Abstract: The objective of our study was to assess the relation of current pain ratings to observer versus field modes of memory retrieval in patients with chronic pain. Memories from an observer perspective involve seeing oneself in the original event as if from an external point of view; memories from a field perspective involve recalling the event as if viewing it through one’s own eyes. Sixty-one patients with chronic pain were asked to (1) recall a painful memory, (2) indicate whether they saw themselves in the memory (observer mode) or re-experienced events of the memory from the first-person perspective (field mode), and (3) rate various phenomenologic properties of the memory. Twenty of these pain patients were also given two frontal lobe tests to examine potential neuropsychologic correlates of memory retrieval preferences. Memory retrieval in the field mode was associated with (a) significantly higher self-reported pain scores on the McGill Pain Questionnaire, (b) non-right-handedness, and (c) poorer performance on the tests of frontal function. Patients with chronic pain who adopt the field mode of memory retrieval when recalling painful memories experience greater current pain severity than chronic pain patients who adopt observer retrieval strategies. Those adopting field retrieval strategies may also evidence frontal system neuropsychologic anomalies.

Key Words: Chronic pain, memory, frontal lobes, observer memories, field memories.

Personal memories can be recalled from either an observer or a field perspective (Nigro and Neisser, 1983). When adopting the observer perspective, persons see themselves as actors in the remembered scene. When adopting the field perspective, they see or experience the events of the memory unfold as they apparently did when they first experienced the event, with many of the sensory features of the event re-experienced. Observer memories are more common when one recalls an event involving heightened self-consciousness, such as public speaking; field memories are more common with events involving intense affect (Nigro and Neisser, 1983).

Although data are not available on whether healthy populations rely more often on one or the other retrieval strategy when recalling autobiographical memories, an over-reliance on the observer mode of remembering has been documented in selected clinical populations. For example, patients with posttraumatic stress disorder (PTSD) (Foa and Rothbaum, 1998) and patients with social phobia (Clark and Wells, 1995) more often adopt observer modes of remembering in recalling autobiographical memories involving social situations evoking high anxiety levels when compared with healthy controls. McIsaac and Eich (2002) suggest that the preference for the observer perspective in these clinical populations may serve to distance the individual from experiential aspects of remembering. To the extent that these patients display a recall bias for unpleasant autobiographical memories, adopting the observer perspective may help to dampen negative affect associated with recall of unpleasant memories. Despite the immediate mood-regulatory effects of observer modes of remembering, some authors have suggested that adoption of the observer perspective may have negative clinical effects as well. If emotional engagement during recall of earlier unpleasant or traumatic memories is helpful for resolution and letting go of those memories (Foa and Hearst-Ikeda, 1996), then adoption of the observer perspective may be clinically counterproductive.

Current pain experience in patients with chronic pain may be directly influenced by the ways in which negative or
pain-related memories are recalled (Bryant, 1993; Christianson and Safer, 1995; Gamsa, 1994; Wright and Morley, 1995). Many patients with chronic pain display a recall bias for unpleasant and pain-related autobiographical memories (Gamsa, 1994; Wright and Morley, 1995). Morley (1993) studied the extent to which vivid memories for everyday pains influenced possible re-experiencing of the qualities of the remembered pain event. Adapting questionnaire and interview methods from the experimental literature on assessment of autobiographical memory, he found that experiential elements (distress and intensity) of a current pain experience were significantly associated with reported vividness of the original pain event memory. Given the evidence for effects of memory and recall strategies on pain experience in patients with chronic pain, we designed the current study with the primary aim of evaluating observer versus field recall biases in patients with chronic pain.

As a secondary aim, in a subset of our research participants, we examined the relation between frontal system function and observer versus field mode of memory retrieval. Memory retrieval strategies in both healthy subjects and in clinical populations appear to be influenced by neuropsychologic variables, but these variables are underinvestigated in patients with chronic pain. Neurocognitive systems of the right frontal cortex may be particularly important in this regard (McNamara et al., 2000; Nyberg et al., 1996; Wheeler et al., 1997). In a review of positon emission tomography (PET) studies on episodic encoding and retrieval processes, Wheeler et al. (1997) concluded that episodic retrieval is associated with increased blood flow in the right frontal cortex with no increased blood flow in left frontal cortex, whereas episodic encoding is associated with the opposite pattern, i.e., increased flow in left-frontal cortex and no increased flow in right frontal cortex (see also Nyberg et al., 1996). Right frontal activation has also been associated with retrieval of negative autobiographical memories. Rauch et al. (1996) used a symptom provocation design together with PET to investigate brain systems that mediate retrieval of negative memories in PTSD. Eight patients with PTSD were studied using script-driven imagery to elicit symptoms. Increases in measures of autonomic nervous system function and normalized blood flow were found for right anterior limbic and paralimbic regions and for posterior visual areas. Similarly, Schiffer et al. (1995) presented evoked potential evidence for right-sided brain activity during recall of traumatic memories in a group of subjects with childhood trauma histories. Taken together, these studies indicate a potential role for right frontal systems in retrieval of negative emotional and autobiographical pain memories that may be an important mediator of observer versus field retrieval strategies in patients with pain syndromes.

Specifically, in the present study, we tested the following two hypotheses: (1) patients with chronic pain who fail to adopt the observer perspective, but instead rely on the field perspective, will evidence greater current levels of pain; and (2) the inability to adopt an observer strategy is related to frontal system dysfunction.

**MATERIALS AND METHODS**

Participants represented a convenience sample of volunteers with histories of pain greater than 6 months duration who had sought treatment of their chronic pain from the Pain Management Group in the Department of Neurology at the Boston Medical Center. Sixty-one patients with chronic pain were recruited. Procedures of the study were explained to each volunteer, and informed consent was obtained. Twenty-four of the participants were diagnosed with degenerative disease of the spine or low back pain, 23 with myofacial and/or neck pain involving cervical radiculopathy, six with neuropathic pain, five with headaches or migraines, and three with other joint, face, or abdominal pains. The average duration of the pain syndrome in this group was 8.12 years. At the time of the study, all participants were taking pain medications and/or antidepressants (often as adjuvant analgesics) for their pain.

Participants were asked to recall a painful memory and indicate one of the following: whether they saw themselves in the memory (observer mode of memory retrieval) or whether they re-experienced events of the memory from a first-person perspective (field mode of memory retrieval). They were then asked to rate the rehearsal properties of the memory on a scale from 1 (low) to 7 (high). By rehearsal properties, we mean answers to such questions as the following: “How often do you speak about the memory? How often do you think about the memory? How often do you dream about events in the memory? Does the memory ever pop into or intrude into your daily thoughts?” When patients asked for clarification about the type of memory to recall, they were told that a physically painful event was intended.

Instructions were as follows:

“Please take a moment to recall a physically painful event that is significant in terms of its impact on your life. Please write out a description of this event in as much detail as possible. Try to remember the emotions you felt at the time, where you were when it occurred, and so forth. When you have completed the description, please answer the questions on the following page.”

Patients were also administered the logical memory test from the Wechsler Memory Scale—Revised (WMS-R), the Edinburgh Handedness Questionnaire, the McGill Pain Questionnaire, and the Hamilton Rating Scale for Depression. The logical memory test was given to assess baseline recall ability; it measures ability to recall a short story after a delay of 20 minutes. Outcome score for the logical memory test was the number of basic thematic elements of the story recalled. The Edinburgh Handedness Inventory (Oldfield,
interference is calculated as a ratio of the time taken to name the colors in the congruent condition and time taken to name the color words printed in black ink. We also tabulated the number of errors committed (e.g., giving the word rather than the color) during the interference condition. PET studies show that frontal cortex is activated in normals during the Stroop interference condition (Bench et al., 1993) with slightly greater right-sided effects.

For purposes of statistical analysis, we divided participants into two groups on the basis of their observer versus field recall preferences and used Bonferroni-corrected t-tests for independent groups to assess mnemonic, pain, and neuropsychologic differences between these two groups.

RESULTS

Of the 61 participants, 36 (60%) used the observer mode of memory retrieval, and 24 (40%) used the field mode. One patient could not indicate retrieval preference for a pain memory, and his data were not included in further analysis. Table 1 displays memory characteristics (logical memory recall and rehearsal ratings) of the observer and field groups. Table 2 displays clinical characteristics and neuropsychologic scores for the observer and field groups. No significant differences were found between the two groups on baseline recall abilities as indicated by performance on the logical memory test of the WMS (Table 1). Nor did the two groups differ in terms of age, educational levels, or mean depression ratings (Table 2).

With respect to the relation between current pain and memory retrieval preference, the field group reported higher pain severity ratings than the observer group. Mean total score on the McGill Pain Questionnaire was significantly higher in the field group (mean = 46.5 [11.9]) than in the observer group (mean = 38.2 [9.7]; p < .01; Table 2).

With respect to neuropsychologic differences, participants reporting field memories evidenced significantly lower laterality scores (indicating greater nonright-handedness)
TABLE 2. Clinical Characteristics of Observer Versus Field Groups*  

<table>
<thead>
<tr>
<th>Measure</th>
<th>Observer</th>
<th>Field</th>
<th>p Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of total</td>
<td>60%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>49.2 (8.8)</td>
<td>49.8 (11.4)</td>
<td>NS</td>
</tr>
<tr>
<td>Education</td>
<td>12.6 (2.0)</td>
<td>12.0 (2.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Hamilton Rating Scale for</td>
<td>20.8 (9.3)</td>
<td>17.5 (8.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPQ totalc</td>
<td>38.2 (9.7)</td>
<td>46.5 (11.9)</td>
<td>.01</td>
</tr>
<tr>
<td>MPQ PPId</td>
<td>2.6 (0.5)</td>
<td>3.3 (1.5)</td>
<td>NS</td>
</tr>
<tr>
<td>Handedness</td>
<td>87.3 (15.8)</td>
<td>57.5 (50.7)</td>
<td>.014</td>
</tr>
<tr>
<td>Stroop interference time</td>
<td>55.2 (8.0)</td>
<td>64.5 (32.8)</td>
<td>.01</td>
</tr>
<tr>
<td>Verbal fluency (letter)</td>
<td>36.8 (7.8)</td>
<td>35.7 (13.1)</td>
<td>NS</td>
</tr>
<tr>
<td>Verbal fluency (animals)</td>
<td>21.0 (5.2)</td>
<td>16.5 (6.8)</td>
<td>.04</td>
</tr>
</tbody>
</table>

*aValues are means (SDs).  
*bValues Bonferroni-corrected.  
*cMcGill Pain Questionnaire total score.  
*dMcGill Pain Questionnaire, Present Pain Intensity.

than those reporting observer memories (observer mean = 87.3 [15.8]; field mean = 57.5 [50.7]; p = .014). Mean completion times on the Stroop interference test were significantly faster for the observer group (mean = 55.2 [8.0] s) versus the field group (64.5 [32.8] s; p = .01). The field group mean on this Stroop variable is outside the normal range for its age group (~5 years old) and is more typical of an impaired elderly group (see, for example, McNamara et al., 2003). The observer group produced a greater mean number of words on the animals semantic fluency task than did the field group (observer mean = 21.0 [5.2]; field mean = 16.5 [6.8]; p = .04).

DISCUSSION

This is a preliminary study, and all findings and conclusions must be considered tentative at this time. We found that patients with chronic pain who use a field recall strategy when recalling a painful memory tend to report significantly higher current pain severity ratings than those adopting an observer strategy. Patients using field retrieval strategies were also more likely to be nonright-handed and to perform more poorly on two tests of frontal lobe function than those adopting an observer strategy.

To our knowledge, a correlation between the field mode of memory retrieval and current pain severity has not been reported before. This finding has important clinical implications, because previous studies have shown that current pain experience in patients with chronic pain may be directly influenced by the ways in which negative or pain-related memories are recalled (Bryant, 1993; Christianson and Safer, 1995; Gamsa, 1994; Wright and Morley, 1995). The field retrieval mode is known to be associated with greater recall of sensory features of the original event (McIsaac and Eich, 2002), and this characteristic of field retrieval may have contributed to greater pain levels in persons who used the field strategy.

In an earlier article, we suggested that chronic pain might be a form of ruminative autobiographical memory linked to frontal (especially right frontal) systems. In the present study, we found that field retrieval strategies were associated with greater nonright-handedness and poorer frontal lobe performance on Stroop and semantic fluency tasks. Despite the preliminary nature of this study, one might speculate that the association between these neuropsychologic variables and the field mode of memory retrieval may be related to right frontal specialization for negative memory retrieval and for negative affect (see review in McNamara et al., 2000). Rumination, perseveration, and retrieval of negative memories have all been linked to right frontal activities in other patient populations (Edwards-Lee and Saul, 1999; Rauch et al., 1996; Robinson et al., 1984; Schiffer et al., 1995), and several investigators have argued for a special role for the right hemisphere in control of pain severity, chronicity, and tolerance (Hari et al., 1997; Hsieh et al., 1996; Neri and Agazzani, 1984; Pauli et al., 1999). Advances in functional neuroimaging techniques have confirmed that right-sided cortical networks do help to mediate both acute and chronic pain states (Derbyshire and Jones, 1998; Hsieh et al., 1995; Iadarola et al., 1998; Jones, 1998; Talbot et al., 1991).

Although these considerations suggest that adoption of a field-retrieval strategy indirectly increases vulnerability to greater pain severity, it may be the other way round: greater pain severity, for example, may bias the processing system against adoption of the observer perspective when recalling painful memories. In the latter case, the individual with more severe pain syndromes would find it more difficult to adopt the observer perspective and thus abstract away from re-experiencing sensory detail of the original pain event. In the former case, the individual starts with a bias toward adoption of a field retrieval strategy, and this strategy leads to greater pain levels upon recall of pain events. Given that this was a correlational study, our data do not allow us to decide between these alternatives. However, development of effective clinical interventions will depend on clearly sifting through potential causal routes connecting memory perspective and pain levels.

One factor that will be critical when evaluating the direction of effects on pain involving these memory retrieval biases is the stability of these biases. For example, do individuals consistently prefer one retrieval strategy over another? Unfortunately, no data are yet available on the issue. To our knowledge, no longitudinal studies on preferences for observer versus field retrieval strategies have yet been conducted. The clinical literature suggests that stable preferences...
for one retrieval strategy over the other are not found in healthy subjects. Rather, recent memories are recalled from the field perspective, whereas longer-term memories tend to be recalled from the observer perspective. In clinical populations, on the other hand, there appears to be a tendency for stability in use of one strategy over the other. Social phobics, for example, tend to adopt the observer strategy when recalling high-anxiety social situations.

Caution is also in order when considering the association we found between nonright-handedness, field recall, and impaired frontal performance. This set of associations may have been a result of early brain insult in individuals displaying these associations, rather than current pain levels. Although the concept of pathological left-handedness is controversial, early and perinatal brain insult is often associated with later nonright-handedness or ambidexterity and selected changes (either impairment or improvement relative to controls) in cognitive processing abilities (Fein et al., 1985; Kolk and Talvik, 2002). It is possible, therefore, that pain syndromes and frontal impairment exhibited by individuals in our studies exhibiting nonright-handedness may be independently related to undocumented neurodevelopmental factors.

**CONCLUSION**

The findings in this study may have implications for treatment of chronic pain. Suffering in patients with pain may be ameliorated by cognitive therapies that influence preference for observer versus field modes of remembering.

**REFERENCES**


