

## Daily verbal and nonverbal expression of osteoarthritis pain and spouse responses

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### ABSTRACT

The current study applied a model of pain communication to examine the distinction between verbal and nonverbal pain expression in their prediction of punishing, empathic, and solicitous spouse responses to patient pain. It was hypothesized that on days when patients engaged in more nonverbal expression, spouses would respond more positively (ie, with less punishing and more solicitous and empathic behavior). The same pattern was predicted for verbal expression. In addition, it was expected that associations between patient nonverbal pain expression and positive spouse responses would be strengthened, and that the association with punishing responses would be weakened, on days when levels of verbal pain expression were higher than usual, regardless of daily pain severity. In a 22-day diary study, 144 individuals with knee osteoarthritis and their spouses completed daily measures of pain expression, spouse responses, health, and affect. The predicted positive main effect of nonverbal expression on empathic and solicitous responses was supported by the data, as was the positive main effect for verbal pain expression. Results from moderation analyses partially supported our hypothesis in that patients' nonverbal pain expression was even more strongly related to empathic and solicitous spouse responses on days of high verbal pain expression, and patients were buffered from spouse punishing responses on days when both nonverbal and verbal expression were high. These findings suggest that pain expression in both verbal and nonverbal modes of communication is important for positive and negative spousal responses.

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## 1. Introduction

Research on the relationship between pain expression and spousal responses has often focused on how sequences of nonverbal pain expression (eg, grimacing, bracing, groaning) and solicitous responses lead to greater patient pain and disability in chronic pain disorders [22,34,36–39]. However, whether nonverbal and verbal expression of disease-related pain independently and interactively predict a variety of spouse responses has not been examined. Using a sample of individuals diagnosed with osteoarthritis and their spouses, the current study assessed the covariation of daily nonverbal and verbal pain expression with daily spouse responses. We also examined the degree to which daily verbal pain

expression enhanced positive and buffered negative effects of nonverbal pain expression on spouse responses.

In the few studies that have measured nonverbal and verbal pain expression as separate constructs, patient verbal disclosure has supported relationship intimacy, and holding back from disclosure has been related to spouse criticism [3,30,31]. Nonverbal expression has most consistently been associated with more solicitous albeit, in a few cases, punishing spousal responses, most often in patients with chronic pain disorders [36–40,43]. According to a pain communication model [6,9,10], pain is a message to be transacted—a message that may elicit an empathic, benevolent response from the listener when it is clearly understood, under certain favorable conditions. Nonverbal pain expression, less governed by executive function than verbal acts, can be identified by observers and may be especially likely to be interpreted as genuine, particularly in disease-related pain [9,33]. Furthermore, the clarifying, specific quality of verbal expression may supplement nonverbal cues to produce an even more interpretable and

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directive pain message. The complementarity of nonverbal and verbal pain expression seems clear, yet the interactive contributions of these distinct communication channels to spouse responses have not been investigated.

In this study of osteoarthritis patients and their spouses, our first hypothesis was that greater patient nonverbal pain expression on a given day as reported by the spouse would be associated with more empathic and solicitous responses as well as fewer punishing responses from the spouse on that day, independent of verbal pain expression on the same day. Greater verbal pain expression on a given day was also expected to relate to more empathic and solicitous responses, and fewer punishing responses on that day, independent of that day's nonverbal pain expression. Our second hypothesis was that daily verbal pain expression would strengthen the associations between daily nonverbal pain expression and spouse responses because, extending the pain communication perspective, each form of expression clarifies the pain experienced and together they generate a thorough pain message. Specifically, the associations between daily nonverbal pain expression and spouse responses (positive for empathic and solicitous, and negative for punishing responses) were expected to be stronger on days when the patient verbally disclosed pain more than usual, as compared to days when the patient disclosed his or her pain less than usual. Same-day associations were examined because our interest was in pain on a given day, its expression, and spouse responses to that day's pain.

## 2. Methods

### 2.1. Study design

Data presented in this report are from a study of patients diagnosed with knee osteoarthritis (OA) and their spouses that combined in-person interviews conducted over an 18-month period (ie, T1, T2 at a 6 month follow-up, and T3 at an 18 month follow-up) with a 22-day assessment of daily experiences immediately after the T1 interview. During the daily assessment protocol, patients and spouses used a hand-held computer to answer questions regarding health and affect three times per day (ie, beginning-of-day, afternoon, and end-of-day), and questions regarding marital and pain-related interactions at end-of-day. The current report utilizes data from the T1 interviews and end-of-day diary assessments.

### 2.2. Study participants

To be eligible for the study, patients had to be diagnosed with knee OA by a physician, experience usual knee pain of moderate or greater intensity, be at least 50 years of age, and be married or in a long-term relationship (self-defined) in which they shared a residence with their partner. Exclusion criteria were a comorbid diagnosis of fibromyalgia or rheumatoid arthritis, use of a wheelchair, or a plan to have hip or knee surgery within the following 6 months. Couples were excluded from the study if the spouse reported arthritis pain of moderate or greater intensity, used a wheelchair, or required assistance with personal care activities. Both partners were required to be cognitively functional as indicated by the accuracy of their answers to questions regarding the current date, weekday, their age, and birthdate. Both partners also had to be free of any major hearing, speech, or language problems that would interfere with the comprehension and completion of data collection conducted in English [25].

Primary sources of recruitment were research registries for rheumatology patients and older adults interested in research in the Pittsburgh, PA, area; flyers distributed to University of Pitts-

burgh staff and faculty; and word of mouth. A total of 606 couples were screened for eligibility. Of these, 221 couples declined to participate; the most frequent reasons were lack of interest ( $n = 87$ ) or illness in the family ( $n = 55$ ). A total of 233 couples were not eligible; the most frequent reasons were lack of OA in the knee ( $n = 55$ ) or knee OA pain that was mild ( $n = 47$ ). The total enrolled sample comprised 152 couples (ie, 304 individuals). Of these, 145 couples completed the diary assessment component of the study, and 144 couples provided sufficient diary data to be included in analyses. Table 1 provides background information for these patients and their spouses. Both patients and spouses reported high levels of marital satisfaction on average (mean<sub>Patient</sub> = 39.61, SD<sub>Patient</sub> = 6.26; mean<sub>Spouse</sub> = 38.94, SD<sub>Spouse</sub> = 6.47) using the established 10-item dyadic satisfaction subscale (range = 0–50) of the Dyadic Adjustment Scale (11). Using the 24-item Western Ontario and McMaster Universities Osteoarthritis Index [1] scaled 0 to 100, patients reported a mean osteoarthritis severity of 36.54 (SD = 15.42), close to the cutoff score of 39 determined by Hawker et al. [13] as potentially eligible for arthroplasty.

### 2.3. Data collection procedure

Trained staff interviewed patients and spouses separately in each home. After the interviews, couples were trained to use the hand-held computer (ie, the Palm TX, Palm, Inc., Sunnyvale, CA) and were familiarized with the format and content of the diary questions. The hand-held computer and questionnaire were designed for easy use by older adults and people with minimal computer experience; accessible features included large font size and an oversized stylus for registering responses. Each patient and spouse was provided with a hand-held computer that was clearly labeled with his or her name, and the importance of completing diary assessments independently was emphasized. Surveys were intended to be completed in the morning, afternoon, and evening. More specifically, participants were instructed to answer questions as follows: (1) within 60 minutes of rising in the morning, (2) between 2 and 4 PM, and (3) upon retiring at night. The current study focused on end-of-day assessments because ratings of nonverbal and verbal pain expression as well as spouse responses were collected only at the end of each day.

Completion and compliance rates were examined for the diary data. Out of a potential 6380 end-of-day observations (290 individuals in 145 couples  $\times$  22 days), a total of 5863 were completed (92%). Compliance with the requested timing of the end-of-day assessment was evaluated by comparing the time of the hand-held computer entries with participants' written log of daily bedtimes. End-of-day assessments that were completed more than 120 minutes before bedtime were excluded from analysis. Using this crite-

**Table 1**  
Demographic characteristics of patients and spouses ( $N = 144$ ).

Variable	Patients M (SD) or N%	Spouses M (SD) or N%
Age	65.6 (9.8)	65.3 (11.5)
Male sex	43%	58%
White race/ethnicity	88%	86%
Years of education	16.1 (2.0)	15.9 (2.1)
Full-time employment	33%	33%
Years of knee OA	12.6 (11.3)	
Household income	\$40,000–59,000	
Years married/in relationship	34.3 (16.6)	
Marital satisfaction	39.61 (6.26)	38.94 (6.47)

Note: Data are mean (SD) or  $n$  (%). Full-time employment status was defined as typically working 30 hours or more per week. Marital satisfaction was assessed with the 10-item dyadic satisfaction subscale of the Dyadic Adjustment Scale, the scores of which range from 0 to 50 [42].  
OA = osteoarthritis.

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