24.38$ ). Spouses tended to report, on average, a moderate level of patient pain understanding ( $M = 59.48$ ,  $SD = 21.65$ ). On average, participants reported high marital satisfaction (patient:  $M = 39.64$ ,  $SD = 6.22$ ; spouse:  $M = 39.06$ ,  $SD = 6.42$ ). Neither patients nor spouses reported high levels of depressive symptomatology (patient:  $M = 6.57$ ,  $SD = 5.22$ ; spouse:  $M = 5.97$ ,  $SD = 4.57$ ). The distribution of OA severity followed a normal curve with the average score being a 35.08 ( $SD = 14.80$ ; range = 3-82).

Correlations among key variables are provided in Table 2-4. Results show that self-efficacy for pain communication and pain disclosure were positively associated ( $r = .21$ ,  $p < .05$ ). Patients' reports of pain disclosure to the spouse were not associated with patients' marital satisfaction ( $r = .14$ ,  $p = .10$ ). Patients' and spouses' reports of spouse understanding of patient pain were positively associated with their own marital satisfaction ( $r_{\text{patient}} = .48$ ,  $p < .001$ ;  $r_{\text{spouse}} = .19$ ,  $p < .05$ ). Additionally, the patient and spouse reports of spouse understanding patient pain were significantly correlated ( $r = .32$ ,  $p < .001$ ). Lastly, there were significant correlations

between patients' and spouses' reports of marital satisfaction ( $r = .62, p < .001$ ) and depressive symptomatology ( $r = .22, p < .05$ ).

### Patient Self-Efficacy and Pain Disclosure (Hypothesis 1)

In line with H1, Figure 3-1 shows that patient self-efficacy for communicating pain was associated with greater patient pain disclosure to the spouse ( $\beta = .27, p < .01$ ; Table 3-1). This effect was found above and beyond the effects of patients' OA severity. Results of the unadjusted model produced similar results. A total of 15% of the variance in patients' reports of disclosure was accounted for in the final model.

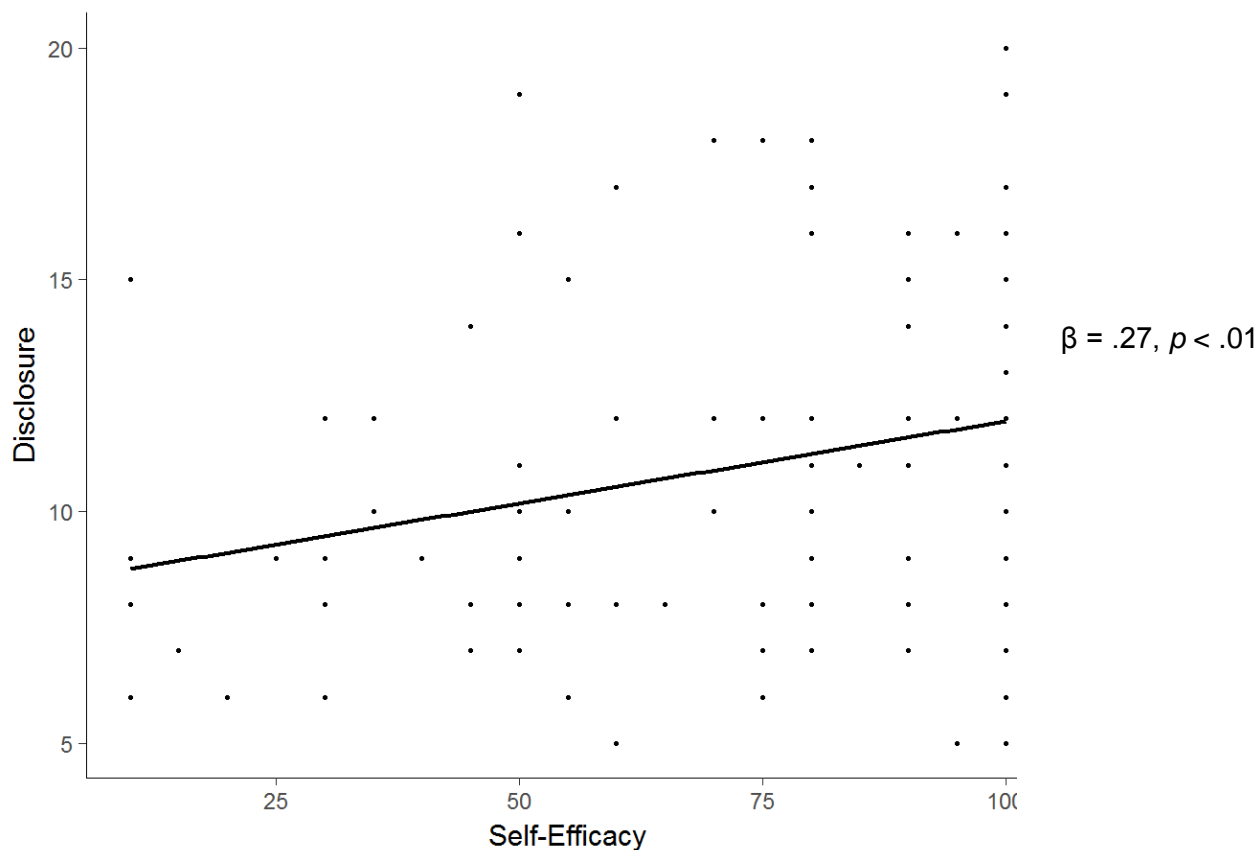


Figure 3-1. Relationship Between Patient Self-efficacy for Communicating Pain and Pain Disclosure at T1.

Table 3-1. Associations Between Self-Efficacy, Pain Communication, and Relational Well-being for OA Patients.

Predictor	B	SE	$\beta$	$R^2$
H1. Outcome: Pain Disclosure				.15
Patient Self-Efficacy for Communicating Pain	.046	.013	.266**	
Patient Pain Severity	.095	.023	.325**	
H2. Outcome: Patient Marital Satisfaction				.33
Patient Pain Disclosure	.045	.107	.031	
Spouse Understanding of Patient Pain <sup>1</sup>	.128	.019	.495**	
Disclosure x Spouse Understanding	.006	.005	.093	
Patient Age	.115	.044	.235**	
Income	.586	.197	.210**	

Note. \*\*  $p < .01$ . <sup>1</sup>Patient Report.

### **Pain Disclosure and Marital Satisfaction – The Moderating Role of Spouse Understanding (Hypothesis 2)**

The bottom portion of Table 3-1 provides the results for the test of H2 which focused on the potential moderation effect of spouse understanding (patient report) in the association between patient pain disclosure and marital satisfaction. There was a significant main effect for spouse understanding predicting patient marital satisfaction ( $\beta = .50, p < .01$ ). There was no main effect for patient pain disclosure ( $\beta = .03, p = .67$ ). This result is in line with the interpersonal process model of intimacy which suggests that disclosure alone is not a sufficient indicator of intimacy (Reis & Shaver, 1998). Contrary to prediction, the interaction term was not statistically significant ( $\beta = .09, p = .20$ ), suggesting that spouse understanding does not moderate the relationship between patients' pain disclosure and their own marital satisfaction. The  $R^2$  for the model indicates that approximately 33% of the variance in patients' marital satisfaction was explained by all constructs in the final model. The unadjusted model did not produce a different pattern of results from the final model.

In sum, results from the regression models show the importance of patient self-efficacy for communicating pain to the spouse. This positive coefficient suggests that patients who feel more efficacious in communicating their pain to their spouse also tend to disclose more about their pain to their spouse. Additionally, results from the test of H2 suggest that patients' perceptions of spouse understanding their pain is not a moderator of the relationship between patients' pain disclosure and their own marital satisfaction. This finding suggests that the effect of pain disclosure to the spouse on patient marital satisfaction does not depend on how well the spouse seems to understand the patient's pain.

### **Dyadic Associations between Spouse Understanding and Psychosocial Adjustment (Hypotheses 3a,b)**

RQ<sub>3</sub> sought to uncover potential actor or partner effects within the relationships between patients' and spouses' reports of spouse understanding patient pain and patients' and spouses' reports of marital satisfaction (H3a) and depressive symptomatology (H3b). H3a proposed that greater ratings of spouse understanding would be associated with greater marital satisfaction for the respondent (actor effect) and his/her spouse (partner effect). Additionally, H3b stated that greater ratings of spouse understanding would be associated with one's own (actor effect) and one's spouse's (partner effect) lower depressive symptomatology. Preliminary tests of non-independence in patients' and spouses' outcome scores were conducted, and supported use of the APIM. Specifically, while controlling for patient and spouse reports of spouse understanding, patients' and spouses' scores on marital satisfaction ( $r = .56, p < .001$ ) and depressive symptomatology ( $r = .22, p < .05$ ) were significantly correlated. Additionally, to address discrepancies in perceptions of spouse understanding of patient pain between patients and spouses, an independent sample t-test was conducted. Results showed that on average, patients



reported higher levels ( $M = 71.8$ ,  $SD = 24.4$ ) of spouse understanding of patient pain than spouses ( $M = 59.5$ ,  $SD = 21.7$ );  $t(302) = 4.7$ ,  $M_{diff} = 12.3$ ,  $p < .001$ . The associations between spouse understanding of patient pain and psychosocial adjustment (i.e., marital satisfaction and depressive symptomatology) were tested with two separate APIMs.

### ***Marital Satisfaction***

In the model estimating marital satisfaction, an actor effect for patients and a partner effect for spouses were found, partially supporting H3a. Results displayed in Figure 3-2 show patients' reports of spouses' understanding of patient pain were positively associated with their own marital satisfaction ( $b = .11$ ,  $p < .001$ ; i.e., an actor effect for the patient). Consistent with the interpersonal process model of intimacy, this finding suggests that patients who felt more understood by their spouse also reported higher marital satisfaction. Additionally, there was a positive association found between patients' reports of spouse understanding of patient pain and spouses' marital satisfaction ( $b = .08$ ,  $p < .001$ ; i.e., a partner effect for the spouse). This result suggests that patients who feel more understood by their spouse have spouses with higher marital satisfaction. All of these associations were found above and beyond the influences of patients' and spouses' levels of depressive symptomatology.

Contrary to hypothesis, neither the actor effect for spouses ( $b = .02$ ,  $p = .34$ ) nor the partner effect for patients ( $b = .04$ ,  $p = .09$ ) was significant. These results suggest that spouses' reports of pain understanding do not predict their own, or the patients', marital satisfaction.

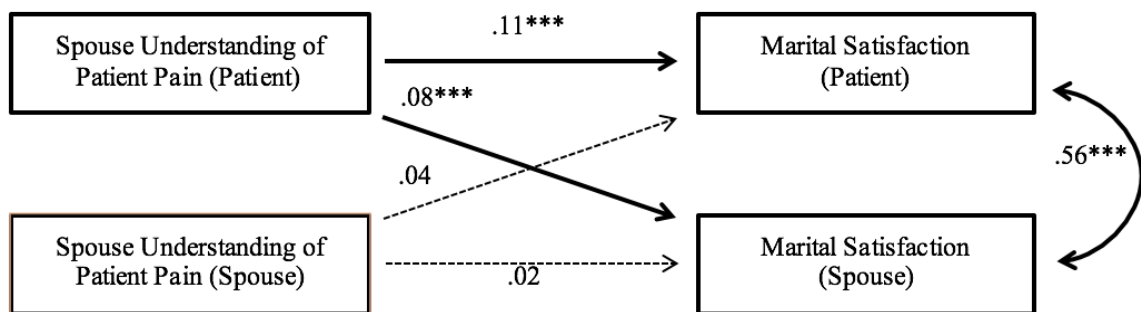


Figure 3-2. APIM for Spouse Understanding Patient Pain Predicting Marital Satisfaction.

Note. \* $p < .05$ . \*\*\* $p < .001$ . The bold lines indicate significant paths. The dashed lines indicate a non-significant path. The covariates in this model were patient depressive symptomatology and spouse depressive symptomatology.

### *Depressive Symptomatology*

Results for the test of H3b are shown in Figure 3-3. The Figure shows that the model which tested the associations between spouse understanding of patient pain and depressive symptomatology indicated neither actor, nor partner, effects for patients and spouses. Results did not support H3b.

Results from the APIMs suggest that spouse understanding of patient pain can be important for OA patients' and spouses' relational well-being. Specifically, greater levels of spouse understanding, from patients' perspectives, were associated with greater marital satisfaction for patients (actor effect) as well as spouses (partner effect), above and beyond the influences of depressive symptomatology of both dyad members. Results of the unadjusted model yielded the same pattern of significance as the model controlling for depressive symptomatology.

Contrary to prediction, spouse understanding of patient pain was not associated with either dyad member's level of depressive symptomatology. Interestingly, analyses of the unadjusted model, which did not control for marital satisfaction, revealed a significant actor effect for patients ( $b = -.04, p < .05$ ), suggesting that patients with higher levels of spouse

understanding have lower levels of depressive symptomatology. It is important to note that the magnitude of this effect increases only slightly in the model which does not include marital satisfaction as a covariate ( $\Delta = -.02$ ).

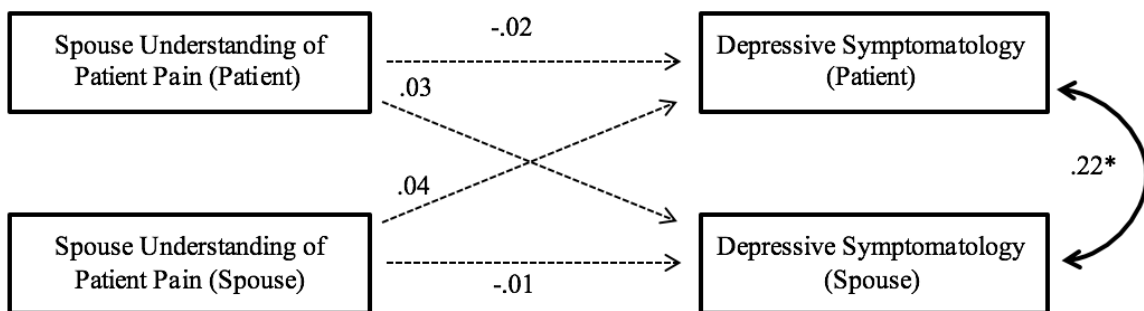


Figure 3-3. APIM for Spouse Understanding Patient Pain Predicting Depressive Symptomatology.

*Note.*  $*p < .05$ . The dashed lines indicate a non-significant path. The covariates included in this model were patient marital satisfaction and spouse marital satisfaction.

## Chapter 4

### Discussion

Intimacy is a process that requires meaningful and emotional communication (Reis & Shaver, 1988). Although spouses tend to overestimate arthritis patients' pain (Martire et al., 2006; Lehman et al., 2011; Riemsma et al., 2000; Cremeans-Smith et al., 2003), patients of spouses who are more accurate about patients' pain severity experience less pain and better physical functioning (Martire et al., 2006). Additionally, spouses who are more accurate regarding patients' pain report greater well-being (Cremeans-Smith et al., 2003) and better support provision (Martire et al., 2006). Historically, less empirical attention has been given to examining the precursors of pain concordance among patients and spouses or the relational benefits of spouses' understanding for OA patients' levels of pain. The current study contributes to the field by addressing these gaps.

The purpose of this work was to address multiple aspects of pain-related communication among OA patients and spouses. Reis and Shaver's interpersonal process model of intimacy (1988) and Bandura's self-efficacy theory (1977) guided the stepped approach used to address pain communication in the context of couples managing one dyad member's OA. First, the relationship between patients' self-efficacy to communicate their pain to their spouse and their OA-related disclosure was examined (RQ<sub>1</sub>). Next, as a test of the interpersonal process model, spouse understanding was assessed as a moderator of the relationship between patients' pain disclosures and their own marital satisfaction (RQ<sub>2</sub>). Lastly, as an extension of the intimacy model, two APIMs tested the associations between patients' and spouses' perceptions of spouses' understanding of patients' pain and their own or their partners' psychosocial adjustment (i.e., marital satisfaction and depressive symptomatology; RQ<sub>3</sub>).

Overall, findings partially confirmed hypotheses and emphasized the importance of patients' self-efficacy for pain disclosure, and patients' perceptions of spouse understanding of patient pain, for patients' and spouses' marital satisfaction. Specifically, higher self-efficacy to communicate pain to one's spouse was found to significantly predict patients' greater level of pain disclosure to their spouses. Additionally, dyadic modeling uncovered relational benefits for both dyad members as a result of patients' greater perception of spouses' understanding of patients' pain. Contrary to prediction, results did not suggest that patients who disclosed more of their pain to their spouse and felt that spouses understood their pain well were more satisfied in their marriages. Unexpectedly, results did not support the expectation that patient and spouse perceptions of spouse understanding of patient pain would be associated with either dyad member's level of depressive symptomatology.

### **Hypothesis 1: Patient Self-efficacy for Pain Communication as a Significant Predictor of Pain Disclosure**

Although not a primary aim, this study uncovered two underlying constructs within the measure of self-efficacy for pain communication proposed by Porter and colleagues (2008; i.e., self-efficacy for pain communication and spouse understanding of patient pain). Exploration of these underlying constructs was theoretically based and then empirically supported. Future work using this measure should also test for the presence of these two constructs. A positive outcome of this measurement work was that it provided parallel measures of spouse understanding as reported by patients and spouses, and application of APIMs.

Results from the present study are in line with Bandura's (1997) seminal piece on self-efficacy, as well as the limited research addressing self-efficacy for pain communication (Porter et al., 2008; Edmond

et al., 2013). Previous work found that greater self-efficacy for communicating breast cancer symptoms to a married partner was associated with less holding back (Edmond et al., 2013). However, disclosure and holding back are unique forms of communication (e.g., Manne et al., 2010; Porter et al., 2005; Porter et al., 2009), and research linking self-efficacy to rates of pain disclosure is lacking. Thus, the current study aimed to address this gap and uncover the extent to which self-efficacy for pain communication is associated with greater disclosure, as a precursor to examining the effect of disclosure on marital satisfaction in a test of the interpersonal process model of intimacy (H1). It was expected that greater reports of self-efficacy to communicate pain would be associated with greater disclosure of pain. H1 was confirmed and suggested that, for OA patients, greater self-efficacy for communicating pain to their spouse was concurrently associated with greater pain disclosure to the spouse regardless of patients' severity of OA.

Looking beyond the significance level, it is important to address the small magnitude of the association. Specifically, only a small portion of the variance ( $R^2 = .15$ ) in disclosure was explained by patients' self-efficacy, and the coefficient was not large in magnitude ( $\beta = .27, p < .01$ ). One potential explanation lies in the items used to measure pain disclosure and self-efficacy. The disclosure scale assessed how often patients share their feelings of sadness, worries, and fears about their pain. This construct of "emotional disclosure of pain-related distress" has received recent attention in the field as distinct from other pain-related behaviors (Cano & Goubert, 2017). In contrast, the items measuring self-efficacy refer to informing the spouse about the amount of pain and how bothersome it is. Therefore, it is possible that the magnitude of the association between self-efficacy and disclosure would have been larger if the self-efficacy scale included emotional components.

## **Hypothesis 2: Spouse Understanding of Patient Pain as a Moderator of Patient Pain Disclosure and Marital Satisfaction**

Reis and colleagues (1988, 1996, & 2004) state that disclosure is not a sufficient predictor of intimacy and emphasize the importance of perceived partner responsiveness (PPR; i.e., feeling understood, validated, and cared for) in developing and maintaining intimate relationships. Little is known about how this may work in an illness population; therefore, as a test of the interpersonal process model of intimacy in couples managing one dyad member's OA, spouse understanding of OA pain was examined as a contextual factor in the relationship between patient pain disclosure and patient marital satisfaction (H2). Results did not support this hypothesis as spouse understanding did not moderate the association between patients' pain disclosure and marital satisfaction.

In line with the intimacy model, results suggested that patients' pain disclosure alone was not a significant predictor of marital satisfaction. Previous work examining this association in other illness populations also supported this finding. Druley and colleagues (1997) did not find an association between condition-related disclosure of feelings or symptoms with marital satisfaction among lupus patients. Additionally, in conversations between breast cancer patients and their husbands, patients' disclosures were not associated with their own feelings of intimacy (Manne et al., 2004).

Contrary to prediction, patients who disclose their pain and perceive their spouse to understand their pain did not report higher satisfaction in their marriage. One potential reason for this null finding is that only one aspect of PPR (i.e., understanding) was assessed. One study of healthy couples found that participants report lower marital satisfaction if their spouse responds to an emotional disclosure in a way that does not meet the disclosers' needs (Cutrona et al., 2007). Future research should extend Cutrona and colleagues' work to couples facing a chronic condition. Addressing all three components of PPR (i.e., feeling understood, validated, and cared for) may provide a more comprehensive way to study the interpersonal process model of intimacy among OA patients.

### **Hypothesis 3: Relational Benefits of Pain Understanding for both Dyad Members**

Experiencing chronic pain has been found to be related to lower marital satisfaction for pain sufferers and their spouses (Flor et al., 1987; Maruta et al., 1981). Additionally, research has consistently shown a high correlation between partners' depressive symptomatology and between partners' marital satisfaction (Cano et al., 2000; Druley et al., 2003; Walker et al., 2013; Ross et al., 2016). Therefore, it is important to address the relationship between spouses' pain understanding and both dyad members' psychosocial adjustment above and beyond the influences of the other partner's adjustment.

It was expected that patient and spouse perceptions of spouse understanding patient pain would be associated with greater marital satisfaction (H3a) and lesser depressive symptoms (H3b) for both dyad members. APIM results partially confirmed hypotheses. First, in the model of marital satisfaction, results suggested that patients who perceive greater understanding of their pain by the spouse have higher, and spouses with higher, marital satisfaction. Contrary to expectation, spouses' perceptions of their own understanding of patient pain did not influence their own, or the patients' marital satisfaction. Contrary to prediction, results suggested that neither patients' nor spouses' perceptions of spouse understanding of patient pain were associated with depressive symptomatology for either dyad member. In sum, results suggest that it is only *patients'* perceptions of spouses' levels of understanding of the patients' pain (e.g., PPR) that are important for the marital relationship.

In line with previous studies (Porter et al., 2008) patients in this sample felt that their spouses understood more about their pain than did spouses. Additionally, results suggested that spouses' reports of their own understanding did not predict either the patients' or their own reports of marital satisfaction. The lack of an actor effect for the spouse and a partner effect for the patient may be due to the fact that spouse understanding of patient pain is a patient-focused variable. Although the construct is in regard to spouse understanding, the measure is associated with patients' experiences of pain and may be a more important construct for patients' outcomes as opposed to spouses'. Stated another way, it is the patients



who are experiencing pain, so their perceptions of spouses' abilities to understand their pain may be most important for the marital relationship.

The most exciting finding of this project, and perhaps the most important, was the presence of a partner effect for patients' reports of spouse understanding on spouses' marital satisfaction. This result suggests that a patient who perceives his or her spouse to have a greater understanding of his or her (the patient's) pain will have a spouse who reports greater marital satisfaction. The model statistically controlled for the interdependence of patient and spouse reports of spouse's understanding of patient pain, as well as the interdependence of patient and spouse marital satisfaction. Therefore, this result is not attributed to the patient's marital satisfaction or the significant relationship between his or her own report of understanding and his or her own marital satisfaction. One potential explanation for the significant partner effect could be that patients who feel understood by their spouse display appreciation for their partners in loving ways. For instance, patients who feel understood may also feel more loved and in return will do things for their spouse to reverberate that love and care back to them. Future work should address other potential mechanisms for this association.

Results did not support the expectation for spouse understanding of patient pain to be associated with fewer depressive symptoms for patients and spouses. Increased depression among OA patients has been found to be associated with having fewer social contacts (Rosemann et al., 2007) but neither the quality of social contacts nor the presence of a marital partner in the social network was addressed in that study. Additional predictors of depression for sufferers of OA are increased perceptions of pain and functional limitations (Zautra & Smith, 2001; Rosemann et al., 2007; Hawker et al., 2011). Bivariate correlations in the current study are consistent with these findings, as OA severity had a higher correlation with depressive symptoms for patients than any other construct ( $r = .45, p < .01$ ; Table 2-4). It seems that for patients, pain understanding is not as important for depressive symptoms as the severity of their OA. OA-related predictors of depression for spouses of OA patients have been less established. The correlations in Table 2-4 suggest that other factors such as spouses' marital satisfaction, may more

strongly influence their depressive symptoms than factors related to the patient's OA diagnosis (e.g., pain understanding).

### **Theoretical Implications**

Reis and Shaver's intimacy model and Bandura's seminal work on self-efficacy served as the theoretical frameworks for the current project. In support of Bandura's theory, results from this study suggest that higher self-efficacy for communicating OA pain is a precursor to pain disclosure to one's spouse (H1). Additionally, interpersonal associations of spouse understanding with marital quality were found and are in line with Reis and Shaver's intimacy model (H3). The test of the interpersonal process model (H2) did not show that the effects of disclosure on marital satisfaction were dependent on spouse understanding. However, results did suggest that disclosure is not sufficient for intimacy (i.e., marital satisfaction), which is also in line with Reis and Shaver's model.

Additionally, this study extends Reis and Shaver's model (1988) to the chronic condition of OA, which other researchers have suggested as an important focus (Edmond & Keefe, 2015; Cano et al., 2010). This model has been tested in other illness conditions, such as cancer (Manne, et al., 2004; Manne & Badr, 2008) but this is the first known study to examine OA.

### **Implications for Couple-Oriented Interventions**

The efficacy of couple-oriented interventions for the management of chronic illnesses has been established (Martire, Schulz, Helgeson, Small, & Saghafi, 2010; Martire & Helgeson, 2017). The current work uncovered aspects of communication and marital relationships that may be important for future interventions for couples managing a chronic condition. Previous research has shown that female patients' verbal and non-verbal communication about pain (especially severe pain) leads to decreased

psychological well-being and less support from caregiving husbands over a 6-month period (Stephens et al., 2006). One potential reason for this finding is that patients may not be effective communicators of their pain. An additional reason is that husbands may be burdened by not knowing how to respond to their spouses' pain. Results from the current study suggest that an intervention focusing on improving patients' self-efficacy for communicating their pain and spouses' responses to patients' pain disclosures may be beneficial to both partners.

Improvements in health and/or well-being are major outcomes of interest for most, if not all, interventions addressing the management of chronic conditions. A recent meta-analysis has suggested the small, yet stable, effect that marital quality has on health (Robles, Slatcher, Trombello, & McGinn, 2014). Additionally, close social connections have been shown to influence both biological and behavioral health outcomes (Pietromanaco & Collins, 2017). Therefore, intervention scientists must consider how marriage and the quality of the marital relationship may help, or hinder, their efforts. The current study emphasizes the influence of communication and understanding for the relational well-being of OA patients and their spouses. Thus, maintaining good communication is important for the marital relationship and may translate to better health for patients and their spouses.

### **Limitations and Future Directions**

Results of this study suggest the relational benefits of spouse understanding patient pain among couples; however, this work is not without limitations. First, most of the sample was Caucasian, had been married for an average of 34 years, and had been managing the patient's OA for almost 13 years, on average. Future work should examine couples from diverse racial/ethnic backgrounds. Additionally, couples who have been married for a long duration may have established communication patterns that do not involve disclosure. Patients who have been managing their pain for many years may have also tried to avoid disclosing their OA pain so as to not burden their spouses. Generalizability of study findings would

be enhanced if future research finds the same patterns for couples who are in shorter-term relationships or who are studied nearer the time of the onset of the patient's OA.

Second, this work is cross-sectional and observational; therefore, neither temporal order nor causality can be inferred. Self-efficacy is a cognitive process that is highly influenced by everyday experiences and will likely fluctuate over time (Bandura, 1977). It is probable that self-efficacy for pain communication will vary depending on if, and how, the spouse responds to patient disclosure (e.g., with understanding or criticism). No studies to date have looked at changes in the trajectory of self-efficacy for pain communication across time or predictors of those changes. Future work could focus on how changes in patients' self-efficacy to communicate their pain may be associated with changes in their pain-related disclosure. Additionally, greater self-efficacy to cope with and/or ameliorate OA concerns has been shown to enhance health related outcomes for patients (Lorig, Chastain, Ung, Shoot, & Holman, 1989). Future research should investigate how self-efficacy to communicate OA pain also may be directly associated with future OA-specific health-promoting behaviors. Furthermore, this study did not explicitly ask patients to report reasons for disclosing their pain experience to their spouse. Future work is warranted to better explain other factors that may be leading OA patients to disclose their pain to their spouses.

Relatedly, the intimacy model was initially proposed as a way to examine a process that occurs within a specific time-scale (i.e., a single interaction) and the roles (e.g., discloser or listener) were expected to shift periodically (Reis & Shaver, 1988). Research examining this framework among samples of healthy and ill participants has observed conversations in the lab (Manne et al., 2004; Mitchell et al., 2008) or responses to daily diary questionnaires (Laurenceau, Barrett, & Rovine, 2005; Shelton, Trail, West, & Bergsieker, 2010). However, the current study investigated reports of disclosure and understanding at a single time-point and by self-report. Therefore, temporal ordering among disclosure, understanding, and marital satisfaction could not be assessed. Future work would benefit by using a lab or daily diary approach to examine OA-related disclosure, spouse understanding, and satisfaction in a way that matches the intimacy model more closely.

Third, results from this study did not fully address the intimacy model by considering patients' feelings of being cared for and validated (Reis & Shaver, 1998). Results confirm that spouse of understanding patient pain is important for marital satisfaction; however, it was not a sufficient contextual factor for patients who more often disclose their pain. Future work should consider the conceptual differences among feeling understood, cared for, and validated, and the extent to which these experiences may be collectively beneficial for the marital relationship of patients who disclose their pain to their partner.

Though not a limitation, this is the first known study to use dyadic models to examine the relationship between perceptions of spouse understanding of patient pain and marital satisfaction or depression. Future research should seek to understand if patients who feel understood by their spouses are better able to manage knee OA as a result of better support from spouses. Undoubtedly, the opposite directionality may also be true, so this work should examine these questions longitudinally. Additionally, results from the current study would benefit from replication in samples of couples facing other chronic conditions. Condition-related self-efficacy and perceptions of spouse understanding may be important for disclosure and marital adjustment in other illness contexts.

## **Conclusion**

Being in a well-adjusted marriage has been linked to experiencing less pain and better physical functioning for patients managing chronic pain conditions (Reese, Somers, Keefe, Mosley-Williams, & Lumley, 2010). As the aging population continues to increase in number, so will the number of older couples facing chronic conditions (Zhang & Jordan, 2010). Now more than ever, research is needed to help older couples manage their relationship and health conditions simultaneously.

Communication and understanding are transactional processes that are critically important for intimacy in relationships (Reis & Shaver, 1988). The current study suggests that disclosure may be a

result of patients' self-efficacy for communicating their pain to their spouse. Future work should aim to uncover other factors that may also explain patients' rates of disclosure to their spouses. It also is important for spouses to show that they understand patients' experiences. Spouse understanding did not moderate the relationship between patient disclosure and their own marital satisfaction; however, spouses' understanding was important for both dyad members' relational well-being.

The current study contributes to the present literature by uniquely addressing both Bandura's and Reis and Shaver's theoretical models and by taking a dyadic perspective to emphasize the influence of pain-related communication and understanding for couples managing knee OA. This work addresses the complexity of OA-related communication within a marriage and suggests that the relationship may benefit from enhancing spouse understanding of patient pain.

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