Pain Catastrophizing and Symptom Severity During Upper Respiratory Tract Illness

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Abstract:

Objectives: The present study examined the relation of pain catastrophizing to the severity of upper respiratory tract illness.

Materials and Methods: Participants included 50 adults (35 female subjects, 15 male) who were self-diagnosed with upper respiratory tract illness and who agreed to complete a diary of symptoms for 7 days. Illness symptoms were grouped into three categories: pain-related, constitutional, and respiratory symptoms.

Results: Results showed that pain catastrophizing was associated with symptom number and symptom severity in all three categories of symptoms. The rumination subscale of the Pain Catastrophizing Scale showed the strongest relations with illness severity. The relation between pain catastrophizing and illness severity remained significant even when controlling for initial symptom severity, duration of the symptoms before the study period, and depression.

Discussion: The results provide the preliminary evidence that the influence of pain catastrophizing may not be restricted to pain-specific domains. The data also provide some support for the view that the excessive focus on bodily sensations may account for more severe symptoms.

Key Words: BDI—Negative affect—Negative affectivity—Pain catastrophizing—Upper respiratory tract illness.

Upper respiratory tract infections can be debilitating illnesses that result in substantial morbidity and mortality. The most common upper respiratory tract illnesses include common cold and influenza. In the United States, approximately 1 billion cases of common cold occur per year, with adults annually experiencing from 2 to 4 colds on average.1 In Canada, approximately 5 million persons contract an influenza virus every year, resulting in the death of more than 4,500 Canadians yearly.2 Common cold and influenza contribute to millions of work days lost per year and are associated with high rates of health care use.2–4

There is evidence that psychosocial stressors play a significant role in susceptibility to upper respiratory tract illnesses.5,6 There are also indications that psychological factors may impact on symptom severity after upper respiratory tract infection.7 The present study examined the relation between pain catastrophizing and illness severity after the development of upper respiratory tract illness.

Psychology of upper respiratory tract illness

Influenza and the common cold are the two most common types of upper respiratory tract infection. They are most often transmitted via respiratory secretions through coughing and sneezing.8 Although most persons tend to recover within 14 days, residual symptoms may persist...
for weeks. Manifestations of upper respiratory tract illness typically include respiratory problems (i.e., cough, congestion), fatigue, weakness, as well as pain-related symptoms (i.e., headache, muscle aches). Common cold is associated with less severe symptoms, differing from influenza by the absence of fever, headache, and extreme exhaustion. The severity of symptoms among those who become ill tends to vary with age, health status, and immune efficiency. Several investigators have suggested that psychological factors may also be partially responsible for individual differences in illness severity.

Numerous viral-challenge studies have shown an association between life stress and susceptibility to upper respiratory infections. Also, higher levels of psychological factors may also be partially responsible for individual differences in illness severity. Pain catastrophizing has been implicated as a significant cognitive determinant of symptom severity in the context of acute and chronic pain.

Pain catastrophizing

Pain catastrophizing has been implicated as a significant cognitive determinant of symptom severity in the context of acute and chronic pain. Pain catastrophizing has been defined as the tendency to focus excessively on pain sensation (i.e., rumination: “I can’t stop thinking about how much it hurts”), to exaggerate the threat associated with pain sensation (i.e., magnification: “I worry that something serious might happen”), and to feel unable to control the intensity of pain (i.e., helplessness: “There is nothing I can do to reduce the intensity of the pain”). Several investigators have reported that pain catastrophizing is one of the most robust psychological predictors of pain experience. For instance, numerous investigations have found that pain catastrophizing is associated with heightened pain responses in diverse patient groups, including mixed chronic pain, rheumatoid arthritis, low back pain, dental procedures, surgery, whiplash injuries, and samples of asymptomatic persons participating in experimental pain procedures (see for review). Sullivan et al. showed that, although pain catastrophizing, depression, trait anxiety, negative affectivity, and fear of pain measures were all moderately correlated with each other, only the pain catastrophizing measure (the Pain Catastrophizing Scale [PCS]) contributed significant unique variance to the prediction of pain intensity.

Turner and Aaron have recently raised the possibility that pain catastrophizing may be more than a pain-specific construct. They have suggested that pain catastrophizing may be related to other individual difference variables, such as depression, anxiety, worry, and negative affectivity. Turner and Aaron highlight that the concept of catastrophizing was originally conceived as closely related to depression, anxiety, and neuroticism. For example, Beck has suggested that catastrophizing is a cognitive distortion that contributes to the development, maintenance, and exacerbation of depressive symptoms. Catastrophizing has also been implicated as an important component of anxiety disorders. Consistent with this view, pain catastrophizing has been shown to be related to various measures of negative emotional states, including depression, anxiety, and neuroticism. Turner and Aaron suggest that, to increase our understanding of the parameters and function of the pain catastrophizing, it will be necessary to examine the effects of pain catastrophizing beyond pain-specific domains.

Two studies by Van Dulmen et al. provide supportive evidence for the view that pain catastrophizing can be associated with variations in general somatic complaints. These investigators asked clinic patients to complete a subset of “catastrophizing” items from the Dutch Pain Cognition List and to report somatic symptoms related to functional abdominal syndromes. Their findings showed that, over the course of clinic visits, reductions in pain catastrophizing were modestly associated (r...
The present study

Upper respiratory tract illness may provide an ideal context for examining the specificity of pain catastrophizing effects. As noted earlier, influenza and the common cold are associated with symptoms of generalized physiologic distress as well as with symptoms of pain. If pain catastrophizing is a pain-specific construct, then it should be related exclusively to pain-related manifestations of upper respiratory tract illness rather than to constitutional or respiratory symptoms. If pain catastrophizing can be generalized to non-pain-specific domains, however, it will be associated with physical symptoms that are not related to pain.

The present study was conducted to examine the role of pain catastrophizing in prospectively determining the number and severity of symptoms associated with upper respiratory tract illness. The symptoms in question included both pain-related symptoms and symptoms that were not associated with pain, with the latter being further subdivided into constitutional (e.g., nausea) and respiratory (e.g., cough) symptoms. Evidence that pain catastrophizing is related to symptoms that are not associated with pain would support the notion that the construct of pain catastrophizing is not pain specific and can be generalized across other domains of health conditions.

MATERIALS AND METHODS

Participants

Fifteen male and 35 female subjects volunteered to participate in the research. Volunteers responded to posters displayed across Dalhousie University campus and to advertisements placed on the Introductory Psychology class Web site and in the university newspaper. Participants were recruited between November and April, to coincide with the seasonal increase in upper respiratory tract illnesses. Participants ranged in age from 17 to 45 years (mean = 21.50, standard deviation [SD] = 5.72) and were all experiencing at least two symptoms associated with upper respiratory tract illness at the time of recruitment.

Procedure

On arrival at the laboratory, participants were informed that the study addressed the relation between emotional distress and influenza symptoms, and were then asked to read and sign a consent form. Participants were asked to complete measures of pain catastrophizing, depression, and influenza and common cold symptoms. They were then provided with a symptom diary, which they were asked to complete daily during the next 7 days, starting on the next day. Participants were given a digital thermometer to record their temperature at home each day of the study. They were requested to record their temperature at the same time each day.

Measures

Influenza and Common Cold Symptoms Questionnaire

The Influenza and Common Cold Symptoms Questionnaire (ICCSQ) was developed for the purpose of the present study on the basis of the epidemiologic measures used by Keech et al.3 On the ISCCQ respondents are asked to rate the severity of present symptoms on a 4-point Likert scale with the endpoints 0 (none) and 3 (severe). Respondents were also asked to indicate the duration (in days) of present symptoms associated with respiratory tract illnesses. The scale includes a list of 8 symptoms commonly associated with influenza and common cold, including fever, weakness, muscle aches, loss of appetite, cough, stuffy nose or nasal congestion, sore throat, and headache. The ISCCQ includes an assessment of baseline symptom severity. The version of ISCCQ used in this study was found to be internally consistent (α = 0.72). Although no internal reliability data were reported in the Keech et al. study,3 the authors reported significant correlations between number of symptoms endorsed and the number of workdays missed, supporting the validity of the measure.

Pain Catastrophizing Scale

The PCS20 is a 13-item self-report measure that has been developed to assess thoughts and feelings regarding previous, present, or anticipated pain-related experience. It yields a total score and three subscale scores, which assess the three components of pain catastrophizing: rumination, magnification, and helplessness.20 The PCS subscales have been shown to have adequate to high internal consistency (Cronbach’s: total PCS = 0.87, rumination = 0.87, magnification = 0.66, and helplessness = 0.78) and to correlate with interview-based methods of assessing catastrophic thinking associated with pain.20 The PCS has also been shown to correlate with several indices of pain experience and pain-related outcomes.19

Beck Depression Inventory

The Beck Depression Inventory (BDI)31 is a 21-item self-report measure of depressive symptom severity. Respondents are asked to endorse statements that best describe how they have been feeling during the past 7 days.
Weighted values for endorsed statements are summed to yield an overall score of depressive symptom severity. The reliability and validity of the BDI have been demonstrated in several investigations.32

Symptom diary
The symptom diary was developed for the purpose of this study. Items were derived primarily from epidemiologic research on the type and course of symptoms associated with upper respiratory tract illness.3 The symptom diary consisted of 7 daily record sheets where participants were asked to rate the number and severity of their upper respiratory tract symptoms. The list of 25 symptoms included pain-related symptoms (i.e., headaches, abdominal pain, muscle aches), constitutional symptoms (i.e., fatigue, nausea, diarrhea) and respiratory symptoms (i.e., cough producing phlegm, runny nose, difficulty breathing). The participants indicated the severity of the symptoms by rating each one of 25 symptoms on a scale from 0 (none) to 3 (severe). Coefficients of internal consistency33 for each of the three symptom subscales, averaged over 7 days, were 0.69 (pain symptoms), 0.89 (constitutional symptoms), and 0.74 (respiratory symptoms).

Participants also recorded the name and amount of any medications being taken during the study period. Medications taken by participants were classified into three illness-related categories including analgesics, antihistamines, and cough-reducing medication.

Body temperature
Participants were instructed to measure their temperature at approximately the same time each day using a digital thermometer (model 15–685–000; MABIS Healthcare, Lake Forest, IL, U.S.A.). Participants were asked to place the probe tip under the tongue near the back of the mouth. Participants were instructed to remove the thermometer after the sounding of 4 long beeps, which are emitted by the unit once peak temperature has been reached.

Table 1. Symptom severity and symptom number over a 7-day period

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom severity (0–3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>0.90 (0.48)</td>
<td>0.71 (0.46)</td>
<td>0.57 (0.46)</td>
<td>0.54 (0.46)</td>
<td>0.49 (0.43)</td>
<td>0.48 (0.49)</td>
<td>0.49 (0.43)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>1.14 (0.69)</td>
<td>1.02 (0.69)</td>
<td>1.00 (0.67)</td>
<td>0.91 (0.66)</td>
<td>0.85 (0.64)</td>
<td>0.80 (0.66)</td>
<td>0.85 (0.64)</td>
</tr>
<tr>
<td>Constitutional</td>
<td>0.93 (0.53)</td>
<td>0.73 (0.55)</td>
<td>0.63 (0.54)</td>
<td>0.56 (0.53)</td>
<td>0.49 (0.49)</td>
<td>0.44 (0.49)</td>
<td>0.35 (0.44)</td>
</tr>
<tr>
<td>Symptom number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain (0–6)</td>
<td>3.50 (1.40)</td>
<td>3.12 (1.59)</td>
<td>2.58 (1.44)</td>
<td>2.32 (1.54)</td>
<td>2.10 (1.61)</td>
<td>2.02 (1.57)</td>
<td>1.54 (1.49)</td>
</tr>
<tr>
<td>Respiratory (0–4)</td>
<td>2.70 (1.11)</td>
<td>2.56 (1.16)</td>
<td>2.50 (1.15)</td>
<td>2.42 (1.49)</td>
<td>2.34 (1.22)</td>
<td>2.24 (1.10)</td>
<td>1.98 (1.29)</td>
</tr>
<tr>
<td>Constitutional (0–13)</td>
<td>7.26 (2.91)</td>
<td>6.18 (2.98)</td>
<td>5.52 (3.23)</td>
<td>4.86 (3.34)</td>
<td>4.28 (3.23)</td>
<td>3.80 (3.25)</td>
<td>4.28 (3.23)</td>
</tr>
<tr>
<td>Temperature</td>
<td>36.77 (0.89)</td>
<td>36.59 (0.77)</td>
<td>36.73 (0.82)</td>
<td>36.50 (0.83)</td>
<td>36.45 (0.78)</td>
<td>36.36 (0.57)</td>
<td>36.54 (0.51)</td>
</tr>
</tbody>
</table>

Numbers in parentheses refer to standard deviation.

RESULTS

Sample characteristics
Participants reported experiencing symptoms of upper respiratory tract illness for 5.8 days (SD = 4.7) before entering the study. On baseline assessment, the most common symptoms reported by the participants included nasal congestion (74%), cough (70%), sore throat (64%), weakness (58%), and muscle aches (54%). Participants reported having had approximately 3 episodes of upper respiratory tract illness during the past 12 months (mean = 3.2, SD = 2.7). There were no sex differences in symptom duration before the first assessment or number of symptoms reported on the assessment day.

Composite indices of overall symptom number and overall symptom severity were computed by averaging diary ratings across symptom categories and across days. Symptom number was significantly correlated with the total number of hours of work or school missed because of illness ($r = 0.44, P < 0.001$) and the total number of medications taken through the week ($r = 0.45, P < 0.001$). Overall symptom severity was also correlated with time lost because of illness ($r = 0.53, P < 0.001$) and medications consumed ($r = 0.49, P < 0.001$).

Number and severity of symptoms
The mean and SD for symptom number and symptom severity for the 7 days of the diary reporting period are presented in Table 1. Symptom number (F[6,294] = 27.5, $P < 0.001$) and symptom severity (F[6,294] = 22.1, $P < 0.001$) decreased significantly over the course of the diary recording period. For symptom severity, a significant effect for symptom type was obtained (F[2,98] = 22.1, $P < 0.001$), where respiratory symptoms were rated as more severe than pain or constitutional symptoms. A significant symptom type by day interaction was observed (F[12,588] = 2.1, $P < 0.01$), where respiratory symptoms were rated as more severe than pain and constitutional symptoms on all days except day.
1. For symptom number, a significant effect was also obtained for symptom type, although it was trivial given that different numbers of symptoms were subsumed within each symptom category.

Table 2 presents the correlations among the different pain catastrophizing subscales, and the number of illness symptoms during the 7-day diary recording period. Correlational analyses were conducted to examine the relation between the subcomponents of pain catastrophizing and symptom severity across 7 days, as shown in Table 3. These analyses showed that pain catastrophizing is associated with symptom reporting in domains that are not necessarily pain related. Pain catastrophizing subscales were significantly correlated with symptoms severity and symptom number for respiratory symptoms and constitutional symptoms.

**Temperature**

Temperatures for the sample were analyzed over the 7-day period. There was no significant relation between catastrophizing and temperature except for day 6. Examination of raw scores revealed that on day 6, four persons with high catastrophizing scores reported elevated temperatures. Fourteen participants reported temperatures indicative of fever (greater than 38°C). There was no significant relation, however, between pain catastrophizing and the probability of experiencing fever during the study period.

**Prediction of symptom number and symptom severity**

Two hierarchical regression analyses were performed to examine the utility of the different components of pain catastrophizing in predicting symptom severity and symptom number associated with upper respiratory tract illness. For these analyses, the composite indices of overall symptom number and symptom severity were used as dependent variables. Initial symptom levels, illness duration, and depression were used as covariates.

The results of a hierarchical regression analysis predicting overall symptom number are presented in Table 3. For symptom number, a significant effect was also obtained for symptom type, although it was trivial given that different numbers of symptoms were subsumed within each symptom category.

The findings of the present study showed that pain catastrophizing, measured on the first day of the study of period, was significantly correlated with the number and severity of the symptoms of upper respiratory tract illness over a 1-week period. In addition, subscales of pain catastrophizing were associated with severity of nonpain symptoms. This study shows that pain catastrophizing is associated with physical symptoms that are not specific to pain conditions. The relation between pain catastrophizing and symptom severity remained significant even when controlling for initial symptom levels, symptom duration before the initial assessment, and depression.

The ruminatiion subscale of the PCS, but not the magnification and helplessness subscales, correlated significantly with the number and severity of symptoms. In other words, the endorsement of items, such as “I keep thinking about how much it hurts” and “I can’t seem to keep it out of my mind” was associated with more severe symptoms. In previous research, the ruminatiion subscale of the PCS has been shown to be most strongly correlated to pain intensity ratings and pain-related outcomes. For example, Sullivan and Neish found that only the ruminatiion component of pain catastrophizing contributed significant unique variance to the prediction of pain intensity during dental hygiene treatments. In addition,
Sullivan et al.\textsuperscript{35} reported that only the rumination contributed significant unique variance to the prediction of pain-related disability.

Several investigators have discussed the importance of attentional mechanisms associated with pain catastrophizing. Crombez et al.\textsuperscript{36} reported that pain catastrophizers showed greater interference on attention-demanding task than non-pain-catastrophizers in anticipation of a pain stimulus onset. Heyneman et al.\textsuperscript{37} showed that pain catastrophizers were unsuccessful in using attention-diversion coping strategies to reduce their pain. Similarly, Sullivan et al.\textsuperscript{38} provided data suggesting that pain catastrophizers may be impaired in their ability to divert attention away from pain. Eccleston et al.\textsuperscript{39} have suggested that excessive focus on pain sensations may lead to the facilitation of pain access into consciousness and the magnification of painful sensations.

Attentional mechanisms have frequently been cited as a significant mediator of heightened physical symptoms.\textsuperscript{40–44} Watson and Pennebaker\textsuperscript{14} have suggested that internally focused attention may be one of the factors that underlie the relation between negative affectivity and an increased number of physical symptoms.\textsuperscript{14} Arntz et al.\textsuperscript{45} have reported that attention may be the primary mediator of anxiety effects on pain experience. It is possible that attentional focus may represent one of the final common pathways through which many cognitive and affective variables impact on negative somatic experience.

Demonstrating a relation between pain catastrophizing and symptom severity within a prospective longitudinal

| Table 3. Relations between pain catastrophizing subscales and symptom severity across 7 days |

<table>
<thead>
<tr>
<th>Pain</th>
<th>Rumination</th>
<th>Magnification</th>
<th>Helplessness</th>
<th>Total PCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>0.35*</td>
<td>0.39*</td>
<td>0.21</td>
<td>0.30†</td>
</tr>
<tr>
<td>Day 2</td>
<td>0.08</td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.03</td>
</tr>
<tr>
<td>Day 3</td>
<td>0.23</td>
<td>0.17</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Day 4</td>
<td>0.28*</td>
<td>0.25</td>
<td>0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>Day 5</td>
<td>0.27</td>
<td>0.19</td>
<td>0.20</td>
<td>0.13</td>
</tr>
<tr>
<td>Day 6</td>
<td>0.14</td>
<td>-0.30</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>Day 7</td>
<td>0.24</td>
<td>0.04</td>
<td>0.12</td>
<td>-0.03</td>
</tr>
<tr>
<td>Total</td>
<td>0.26</td>
<td>0.09</td>
<td>0.16</td>
<td>0.04</td>
</tr>
</tbody>
</table>

All correlations are two-tailed.
*P < 0.01; †P < 0.05.

PCS, Pain Catastrophizing Scale.

| Table 4. Regression analysis predicts overall symptom number, controlling for illness duration, initial symptom levels, and depression |

<table>
<thead>
<tr>
<th>β</th>
<th>R</th>
<th>F (change)</th>
<th>P</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Initial symptoms</td>
<td>0.24</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Depression</td>
<td>0.16</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Duration</td>
<td>0.10</td>
<td>0.35</td>
<td>2.07</td>
<td>0.12</td>
</tr>
<tr>
<td>Step 2 Ruminatin</td>
<td>0.61†</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Magnification</td>
<td>-0.07</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Helplessness</td>
<td>-0.22</td>
<td>0.55</td>
<td>3.74</td>
<td>0.01†</td>
</tr>
</tbody>
</table>

β Weights are from the final regression equation.
*P < 0.05; †P < 0.01.

| Table 5. Regression analysis predicts overall symptom severity, controlling for illness duration, initial symptom levels, and depression |

<table>
<thead>
<tr>
<th>β</th>
<th>R</th>
<th>F (change)</th>
<th>P</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 Initial symptoms</td>
<td>0.29*</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Depression</td>
<td>0.08</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Duration</td>
<td>0.08</td>
<td>0.33</td>
<td>1.86</td>
<td>0.15</td>
</tr>
<tr>
<td>Step 2 Ruminatin</td>
<td>0.65†</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Magnification</td>
<td>-0.10</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Helplessness</td>
<td>-0.29</td>
<td>0.55</td>
<td>3.95</td>
<td>0.01†</td>
</tr>
</tbody>
</table>

β Weights are from the final regression equation.
*P < 0.05; †P < 0.01.
design reduces the range of alternate explanations for the present findings. These findings do not support a reactivity hypothesis, where pain catastrophizing is viewed as a cognitive reflection of symptom severity. Rather, the data support the antecedent status of pain catastrophizing. It is not possible, however, to make strong statements about the causal status of pain catastrophizing given that data obtained from prospective designs remain correlational in nature.

To examine the possibility that pain catastrophizing may be associated with objective indices of respiratory illness symptoms, the present study included a measure of body temperature. Significant relation between pain catastrophizing and temperature was observed only on day 6, when four participants with high pain catastrophizing scores recorded elevated temperatures in a clinically significant range (i.e., 38°C). Typically, the fever associated with influenza starts declining on the second or third day of the illness. Persons scoring high on the PCS could have developed illness-related complications, resulting in elevated temperatures on day 6. Owing to variation in illness onset, peak temperatures would not have occurred on the same day (or even within the study period) for all participants with influenza, thus obscuring a possible relation between pain catastrophizing and temperature. It is possible that many participants with influenza had experienced the peak of their fever before the study period. It is also possible that many participants had common cold that is not associated with fever. To provide an adequate test of the relation between pain catastrophizing and objective indices of somatic symptoms, it will be necessary to recruit participants earlier in the course of the illness, preferably immediately after infection diagnosed by medical procedures.

Both theoretically and empirically, pain catastrophizing has been associated with negative emotional states, such as depression and anxiety. As noted earlier, pain catastrophizing has been discussed as a cognitive component of depression and anxiety. Measures of pain catastrophizing have also been shown to be significantly correlated with measures of depression and anxiety. One of the challenges to research in this area has been to bring greater precision in specifying the nature of the relations between pain catastrophizing, depression, and anxiety. One possibility is that pain catastrophizing, particularly the ruminating component of pain catastrophizing, may mediate the relation between negative emotional states and heightened physical symptoms. This position is consistent with models proposing that anxiety states direct the feared or threatening stimulus. This position, however, would not be entirely consistent with cognitive models proposing that catastrophizing is a precursor to depression. In the present study the relation between pain catastrophizing and symptom severity remained significant even when controlling for levels of depression, ruling out the possibility that depression mediates the relation between pain catastrophizing and symptom severity. It is nevertheless possible that pain catastrophizing may be a precursor to depression, independent of pain-related outcomes.

It is becoming clear that pain catastrophizing is not a pain-specific construct. Previous research showing a relation between pain catastrophizing and generalized emotional distress coupled with the present findings showing that pain catastrophizing predicts nonpain somatic symptoms argue for a broader conceptualization of this construct. The emerging findings suggest that further exploration of the basic process mechanisms underlying the effects of pain catastrophizing should not be restricted to the domain of nociceptive processing.

The observed relations between pain catastrophizing and symptom reporting may have important implications for clinical practice and clinical research. Many clinical decisions are made on the basis of patients’ symptom reports. The prescription of medication, decisions about length of hospitalization, and even decisions about surgery are often made on the basis of symptom reporting. In addition, drug side-effect profiles are evaluated primarily on the basis of subjective symptom reports. Knowledge of a person’s level of catastrophizing may be an important factor in ensuring appropriate clinical decision-making, or in accurately interpreting side-effect profiles obtained from drug trials.

It is necessary to exercise some degree of caution in interpreting the present findings. First, most of our volunteers entered the study only after the peak of their symptoms had passed. In this case, our findings show only an association between pain catastrophizing and mild symptoms of upper respiratory tract illness. Greater experimental rigor could be brought to the investigation of pain catastrophizing and respiratory illness symptom severity by using a viral-challenge protocol. In viral-challenge protocols volunteers are intentionally exposed to upper respiratory viruses and subsequently quarantined during the study period. These protocols afford greater certainty in diagnosis and permit examination of the relation between psychological factors and illness experience from the onset of symptoms.

Caution must be exercised in generalizing the results of the study to non-university population. Most of the participants were recruited from undergraduate classes and were in their early twenties. The psychology of illness symptoms in a young and healthy population will differ both qualitatively and quantitatively from the symptoms experienced by frail populations. For example, in otherwise healthy persons, symptoms of upper...
respiratory tract illness may be interpreted as benign, but the same symptoms may be associated with considerable threat in frail persons.

An additional limitation of the present study was the reliance on self-reports. Influenza and the common cold have a similar symptom profile, and participants may have had difficulty in accurate self-diagnosis. Fever is one of the distinguishing features between influenza and the common cold, but in the present study most participants with influenza likely experienced the peak of their fever before entering the study. Consequently, the diagnosis of influenza or common cold was not reliably established in this study. Physician-based diagnoses or biologic assays have advantages over self-report and should be considered in future research.

The reliance on self-reports could also have introduced error variance in the data. Retrospective biases, lack of adherence to daily recording, and willing distortion of responses are factors that can impact on the quality of self-report data. Although participants were provided with the instructions to complete a checklist of symptoms once a day during a 7-day period, it not possible to determine with certainty the degree to which instructions were followed.

CONCLUSIONS

In spite of limitations of the study, the present findings provide preliminary evidence that pain catastrophizing predicts symptom severity during respiratory tract illness. The robustness of this prospective relation is further supported by the fact that it remained significant even when controlling for initial symptom levels, duration of the illness, and depressive symptoms. Attentional mechanisms may represent the vehicle through which pain catastrophizing exerts its influence on physical symptoms. Consistent with recent theorizing, effects of pain catastrophizing do not seem to be restricted to pain-related outcomes.25

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REFERENCES


