The effects of disclosure on pain during dental hygiene treatment: the moderating role of catastrophizing

Michael J.L. Sullivan a, b, *, Nancy Neish c

a Department of Psychology Psychiatry, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada
b Department of Psychiatry, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada
c School of Dental Hygiene, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada

Received 30 November 1997; received in revised form 28 July 1998; accepted 17 August 1998

Abstract

Catastrophizers and non-catastrophizers were asked to disclose about their dental worries prior to undergoing dental hygiene treatment. It was hypothesized that the effects of emotional disclosure would vary as a function of the level of catastrophizing; where catastrophizers would be more likely than non-catastrophizers to show reductions in pain and emotional distress. The study also examined whether emotional disclosure influenced subsequent levels of catastrophizing and dental anxiety. Eighty undergraduate students were randomly assigned to a disclosure condition or a control condition prior to undergoing a scaling and root planing procedure. In the control condition, catastrophizers reported significantly more pain and emotional distress than non-catastrophizers. In the disclosure condition, catastrophizers and non-catastrophizers did not differ significantly in their pain and emotional distress. The interaction between condition and level of catastrophizing remained significant even when controlling for emotional distress and the emotional content of the thought records. While catastrophizers benefited from disclosure in regard to their immediate physical and emotional experience, their levels of catastrophizing and dental anxiety remained essentially unchanged. Theoretical and clinical implications of the findings are discussed.

Keywords: Dental hygiene treatment; Pain; Catastrophizing; Disclosure

1. Introduction

Research suggests that emotional disclosure following exposure to aversive situations may have beneficial effects on physical and emotional well-being (Pennebaker and O’Heeron, 1984; Pennebaker and Susman, 1988; Pennebaker, 1995). Other research has shown that individuals differ markedly in the degree of distress they experience in response to aversive situations (Turk and Rudy, 1992; Sullivan et al., 1995). For example, individuals who score high on measures of catastrophizing show exaggerated distress responses to aversive stimulation (Chaves and Brown, 1978, 1987; Sullivan et al., 1995). The hypothesis under investigation in this study was that the benefits of disclosing emotionally upsetting material may be restricted to individuals who experience heightened distress in response to aversive stimulation. To address this hypothesis, the present research examined the effects of emotional disclosure on pain in catastrophizers and non-catastrophizers undergoing dental hygiene treatment.

1.1. Disclosure and distress

Numerous investigations have shown that emotional disclosure can lead to reductions in emotional distress in individuals who have experienced severe stresses such as personal trauma or loss (Burkovec and Hu, 1990; Pennebaker, 1990). Disclosure of emotionally upsetting information has also been shown to have a positive impact on indices of immune function, health status and health care utilization (Pennebaker et al., 1988; Esterling et al., 1990; Pennebaker, 1993a). The results of a recent investigation showed that emotional disclosure in patients with rheumatoid arthritis led to significant reductions in affective disturbance and physical symptoms (Kelley et al., 1997). In the latter...
study, the beneficial effects of disclosure persisted over a 3-month period. Other investigators have stressed the maladaptive effects of ‘not disclosing’ or, in other words, inhibiting expression of emotional experience (Weinberger et al., 1979; Wegner et al., 1987; Schwartz, 1990). It has been suggested that the act of inhibiting expression of emotional experience may give rise to disturbing thought intrusions (Horowitz, 1986), may result in chronic states of negative mood (Wenzlaff et al., 1991; Wegner and Lane, 1995), and ultimately compromise an individual’s ability to deal effectively with emotionally upsetting experiences (Wegner et al., 1987; Wegner and Eber, 1992; Wegner, 1994). Several experimental investigations have shown that suppression of emotionally laden material can lead to autonomic hyper-reactivity, increased muscle tension and impaired immune function (Esterling et al., 1990; Labott et al., 1990; Traue, 1995). Recent research has also shown that instructions to suppress thoughts about pain lead to heightened pain experience (Cioffi and Holloway, 1993; Sullivan et al., 1997).

1.2. Catastrophizing and distress

There are indications that individuals differ in their experience of physical and emotional distress in response to aversive stimulation. In an early study, Chaves and Brown (1978, 1987) reported that individuals who ‘catastrophized’ during a dental surgery procedure reported that the experience was more stressful than individuals who did not catastrophize. Catastrophizing has been broadly defined as an exaggerated negative orientation to aversive stimuli that involves rumination about painful sensations, magnification of the threat value of the painful stimulus, and perceived inability to control pain (Chaves and Brown, 1978; Rosenstiel and Keefe, 1983; Sullivan et al., 1995). Since the early work of Chaves and Brown (1978), several studies have shown that catastrophizers experience more pain and emotional distress in response to a wide range of clinical conditions and aversive experimental procedures (Spanos et al., 1979; Rosenstiel and Keefe, 1983; Keefe et al., 1989; Heyneman et al., 1990; Sullivan et al., 1995; Sullivan and Neish, 1997).

It is possible that the benefits of emotional disclosure may vary as a function of the level of catastrophizing. For catastrophizers, emotional disclosure may reduce tension or facilitate coping, which in turn may reduce the pain and emotional distress they experience during stressful or aversive procedures. However, for non-catastrophizers, disclosure may have no significant effect on physical and emotional distress. If non-catastrophizers typically experience minimal pain or emotional distress in response to a particularly stressful or aversive procedure, then strategies for reducing distress may have no appreciable effect (e.g., floor effects). It is also possible that disclosure may have a negative impact on the distress levels of non-catastrophizers. If non-catastrophizers approach aversive situations with little or no negative thoughts or feelings, requiring them to engage in emotional disclosure may raise their level of tension, and in turn, may increase the pain and emotional distress they experience.

Examining the moderating role of catastrophizing following disclosure has both theoretical and clinical implications. First, demonstrating that the effects of disclosure vary as a function of level of catastrophizing would provide important information that may help clarify the mechanisms by which disclosure influences physical and emotional distress, as well as the mechanisms by which catastrophizing leads to increased physical and emotional distress. From a clinical perspective, identifying individual difference variables that determine the relative efficacy of distress reduction strategies may help clinicians tailor their interventions in a manner that can best address their clients’ specific needs. Given that pain is considered to be a significant determinant of avoidance of dental care, strategies for effective pain reduction may have beneficial effects on individuals’ oral health (Ronis, 1994; Sullivan and Neish, 1997).

1.3. The present study

In the present study, undergraduate students were randomly assigned to a disclosure condition or to a control condition prior to undergoing a scaling and root planing procedure (i.e., removing hard and soft deposits from the surface of teeth). Individuals were classified as catastrophizers or non-catastrophizers on the basis of their scores on the Pain Catastrophizing Scale (PCS; Sullivan et al., 1995). Consistent with previous research, we predicted that, in the control condition, catastrophizers would experience significantly more pain and emotional distress than non-catastrophizers. We predicted that disclosure would reduce the pain and emotional distress of catastrophizers. There was no basis for making strong predictions about the effects of disclosure on non-catastrophizers. The disclosure manipulation could have little or no effect, or could increase the pain and emotional distress of non-catastrophizers. The study also examined whether the effects of disclosure influenced subsequent levels of catastrophizing and dental anxiety.

2. Methods

2.1. Participants

Eighty students (54 women and 26 men) participated in exchange for course credit and free comprehensive dental hygiene treatment. All participants were enrolled in Introductory Psychology at Dalhousie University. The gender distribution of participants reflected the gender distribution of students enrolled in the Introductory Psychology course. Students were only considered for participation if they had not received dental treatment within the last 6 months.
2.2. Measures

2.2.1. Periodontal status
Periodontal status was determined by clinical evaluation that included visual inspection of gingiva (e.g. colour changes, inflammation), a measure of probing depths, bleeding and radiographic interpretation. On the basis of this information, the hygienist provided a rating on a 5-point severity scale: (1) healthy periodontium (2) gingivitis (3) early periodontitis (4) moderate periodontitis (5) advanced periodontitis.

2.2.2. Degree of scaling difficulty
A 4-point severity scale was used to indicate the location and distribution of hard and soft deposits on the teeth; ranging from (1) minimal supra gingival plaque and calculus to (4) heavy supra and/or sub gingival plaque and calculus.

2.2.3. Catastrophizing
The Pain Catastrophizing Scale (PCS; Sullivan et al., 1995) is a 13-item self-report measure on which respondents rate how frequently they experience different thoughts and feelings when in pain. Ratings are made on a 5-point scale with the endpoints (0) never and (4) always. The PCS has been shown to have high internal reliability (alpha coefficient for PCS total = 0.87), and has been shown to be stable for a 6–8 week period (test–retest $r = 0.78$; Sullivan et al., 1995). In the present study, the alpha coefficient for the total PCS was 0.91 (Cronbach, 1951). Participants scoring above and below the median (Md = 16) were classified as catastrophizers and non-catastrophizers, respectively.

2.2.4. Dental Anxiety
The Dental Anxiety Scale – Revised (DAS-R, check-up version; Ronis, 1994) assesses the degree to which participants experience fear or anxiety in response to imagining different aspects of dental procedures (i.e. preparing for a check-up, waiting for their turn in the chair, waiting while the dentist prepares the drill, and waiting while the dentist or hygienist prepares the scaling instruments). Participants’ responses are summed to yield a total score where higher values reflect more intense dental anxiety. In the present study, the reliability coefficient for the total DAS-R was 0.84.

2.2.5. Pain
Participants were asked to rate the degree of pain they experienced during the scaling and root planing procedure on an 11-point scale with the endpoints (0) no pain and (10) extreme pain. Previous research has shown that scaling and root planing procedures can produce significant pain and discomfort (Sullivan and Neish, 1997).

2.2.6. Emotional distress
Participants completed a brief measure of current mood consisting of 12 adjectives drawn from the Profile of Mood States (POMS; McNair et al., 1971). Ratings were made on an 11-point scale with the endpoints (0) not at all and (10) extremely. Mood adjectives were chosen to sample 4 different mood categories: (1) sadness (sad, discouraged, hopeless) (2) anger (angry, hostile, irritable) (3) anxiety (anxious, tense, worried) and (4) fear (afraid, terrified, scared). A composite score for emotional distress was computed by summing all 12 items of the mood scale. The reliability coefficient for the total scale was 0.81.

2.3. Procedure

2.3.1. Dental hygiene treatment
Comprehensive dental hygiene treatment was provided by 40 senior dental hygiene students. Dental hygiene faculty supervised all procedures and confirmed clinical assessment data.

2.3.2. Initial visit
Dental hygiene students contacted potential participants and scheduled their appointments. Participants were told that the purpose of the study was to examine the thoughts and feelings people experience during dental hygiene treatment. All participants were aware that they were taking part in an experimental investigation.

There was no experimental manipulation during the initial visit. Upon arrival at the dental clinic, participants completed a consent form, the PCS, and the DAS-R. The dental hygienist then collected information relevant to the participant’s health history (e.g. previous illnesses, hospitalizations, medications), and performed an oral examination. During the oral examination, the hygienist measured probing depths, and recorded the location and distribution of plaque and calculus deposits. Following the initial evaluation, participants were scheduled for a return appointment to complete the dental hygiene treatment (approximately 1 week later).

2.3.3. Second appointment
During the return visit, the scaling procedure was performed for all participants. During scaling procedures, dental hygienists used metal instruments to remove deposits from the teeth, above and below the gum line. The discomfort associated with scaling procedures may result from the pressure of the instrument against the tooth, or from contact between the instrument and the gingiva. Infected tissues that are inflamed and tender are typically more sensitive to touch and pressure.

At the termination of treatment, participants were asked to rate the pain they experienced during the scaling procedure. Following treatment, participants also completed the measure of emotional distress, the PCS, the DAS-R, and were debriefed.

2.3.4. Experimental manipulation
Participants were randomly assigned to one of the two
treatment conditions. Prior to the scaling procedure, all participants were provided with a clipboard holding a closed envelope which included experimental instructions and a thought record booklet. Participants were told that the dental hygiene student would return in 5 min to proceed with treatment. In the disclosure condition, participants were asked to write about the thoughts and feelings they typically experienced during dental treatment, focusing on the aspects of dental treatment they found most distressing. In the control condition, participants were asked to describe their activities from the previous day. Participants were asked to replace the thought booklet in the envelope and return the envelope to the dental hygiene student. Participants were asked not to discuss the contents of the envelope with the dental hygiene student.

3. Results

3.1. Sample characteristics

The mean age of the sample was 22.0 years (SD = 5.0) (Table 1). The mean rating of periodontal status was 2.04 (SD = 0.30) indicating that the typical participant was classified as having gingivitis (i.e. 1–3 mm probing depths, evidence of bleeding upon probing, with no radiographic evidence of bone loss due to periodontal disease). The mean rating of scaling difficulty was 1.87 (SD = 0.44). Participants reported brushing their teeth 2.4 (SD = 0.83) times per day and flossing 1.9 (SD = 2.3) times per week.

The mean pain rating for the scaling procedure was 3.22 (SD = 2.2) indicating that the procedure was associated with mild to moderate pain. Men and women did not differ significantly for pain ratings made during the scaling procedure, t(78) = 1.1, ns. There were no significant gender differences on indices of scaling difficulty, or periodontal status. Women (M = 17.9, SD = 8.9) scored marginally higher than men (M = 14.1, SD = 6.2) on the PCS, t(78) = 1.7, P < 0.09. Women (M = 2.5, SD = 0.93) reported brushing their teeth significantly more often than men (M = 2.1, SD = 0.33), t(78) = 2.2, P < 0.05.

Table 1
Sample characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Women n = 54</th>
<th>Men n = 26</th>
<th>Total n = 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>22.2 (5.4)</td>
<td>21.7 (4.7)</td>
<td>22.0 (5.0)</td>
</tr>
<tr>
<td>Periodontal Status</td>
<td>2.0 (0.3)</td>
<td>2.0 (0.3)</td>
<td>2.0 (0.3)</td>
</tr>
<tr>
<td>Treatment Difficulty</td>
<td>1.8 (0.4)</td>
<td>1.8 (0.4)</td>
<td>1.8 (0.4)</td>
</tr>
<tr>
<td>PCS</td>
<td>17.4 (8.9)</td>
<td>14.1 (6.2)</td>
<td>16.4 (8.3)</td>
</tr>
<tr>
<td>DAS-R</td>
<td>8.0 (2.8)</td>
<td>8.6 (2.5)</td>
<td>8.2 (2.7)</td>
</tr>
<tr>
<td>Pain</td>
<td>3.4 (2.2)</td>
<td>2.8 (2.0)</td>
<td>3.2 (2.2)</td>
</tr>
</tbody>
</table>

The numbers in parentheses are standard deviations.

Correlations among measures

<table>
<thead>
<tr>
<th></th>
<th>PCS</th>
<th>DAS</th>
<th>PrSt</th>
<th>TrtDf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.30*</td>
<td>0.03</td>
<td>0.55**</td>
<td>0.36**</td>
</tr>
<tr>
<td>PCS</td>
<td>-</td>
<td>0.33**</td>
<td>-0.11</td>
<td>-0.15</td>
</tr>
<tr>
<td>PrSt</td>
<td>-</td>
<td>-0.23</td>
<td>-0.24*</td>
<td></td>
</tr>
<tr>
<td>TrtDf</td>
<td>-0.30*</td>
<td>0.03</td>
<td></td>
<td>0.53**</td>
</tr>
</tbody>
</table>

N: 80; PCS, Pain Catastrophizing Scale; DAS, Dental Anxiety Scale; PrSt, periodontal status; TrtDf, treatment difficulty.

3.2. Relations among variables

Correlational analyses are presented in Table 2. As expected, age was associated with more advanced periodontal disease (r = 0.55, P < 0.01) and greater treatment difficulty (r = 0.36, P < 0.01). Periodontal status was also positively correlated with treatment difficulty (r = 0.53, P < 0.01). Consistent with previous research (Sullivan and Neish, 1997), catastrophizing was positively correlated with dental anxiety (r = 0.33, P < 0.01), and negatively correlated with age (r = -32, P < 0.01).

3.3. Manipulation check

The number of emotion words used by participants in the thought records was used as an index of the degree to which experimental instructions were followed. A taxonomy of emotion words published by Storm and Storm (1987) was used to classify emotion words. The total number of emotion words was divided by the total number of words in the thought record to yield a proportionate index of emotional content. A two-way (condition X level of catastrophizing) analysis of variance (ANOVA) on the proportionate index of emotional content revealed a significant main effect for disclosure condition, F(1,76) = 49.5, P < 0.001. The thoughts records of participants in the disclosure condition contained a significantly greater proportion of emotion words (M = 0.05, SD = 0.03) than the thought records of participants in the control condition (M = 0.005, SD = 0.011). A marginally significant effect for level of catastrophizing was also obtained, F(1,76) = 3.02, P < 0.08, where catastrophizers (M = 0.04, SD = 0.02) used a higher proportion of emotion words than non-catastrophizers (M = 0.02, SD = 0.01). Participants in the disclosure and control conditions did not differ significantly on age, t(78) = 0.40, ns, periodontal status, t(78) = 0.33, ns, or treatment difficulty, t(78) = 0.42, ns.

3.4. Catastrophizing, disclosure and pain

Pain ratings were analyzed as a two-way factorial with level of catastrophizing (high, low) and condition (disclosure, control) as the between groups factors. A two-way
ANOVA revealed a main effect for level of catastrophizing, \( F(1,76) = 9.86, P < 0.001 \), qualified by a significant condition by level of catastrophizing interaction, \( F(1,76) = 6.1, P < 0.01 \). Pairwise comparisons were computed using the Newman Keuls procedure. As shown in Fig. 1, in the control condition catastrophizers (M = 4.6, SD = 2.6) reported significantly more pain than non-catastrophizers (M = 2.0, SD = 1.8), \( P < 0.05 \). In the disclosure condition, catastrophizers (M = 3.3, SD = 2.0) and non-catastrophizers (M = 3.0, SD = 1.5) no longer differed significantly in their pain ratings. Furthermore, catastrophizers in the disclosure condition reported significantly less pain than catastrophizers in the control condition, \( P < 0.05 \). The difference in pain ratings between non-catastrophizers in the control and disclosure conditions was not significant.

### 3.5. Emotional distress, and changes in catastrophizing and dental anxiety

Participants’ ratings of emotional distress were analyzed with a two-way (condition \( \times \) level of catastrophizing) ANOVA. The analysis revealed a significant two-way interaction, \( F(1,76) = 4.6, P < 0.05 \). In the control condition, catastrophizers (M = 7.4, SD = 10.5) reported significantly more emotional distress than non-catastrophizers (M = 1.8, SD = 1.9), \( t(39) = 2.5, P < 0.05 \). In the disclosure condition, the difference in emotional distress between catastrophizers (M = 5.8, SD = 7.6) and non-catastrophizers (M = 4.5, SD = 5.3) was no longer significant, \( t(37) = 0.78, \text{ns} \).

Analyses were also conducted to determine whether the effects of disclosure influenced the participant’s level of catastrophizing and their level of dental anxiety. For these analyses, change scores were computed by subtracting PCS and DAS-R scores obtained at the termination of treatment from those obtained at the initial visit. A two-way (condition \( \times \) level of catastrophizing) ANOVA on the PCS change scores revealed no significant main effects or interaction. A two-way (condition \( \times \) level of catastrophizing) ANOVA on the DAS-R change scores revealed only a marginally significant main effect for level of catastrophizing, \( F(1,76) = 2.9, P < 0.09 \), where catastrophizers showed a slightly greater reduction in dental anxiety than non-catastrophizers. This effect was due in part to catastrophizers’ higher DAS-R scores at the time of the initial evaluation. In sum, while catastrophizers benefited from the disclosure manipulation in regard to their immediate physical and emotional experience, their levels of catastrophizing and dental anxiety remained essentially unaffected.

### 3.6. Mediation hypotheses

Although it was not the aim of this study to examine the processes by which disclosure may impact on pain perception, an analysis of covariance (ANCOVA) was conducted to address the possibility that changes in pain perception may have been mediated by levels of emotional distress. A two-way (condition \( \times \) level of catastrophizing) ANCOVA was performed on participants’ pain ratings, using the measure of emotional distress as the covariate. The results of the analysis revealed that the condition by level of catastrophizing interaction remained significant, even when controlling for emotional distress, \( F(1,75) = 4.2, P < 0.05 \).

An ANCOVA was also conducted to address the possibility that changes in pain perception may have been mediated by the proportion of emotion words contained in participants’ thought records. The results of the analysis revealed that the condition by level of catastrophizing interaction remained significant even when controlling for the proportion of emotion words in the thought records, \( F(1,75) = 6.2, P < 0.01 \).

### 4. Discussion

The results of the present study join a growing body of literature showing that individuals who catastrophize, experience more pain and emotional distress during aversive or painful procedures than individuals who do not catastrophize (Jensen et al., 1991; Turk and Rudy, 1992; Sullivan et al., 1995). The present study is the first prospective study demonstrating a predictive relation between catastrophizing, pain and emotional distress in individuals undergoing dental treatment.

The findings indicate that, for catastrophizers, the dental situation is a particularly distressing one. Correlational analyses revealed that even prior to treatment, catastrophizing was associated with higher levels of dental anxiety. During treatment, catastrophizers in the control condition experienced significantly more pain than non-catastrophizers, with several participants (approximately 18% of the sample) providing pain intensity ratings greater than 6/10. Catastrophizers in the control condition also reported higher levels of emotional distress following termination of treatment.
Consistent with predictions, catastrophizers derived significant benefit from the disclosure manipulation. While catastrophizers reported significantly more pain and emotional distress than non-catastrophizers in the control condition, the two groups did not differ significantly from each other following the disclosure manipulation. For catastrophizers, disclosure led to significant reductions in pain intensity. Although non-catastrophizers appeared to do worse in the disclosure condition, pain ratings were not significantly different from the control condition.

The results support the position that disclosure manipulations are more likely to be effective for individuals who respond to aversive situations with heightened levels of distress. As suggested by a number of investigators, the expression of intense emotional experience may be necessary in order to allow for optimal psychological and physiological adaptation to stress (Horowitz, 1986; Pennebaker, 1995; Schwartz and Kline, 1995; Traue, 1995). It has been suggested that sustained efforts to suppress intense emotion may lead to cumulative increases in stress, and over time, lead to significant disruption of self-regulatory processes (Pennebaker and Beall, 1986; Schwartz and Kline, 1995).

It could be argued that the failure to observe the distress reducing effects of disclosure in non-catastrophizers may be due in part to the low levels of pain and emotional distress they were experiencing even without intervention. But the pattern of findings suggests that disclosure may actually have a deleterious impact on the dental hygiene experience of non-catastrophizers. Non-catastrophizers in the disclosure condition reported more pain and more emotional distress than non-catastrophizers in the control condition. The basis for non-catastrophizers’ negative response to the disclosure manipulation is unclear. One possibility is that disclosure may have interfered with non-catastrophizers’ preferred mode of coping. For example, there is research to suggest that non-catastrophizers are particularly effective in making use of distraction strategies to reduce pain (Heyneman et al., 1990). Requiring non-catastrophizers to focus on their dental concerns and worries may have compromised their efforts to engage in distraction. However, in the absence of information about the coping strategies that were used by participants to cope with the dental hygiene procedure, it is not possible to evaluate further the tenability of this explanation.

Although the findings of the present study supported the experimental hypothesis, the findings are not entirely consistent with previous research. For example, Kelley et al. (1997) found that disclosure led to initial increases in emotional distress, with the positive effects of disclosure being observed only after a period of increased distress (Pennebaker and Beall, 1986; Greenberg and Stone, 1992). In the present study, disclosure led to immediate reductions in emotional distress. Several factors may account for the discrepant findings.

In previous research, participants have been asked to disclose about previously undisclosed traumatic or stressful events from their lives. It is possible that efforts to confront a traumatic memory may be more likely to lead to increased distress than disclosing worries about an upcoming dental hygiene procedure. The dental hygiene situation is also likely to be a relatively minor stressor compared with traumas such as physical and sexual abuse, the death of a loved one or the loss of employment. Unlike previous research, the focus of disclosure in the present study was directly relevant to the stress situation participants were facing, and disclosure occurred within a treatment context. The treatment context of the present study may have bolstered the distress reducing effects of disclosure.

4.1. Processes linking emotional expression and pain

Horowitz (1986) suggested that the experience of intense emotional distress is frequently associated with intrusive thoughts and images, and increased attention to emotion-relevant information. It is perhaps as a function of mood-related processes such as selective attention, and thought intrusions that catastrophizers experience more pain than non-catastrophizers. In situations that do not foster disclosure, the more intense negative emotional experience of catastrophizers may lead them to focus excessively on pain-related stimuli and experience a higher frequency of thought intrusions. These factors may combine to magnify the unpleasantness of the pain situation or interfere with the individual’s ability to make effective use of pain reducing, coping strategies (Spanos et al., 1979; Turk and Rudy, 1992; Sullivan et al., 1997).

In previous research, investigators have argued against emotional discharge or cathartic explanations of the mechanisms linking emotional disclosure to distress reduction (Pennebaker and Beall, 1986; Pennebaker, 1995). Emotional discharge explanations have been ruled out primarily on the basis of the time delay that is typically observed between disclosure and distress reduction (Pennebaker and Beall, 1986). Rather, it has been suggested that disclosure may allow for the initiation of cognitive processes related to organizing, structuring or assimilating traumatic memories that ultimately facilitate a working through process (Horowitz, 1986; Pennebaker, 1995). In the present study however, the effects of disclosure on the reduction of pain and emotional distress were immediate. Thus, it is possible that emotional discharge may have played a role in the distress reduction observed following the disclosure manipulation. But emotional discharge is probably only partially responsible for the observed effects on pain reduction. The interaction between condition and level of catastrophizing remained significant even when controlling for participants’ emotional distress, and the emotional content of their thought records. In future research, it will be important to examine the cognitive processes that ensue from disclosure manipulations in order to address more specifically the
mechanisms by which disclosure impacts on pain experience.

In real world situations, it is likely that disclosure interacts with social interactional processes, and may not always yield the beneficial effects observed in empirical investigations. Outside of the clinical laboratory, when individuals disclose, they are typically disclosing to another person. On the positive side, disclosure may increase the proximity of potential caregivers, enhance feelings of social support, or foster the sharing of coping-relevant information (Pennebaker, 1993b). But disclosure may also bring about negative social responses. Under some circumstances, disclosure of concerns or worries may be met with criticism or rejection, and impact negatively on well-being. Pennebaker (1993b) suggested that the fear of criticism or rejection may be one of the factors that lead individuals to inhibit the disclosure or expression of their distress.

Individual differences in response to painful medical procedures have been discussed in previous research. For example, it has been shown that individuals who are classified as ‘sensitisers’ report lower levels of distress when they are provided with preparatory information but ‘repressors’ appear to prefer minimal information about upcoming aversive procedures (Shipley et al., 1978; Weinberger, et al., 1979; Roth and Cohen, 1986). Although catastrophizing has been shown to be distinct from related constructs such as trait anxiety, depression and fear of pain (Sullivan et al., 1995), the relation between sensitisation and catastrophizing has not yet been examined. Thus, it remains unclear whether sensitisers would benefit from disclosure manipulations such as the one used in the present study, or whether catastrophizers would benefit from preparatory information manipulations used in previous research.

4.2. Clinical implications

Although dental hygiene treatment is not generally considered to be particularly painful, the findings of the present study suggest that, at least for some individuals, scaling procedures can result in significant pain. Catastrophizers in the control condition provided pain ratings at approximately the mid-point on the measurement scale. Similar pain ratings are provided by individuals suffering from persistent pain disorders (Rosenstiel and Keeffe, 1983; Sullivan and D'Eon, 1990). The findings of the present study are consistent with Tripp et al. (1998), who reported that approximately 25% of their sample rated the pain of scaling as moderate to severe.

From a clinical perspective, the present findings suggest that providing catastrophizers with the opportunity to disclose about their dental worries and concerns may have a significant impact on the degree of pain and emotional distress they experience during dental hygiene treatment. Unfortunately, the disclosure manipulation, disclosure did not lead to significant changes in levels of dental anxiety or catastrophizing. Perhaps the benefits of disclosure were not sufficient to counteract the effects of a history of distressing dental treatment experiences. It may require several positive dental experiences before levels of dental anxiety or catastrophizing can be meaningfully changed. It is also possible that disclosure manipulations may not be sufficient to alter dental anxiety or catastrophizing. Other intervention strategies aimed at changing expectations or beliefs about dental treatment may be required (e.g. Vallis, 1984).

It is necessary to consider limitations and alternatives to disclosure interventions for the reduction of distress in catastrophizers. The primary focus of dental examinations is on the oral health status and oral health behaviours of the client, and does not foster the disclosure of dental worries or concerns. In addition, given that dental examinations and treatment are performed with the client’s mouth open wide to accommodate the dental practitioner’s instruments, the opportunity for disclosure is further minimized. Dental practitioners have access to very effective local anesthetics for the control of dental pain, which are likely to be as effective or more effective than psychological manipulations for pain reduction. The results of the present study indicate that disclosure manipulations may be a useful component of dental treatment, particularly for individuals who may be fearful of needles (e.g. Sullivan and Neish, 1997), but they do not argue for the replacement of alternative pain control interventions.

For non-catastrophizers, no intervention may be the best intervention. Non-catastrophizers reported minimal pain and emotional distress in the control condition. Non-catastrophizers may approach the dental treatment situation equipped with effective pain coping strategies. Efforts to alter or interfere with their strategies may produce only deleterious results.

In order to tailor dental hygiene interventions to the specific needs of individuals, it will be necessary to determine who requires intervention and who does not. One method suggested by the present findings would be to screen patients for level of catastrophizing, and provide catastrophizers with the opportunity to disclose about their dental worries, or with other pain control interventions. Alternatively, interview methods may be useful in distinguishing between catastrophizers and non-catastrophizers. Research currently being conducted at our university clinic is examining the accuracy of dental hygienists’ clinical judgments about patients’ level of catastrophizing.

Caution must be exercised in extending the present findings to the clinical setting. Most importantly, it is necessary to consider that the current sample consisted of University undergraduates. Although undergraduates are likely to be part of the population that seeks dental hygiene treatment, the present sample differs from typical clinical samples in that it consists of younger individuals, and the oral status of the present sample would be considered more healthy than that of clinical populations (Sullivan and Neish, 1997). In addition, the disclosure manipulation involved writing about as opposed to verbally disclosing dental worries and
concerns. It is possible that efforts at maintaining experimental control in this manner, may have compromised, at least to some degree, the ecological relevance of the findings. In future research, it will be important to replicate the present findings under more typical clinical conditions.

Acknowledgements

This research was supported by grants from the Social Sciences and Research Council of Canada and Dentistry Canada. The authors extend thanks to the Dental Hygiene Class of 1997 who assisted in data collection, and to Heather Waite and Shawn Francis for coding and data entry. Thanks to Nadine Rossy and Dean Tripp for providing helpful suggestions on an earlier version of this paper.

References

Crombach, L.J., Coefficient alpha and the internal structure of tests, Psychometrika, 16 (1951) 297–334.