RESPONSE ERRORS AND BIAS IN THE RECALL OF CHRONIC PAIN

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Abstract

The medical and scientific community as well as government agencies have recognized the need for accurate estimates of the prevalence and severity of chronic pain in the general population. However, retrospective reports of pain episodes often are compromised by various biases in recall. This paper describes a research program investigating four factors influencing accurate judgments about and recall of pain and painful experiences: (a) the role of a respondent's mood state in biasing the recall of past experiences with pain and in influencing judgments about present pain, (b) the impact of a respondent's present pain severity on the recall of past pain, (c) the relative susceptibility to recall bias of pain intensity versus pain behavior ratings, and (d) difficulties in the use of language to describe pain and painful experiences. Experiments on all four of these topics are in progress. In the present paper, we will focus on some of the results from an experiment concerning the influence of mood state on recall of and judgments about past painful episodes. In this experiment, 94 college students participated in either a happy, sad, or neutral laboratory mood induction procedure. After mood induction, they were asked to recall and rate a painful incident from the past. They then read stories concerning the painful episodes of others and rated the intensity and quality of the pain likely to result from the described incident. Finally, they judged the number of days during the past year on which they experienced various kinds of pain. Mood had only a weak impact on these frequency ratings, but a pattern of mood by gender interactions characterized the judgments about the past incident and the hypothetical stories. Both happiness and sadness produced higher pain ratings in men as compared to the neutral condition. Women tended to rate previous painful experiences less consistently but showed strong mood congruent ratings (highest for sad, lowest for happy) when considering the stories. These results are considered in light of research on mood, focus of attention, and memory recall.

Introduction

Pain, especially chronic pain, has been called the most universal form of human stress (Turk, Meichenbaum, & Genest, 1983). Millions of Americans suffer from pain-related problems, often resulting in partial or complete disabilities. The social and economic impact of chronic pain is staggering. For example, in the United States, there are thought to be 20 to 50 million sufferers of arthritis, with 600,000 new victims each year (Arthritis Foundation, 1976). Twenty-five million Americans experience the painful consequences of migraine headache on a regular basis (Paulley & Haskell, 1975). Low back pain, an especially common complaint, disables about 7 million citizens and accounts for over 8 million physician office visits yearly (Clark, Gosnell, & Shapiro, 1977).

Despite its pervasiveness, accurate statistical accounts of the personal and societal impact of pain have been plagued by problems of language and recall accuracy. Most self-report instruments and surveys suffer from difficulties in matching descriptive language to the perceptual qualities of pain experiences. Further, recall of pain experiences, episodes, and intensity may not be accurate. These kinds of problems with recall accuracy and language use pose formidable challenges to the designers of national health surveys. Experiences with pain often must be measured retrospectively, and so factors that might systematically bias respondents' answers must be identified and then dealt with either statistically or in the design of the survey itself.

The quality of survey data on experiences with pain is threatened by a variety of sources of error in the recall of the intensity and quality of painful episodes as well as biases in judgments about the nature of present and past pain. We are currently conducting six experiments that address the impact of four possible sources of error in the collection of survey data on pain. The first of these experiments concerns the influence of a respondent's mood at the time of the survey on the recall of past painful experiences and judgments about present levels of pain. Some preliminary results from this experiment will be discussed in the present paper. The second source of error is the anchoring and cuing in memory provided by current levels of pain when a respondent is asked to reflect on and respond to questions concerning previous painful experiences. A third issue is the relative accuracy provided by surveys focusing questions on pain intensity, pain behaviors, or changes in daily life activities. Finally, this program of research will explore difficulties in the use of language to describe painful experiences. In this regard, experiments will focus on differences in the memorial organization of pain language among healthy individuals as compared with individuals suffering from various chronic pain problems as well as commonalities in the use of pain language in certain prototypic situations.

Bias Due to Mood

Our first experiment will be discussed in today's presentation. It concerns biases in recall and judgments of pain attributable to respondents' mood. Although often overlooked, there is increasingly strong evidence that mood affects the manner in which information is encoded, organized in memory, and ultimately retrieved. The role of moods and emotions in the accuracy of judgments about and recall of painful experiences has not been studied directly, despite the fact that it is suggested as the key variable mediating the accuracy of pain recall by many researchers (e.g., Eich, Reeves, Jaeger, & Graff-Radford, 1985; Hunter, Philips, & Rachman, 1979; Kent, 1985; Norvell, Gaston-Johansson, & Fridh, 1987; Roche & Gijsbers, 1986). For example, respondents who experience fear of going to the dentist remember dental pain as more severe than actually reported during the original event. Mothers experiencing the joy of giving birth to a new baby tend to underreport the intense pains of labor after the baby is born. Individuals experiencing depression tend to overestimate the intensity of previous painful experiences. Each of these situations exemplifies the important role played by mood and emotion in the recall of pain.

Possible mechanisms. Despite its common endorsement as an important factor resulting in inaccurate pain reporting, survey researchers have tended to give scant attention to affect in the design of surveys and in the interpretation of their results. Yet, in the past decade, cognitive and personality/social psychologists have become intrigued by the role played by moods and emotions in the processing of information (see recent reviews by Blaney, 1986; Mayer & Salovey, 1988; Singer & Salovey, 1988). There are two different ways in which ongoing affective states might bias the recall of pain experiences. One could be called "mood congruent pain reporting," in which individuals' current mood state, perhaps by influencing the accessibility of positive versus negative memories, directly biases ratings in a direction consistent with this mood state. The second bias may occur when mood at the time of the pain rating does not match the individuals' initial mood during the pain experience. This mismatch in affective context does not allow the individual to experience the memorial benefits of state-dependent recall. These two roles for affect in biasing pain recall correspond to what has been termed "thought congruity" (or "mood congruent recall") and "state-dependent recall" in the literature on memory (e.g., Bower, 1981; Gilligan & Bower, 1984).

Studies of mood state-dependent memory lead to the hypothesis that when mood at the time of the initial experience of pain matches mood at the time of pain recall, recall should be more accurate than when there is a mismatch. So, for example, Hunter et al. (1979) identified a group of "shifters," subjects whose recall of headache pain was most biased after 5 days. Relatively higher levels of dysphoric affect at assessment were more strongly associated with "shifting" than any other variable. Similarly, the positive affect associated with the birth of a new baby does not match the negative affect associated with the actual pain of labor, and recall of labor pain postpartum can be expected to be quite poor (Norvell, et al., 1987). Moreover, the poor recall of pre-operative pain following surgery for rheumatoid arthritis among Roche and Gijsbers's patients (1986) has been explained (by them) as perhaps due to their much improved affective state following successful surgery. Many other studies showing poor recall of pain often relied on initial ratings of pain at a time of heightened dysphoric affect and then later recall when individuals' were feeling much better (e.g., Linton & Götestam, 1983; Linton & Melin, 1982).

Another mechanism that might explain why mood influences the recall of painful experiences is change, induced by depressed mood, in the allocation of attention from the environment on to the self, the so-called "depressive self-focusing style" (Ingram & Smith, 1984; Pyszczynski & Greenberg, 1986, 1987; Smith & Greenberg, 1981). The idea here is that when experiencing a negative emotion, individuals turn their attentions away from the environment and toward themselves. Hence, they become hypersensitive to internal symptoms, perhaps augmenting them. Further, they may be more aware of negative memories concerning health flooding consciousness. The availability of these memories might then bias judgment.

Several studies from the mood and health literature provide support for this general mechanism. Croyle and Uretsky (1987) reported a study in which they induced happy and sad moods in the laboratory and noted that subjects assigned to the sad mood induction subsequently perceived themselves to be less healthy. More directly relevant to the present experiment is a study recently completed by Salovey and Birnbaum (1989). We asked 66 individuals suffering from influenza to experience either a happy, sad, or neutral laboratory-induced moods. We later assessed the aches, pains, and other symptomatic discomforts experienced by these individuals. Two relevant findings emerged. The first was that mood had its most powerful impact on measures of aches and pains as compared with other symptoms of the flu (e.g., nasal congestion, GI distress, sleepiness). The second finding was that reports of aches and pains varied depending on subjects' assignment to mood condition. Subjects induced into mildly sad affective states in the laboratory reported considerably greater pain than neutral mood (control) subjects. Conversely, happy subjects reported fewer aches and pains.

Results consistent with these have been reported in the pain recall literature. For example, Hunter et al.'s (1979) "shifters" tended to report higher levels of pain intensity and to use significantly more negative affective words to describe pain than other patients. Similarly, Kent (1985) noticed the most memorial distortion for dental pain among his subjects who reported the greatest dysphoric affect associated with dental procedures. His subjects tended to distort their recall for dental pain in a direction consistent with their anxiety.

Overview of Present Study

The literature reviewed suggests that judgments about present pain and recall of prior pain episodes are influenced by mood. In particular, survey responses regarding pain may be rendered less accurate when respondents are experiencing reasonably intense moods and emotions or when their current moods are quite different from their dominant affect at the time of the painful experience. The impact of mood on judgment and recall of pain is best examined under fairly controlled circumstances. The results of such experiments, though, have implications for the design and interpretation of health surveys: mood at the time of the survey should perhaps be assessed as part of the survey and then taken into account in the interpretation of survey results. Otherwise, it is difficult to know whether the respondent who answers, "Yes, I experienced intense pain at least 5 of every 7 days last year" in fact had painful episodes of that frequency or was quite depressed at the time of the survey and consequently prone to over report unpleasant painful episodes.

In the present experiment 94 college student subjects were assigned to each of three mood induction conditions, happy, sad, and neutral (control). A tape recorded mood induction procedure (based on Wright & Mischel, 1982) lasting about 10 minutes asked subjects to imagine a vivid situation from the past that resulted in either happy, sad, or neutral feelings. Following mood induction, subjects were asked to recall and rate a painful incident from the past. They then read stories concerning the painful episodes of others and rated the intensity and quality of the pain likely to result from the described episode. Finally, they judged the number of days during the past year on which they experienced various kinds of pain.

Method

Subjects

Ninety-four undergraduates (51 males and 43 females) enrolled in an introductory psychology course served as subjects and received course credit for their participation. Subjects were between the ages of 18 and 23.

Procedure

Mood induction. A tape-recorded mood induction procedure based on one developed by Wright and Mischel (1982) and previously used in this lab (Salovey & Birnbaum, 1989; Salovey & Singer, 1989) was employed. Subjects were told that the focus of the study was on their ability to imagine vividly a past event and therefore they would be asked to try to visualize a scene as earnestly as possible. Once seated in private cubicles, subjects listened through headphones to a seven-minute, tape-recorded message. Subjects were instructed by a taped, female voice to imagine a previously experienced event during which they felt either happy, sad, or neither happy nor sad. The specific instructions were as follows:

> I would like for you to begin imagining a situation that would make you feel (happy, sad, or neutral). Imagine the situation as vividly as you can. Picture the events happening to you. See all the details of the situation. Picture in your "mind's eye" the surroundings as clearly as possible. See the people or objects; hear the sounds; experience the event happening to you. Think the thoughts you would actually think in this situation. Feel the same (happy, sad, neutral) feelings you would feel. Let yourself react as if you were actually there.

Subjects were then given approximately three minutes to visualize the event and experience the feelings. This procedure, called the Autobiographical Recollections Method or Self-Generated Imagery, has been shown effective in inducing various mood states (Salovey & Birnbaum, 1989; Salovey & Singer, 1989; Wright & Mischel, 1982).

Measures. The following measures were completed before the mood induction procedure was administered:

(a) Happiness subscale of the Differential Emotions Scale (Izard, 1971). Subjects rated on 7-point Likert-type scales 16 different adjectives that loaded on the happiness factor of the DES.

(b) Present symptoms and pain questionnaire. Subjects were asked to check on a list of 33 symptoms (e.g., sore throat, headache) whether they had experienced the sensation (a) in the previous 7 days, (b) in the previous 24 hours, and (c) if experienced, how much discomfort they endured due to the symptom (0-4 scale). This symptom list was based on the Wahler (1968) Physical Symptom Inventory.

The following questionnaire was completed after the mood induction procedure and served as a check on effectiveness of mood induction:

(a) Mood manipulation check. On 7-point scales, subjects were asked to rate their feelings using a list of six adjectives (e.g., not happy-very happy, not content-very content). This measure has been used previously as a brief but reliable check on laboratory induced joy and sorrow (e.g., Rosenhan, Salovey, & Hargis, 1981).

The following measures served as the primary dependent variables in this experiment:

(a) Recall of painful incident. Subjects were asked to recall a recent event (from the past year) in which they experienced physical pain. Subjects were then asked several questions concerning the pain. They were to describe briefly the incident, report how long the pain lasted and when it occurred. Subjects were asked to rate the maximum level of pain experienced during this incident by marking an "X" on a 100mm visual analogue scale ("no pain" to "pain as bad as it can be"). Similarly, they were asked to rate on the 100mm visual analogue scale the 'average' amount of pain experienced, how much this pain interfered with daily activities, and how vividly the incident could be recalled. Subjects also reported on the pain's temporal qualities (e.g., constant, rhythmic, or brief) and its severity using the Pain Rating Index (PRI) and pain adjectives of the McGill Pain Questionnaire (MPQ; Melzack, 1975).

(b) Pain scenarios and judgments. Subjects read six scenarios describing hypothetical situations in which pain was experienced by the protagonist. After reading each scenario, subjects rated the intensity of the hypothetical pain (on a 100mm VAS) one would experience immediately following the incident, the intensity of pain that would be experienced ten minutes later, and the quality of pain on the MPQ pain adjectives. The order of presentation of the six stories was randomized and responses averaged across them.

(c) Pain during past year. Subjects indicated which of 7 types of pain they had experienced in the past year: headaches, backaches, stomach aches, joint pains, muscle pains, dental pains, and pain for other reasons.

For each type of pain, subjects estimated the number of days on which it was experienced in the previous 12 months, the usual severity of the pain (on a 0-5 scale), and the maximum pain experienced (also on a 0-5 scale).

Results

Measures Prior to Mood Induction

A two-way (gender x assigned mood induction condition) MANOVA was conducted across the dependent variables that were measured prior to the mood induction procedure. These included the Differential Emotions Scale, the measures of present symptoms, symptoms from the past week, and discomfort due to symptoms. The purpose of this analysis was to demonstrate that prior to mood induction, there were no differences in either mood or symptom reporting across the three groups. In fact, neither the main effect for mood, gender, nor the mood by gender interaction approached significance. Means for these measures are provided in Table 1.

Mood Manipulation Check

A two-way ANOVA (gender x mood) was conducted on the six-item mood check to ensure that happy and sad moods had been properly induced. As can be seen in Table 2, subjects reported the most positive affect in the happy condition and the least in the sad condition ($F(2,88) = 42.00$, $p < .0001$). According to Tukey's Multiple Comparison Procedure, both the happy and sad conditions produced significantly more and less positive affect, respectively, as compared with the neutral condition. The main effect for gender and the mood x gender interaction were not significant.

Recall and Ratings of Painful Incident

Subjects next recalled a recent painful episode, rated its intensity on the several visual analogue scales and rated the quality of the painful experience on the McGill Pain Questionnaire adjectives. The means for these ratings are displayed in Table 2. A two-way MANOVA across this set of dependent variables revealed no main effect for mood (Wilks's lambda = 0.84, $F(16, 162) = 0.92$), but a significant main effect for gender (Wilks's lambda = 0.70, $F(8, 81) = 4.42$, $p < .0005$). The mood x gender interaction did not quite reach conventional levels of significance in the MANOVA (Wilks's lambda = 0.80, $F(16, 162) = 1.22$).

Follow-up two-way ANOVAs revealed that the main effect for gender was due to women rating their recalled pain experience as more interfering with daily routines than men ($F(1, 88) = 3.80$, $p = .05$), and on the McGill Pain Questionnaire, women chose more evaluative adjectives than men ($F(1, 88) = 5.70$, $p < .05$).

Although the interaction term was not significant in the MANOVA and so follow-up analyses must be interpreted with extreme caution, univariate two-way ANOVAs did reveal significant mood x gender interactions for maximum pain reported on the VAS ($F(2, 88) = 4.77$, $p < .01$), average pain reported on the VAS ($F(2,88) = 4.77$, $p < .01$), and the vividness of the recalled incident ($F(2,88) = 3.20$, $p < .05$). Similar interactions were found on the ratings of the pain's affective qualities ($F(2,88) = 4.06$, $p < .05$) and evaluative qualities ($F(2,88) = 4.22$, $p < .05$) on the McGill Pain Questionnaire.

In order to understand these interactions, a linear trend analysis and a quadratic trend analysis were conducted first for the men and then the women across these dependent variables. For the men, none of the linear trends were significant. However, a significant quadratic trend (i.e., a U-shaped curve characterized by higher pain ratings in happy and sad conditions and lower pain ratings in the neutral condition) emerged on several variables: maximum pain ratings ($F(1, 48) = 6.90$, $p < .01$), average pain ratings ($F(1, 48) = 8.27$, $p < .01$), interference ratings ($F(1,48) = 4.83$, $p < .05$), vividness ratings ($F(1, 48) = 5.17$, $p < .05$), and all of the McGill Pain Questionnaire ratings ($F(1,48) = 4.93, 6.66, 3.69$, respectively, for the sensory, affective, and evaluative, qualities of the pain, all $p < .05$). None of the quadratic trends revealed significant differences among women on these measures. However, significant linear trends did emerge among women on ratings of the affective and evaluative qualities of the painful experience ($F(1, 40) = 4.76$ and 3.52, $p < .05$ and $.07$, respectively). These trends, however, were in the mood-<u>in</u>congruent direction (i.e., highest pain intensity reported in the happy condition and lowest in the sad condition), and we will not try to interpret these anomalous findings.

Judgments About Hypothetical Pain Scenarios

There were no systematic differences for story version on the ratings of the six hypothetical stories so data were averaged across them. Means by mood and gender for these ratings are displayed in Table 3. A two-way (mood x gender) MANOVA was conducted across the six story ratings. There was no mood main effect (Wilks's lambda = 0.88, $F(12, 166) = 0.87$), nor a significant gender main effect (Wilks's lambda = 0.96, $F(6, 83) = 0.64$), but there was a borderline significant mood x gender interaction (Wilks's lambda = 0.80, $F(12, 166) = 1.59$, $p < .10$).

Two-way univariate ANOVAs revealed significant Mood x Gender interactions on the following variables: level of pain expected after 10 minutes ($F(2, 88) = 2.81$, $p < .06$), affective adjectives on the McGill Pain Questionnaire ($F(2, 88) = 3.62$, $p < .05$), and evaluative adjectives on the McGill Pain Questionnaire ($F(2, 88) = 3.38$, $p < .05$).

To interpret these interactions, linear and quadratic trend analyses were conducted first on the data for men, looking across the three mood conditions, and then for women. On these variables, there were no systematic linear or quadratic trends across the mood conditions among men. However, for women, significant linear trends (representing mood congruent pain reporting with lowest pain reported in the happy condition and highest in the sad condition) emerged for level of pain expected after 10 minutes ($F(1, 40) = 7.09$, $p = .01$) and on all of the MPQ adjective scales ($F(1, 40) = 4.56, 4.97$, and 5.13, respectively for sensory, affective, and evaluative adjectives, all $p < .05$).

Recall of Pain From Past Year

Finally, subjects were asked to indicate whether they had experienced each of 7 different kinds of pain during the past year (yes/no), to estimate the number of days on which the pain was experienced (0 to 365), to rate the usual level of intensity associated with each pain type (0 to 5), and to rate the maximum level of pain associated with each pain type (0 to 5). The ratings across the 7 kinds of pain were then summed into indices for the first two measures and averaged for the latter two. Means on these indices by mood condition and gender are depicted in Table 4.

A two-way (Mood X Gender) MANOVA revealed no systematic effects for mood, gender, nor a significant mood x gender interaction. Moreover, follow-up univariate tests were not significant. However, inspection of the means for the sum of the number of painful days during the past year reveals the familiar quadratic pattern (i.e., the U-shaped curve with happy and sad high and neutral low) for men and the linear, mood-congruent pattern (i.e., sad high, happy low) for these ratings among women.

Discussion

We hypothesized that pain ratings, whether based on autobiographical incidents or in reaction to fictitious vignettes, should be mood sensitive. In particular, we expected that sad moods would inflate pain ratings of all kinds and happy moods would suppress them. We had no a priori expectations regarding gender differences in these processes. In fact, the data collected in this experiment revealed a more complicated pattern of results. Men and women differed in the way in which mood influenced their pain ratings. Women, for example, showed the predicted mood congruent pattern of pain ratings when they judged hypothetical pain vignettes. Men, however, showed no consistent influence of mood on these ratings. On the other hand, when judging a previous "autobiographical" experience with pain, there was no influence of mood on the ratings of women, but men showed a U-shaped influence of mood. For men, both happy and sad moods inflated pain ratings for the autobiographical incident as compared with the neutral mood control condition.

What are we to make of these results? The findings that are most consistent with our hypotheses were women's ratings of hypothetical vignettes. In that case, sad mood biased ratings in the more severe direction and happy mood attenuated them. The notion that mood increases the availability of mood congruent thoughts which subsequently bias judgment in the mood congruent direction is supported by these findings.

When mood affected men, which only happened on the initial ratings of the "real life" painful incident, the results were more complex. Both happy and sad mood produced more severe pain judgments as compared with the control condition. This result is not consistent with predictions based on mood congruent recall or on depression-induced self-focused attention. However, it is consistent with an hypothesis put forth by Salovey and Rodin (1985) suggesting that self-focused attention follows all emotionally evocative experiences, not just negative ones. This hypothesis has received some, limited, empirical support (Salovey, 1986), and so we offer it here as speculative grist for the post hoc mill.

Future work, we hope, will suggest whether a linear, mood congruent bias or a U-shaped, mood-induced self-focusing bias is the way in which mood influences pain judgments. In fact, we are currently trying to replicate this experiment with a more randomly selected community sample. The most puzzling finding concerns the differential influence of mood on men and women. Although it may not make sense to speculate too much about these difference until we see whether or not they replicate, we did conduct several regression and covariance analyses to explore whether gender is associated with some other variable that moderates the impact of mood on pain judgment. Although these analyses have not revealed the missing piece to this puzzle, they have confirmed that the gender differences in the impact of mood do not seem to be the result of (a) differences in the type of pain imagined following mood induction, (b) differences in responsiveness to the mood induction itself, (c) differences in baseline mood or level of symptomatology, or (d) differences in the vividness with which pain experiences could be imagined. There are gender differences in response to emotion that cannot be explored in the present study but which may need to be investigated. For example, women are often thought to be more skilled at self-regulating their emotions and using emotional information in constructive ways (Salovey & Mayer, in press).

Others have conjectured that induced mood might have a differential impact on pain judgments depending on the "base-line" mood in which subjects entered the experimental situation. Multiple regression analyses were conducted to determine the contribution of base-line mood and induced mood to pain ratings. An interaction term was included in these analysis to test whether induced mood has differential impact on pain judgments depending on the level of base-line mood. These interaction terms were never statistically significant.

The present findings, while possibly intriguing, are certainly not conclusive. They may not even provide us with the satisfaction of feeling like we understand the systematic influence of mood on pain perceptions and judgments. In the coming months, we hope to be able to report on the results of our replication study as well as the findings of the experiments exploring the other three sources of bias in pain ratings mentioned at the outset of this paper.

Footnote

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Table 1:
Means on Mood and Symptom Scales Prior to Mood Induction by Mood and Gender

	Assigned Mood Condition					
	Happy		Neutral		Sad	
	M (N=15)	F (N=15)	M (N=17)	F (N=14)	M (N=19)	F (N=14)
Differential Emotions Scale						
M	4.48	4.36	4.24	4.84	4.22	4.30
sd	.95	1.10	1.05	1.06	.83	1.27
Present Symptoms and Pain: Past 24 hours						
M	8.57	7.47	7.24	6.29	6.63	8.79
sd	7.63	4.66	5.89	3.34	4.30	3.62
Present Symptoms and Pain: Past Week						
M	11.60	10.73	12.00	9.29	9.89	12.14
sd	7.33	4.85	5.83	4.89	4.01	3.70
Present Symptoms and Pain: Discomfort						
M	.94	.70	.65	.62	.56	.72
sd	.93	.37	.51	.45	.40	.33

Table 2:
Ratings of Recent Painful Experience After Mood Induction by Mood and Gender

	Mood Induction Condition					
	Happy		Neutral		Sad	
	M	F	M	F	M	F
Mood Check						
M	30.67	28.07	23.76	27.07	15.47	13.29
sd	8.36	9.22	5.38	5.64	6.40	3.79
Pain Maximum (100 mm VAS)						
M	78.53	68.87	53.47	76.57	68.53	60.21
sd	25.05	23.07	29.04	18.26	22.72	20.49
Pain Average (100 mm VAS)						
M	56.27	48.87	35.18	51.64	54.53	35.71
sd	24.34	23.39	23.04	23.05	23.56	20.27
Pain Interference (100 mm VAS)						
M	47.33	54.13	25.88	58.43	45.37	45.86
sd	35.82	37.69	27.18	36.89	30.91	27.98
Pain Vividness (100 mm VAS)						
M	81.93	67.27	55.71	77.79	68.79	64.50
sd	24.87	24.47	33.27	32.55	27.98	31.33
MPQ Sensory Adjectives						
M	16.47	12.73	12.76	14.71	18.47	14.64
sd	7.31	6.36	5.34	7.93	8.25	5.00
MPQ Affective Adjectives						
M	3.47	3.87	1.24	3.29	3.68	1.43
sd	3.34	4.16	1.95	2.76	3.56	1.28
MPQ Evaluative Adjectives						
M	2.67	3.13	1.76	3.50	2.42	2.21
sd	1.45	1.41	1.39	1.34	1.26	1.19
MPQ Total Score						
M	30.13	24.26	20.82	25.79	31.47	22.14
sd	13.84	11.92	8.62	13.18	14.33	6.71

Table 3:

Pain Ratings of Hypothetical Stories by Mood and Gender

	Mood Induction Condition					
	Happy		Neutral		Sad	
	M	F	M	F	M	F
Pain Now						
M	59.54	57.93	60.93	63.60	61.85	59.64
sd	15.70	14.48	14.20	13.80	14.06	12.25
Pain 10 Minutes Later						
M	50.49	43.00	42.89	49.19	47.08	54.75
sd	13.63	12.49	16.33	14.19	15.50	8.04
MPQ Sensory Adjectives						
M	15.06	12.04	13.26	13.81	16.72	15.64
sd	6.05	4.47	5.11	4.65	5.87	4.50
MPQ Affective Adjectives						
M	3.32	1.38	2.11	2.55	2.66	2.63
sd	2.09	1.20	1.36	1.65	2.50	1.66
MPQ Evaluative Adjectives						
M	2.80	2.28	2.68	2.69	2.55	2.80
sd	.54	.81	.47	.55	.67	.40
MPQ Total Score						
M	26.84	19.57	22.84	23.33	27.45	26.71
sd	9.23	7.04	8.26	7.61	10.68	6.92

Table 4:

Recall of Frequency of Painful Episodes from Previous Year by Mood and Gender

	Mood Induction Condition					
	Happy		Neutral		Sad	
	M	F	M	F	M	F
Types of Painful Experiences During Past Year (0 - 7)						
M	4.40	4.73	4.59	4.36	4.53	4.93
sd	1.24	1.10	1.28	1.50	1.40	0.92
Sum of Number of Painful Days During Past Year						
M	227	170	112	197	175	272
sd	353	129	100	224	178	283
Mean Rating of "Usual" Pain Intensity						
M	1.50	1.41	1.35	1.36	1.36	1.42
sd	.83	.41	.56	.58	.48	.24
Mean Rating of "Maximum" Pain Intensity						
M	2.35	2.38	2.24	2.27	2.35	2.32
sd	1.23	.61	.76	.97	.85	.52