Anxiety sensitivity and other emotionality traits in predicting headache medication use in patients with recurring headaches
Implications for abuse and dependency

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Abstract

The objective of the present investigation was to clarify the role that anxiety sensitivity (AS) and other related constructs play in headache medication use in patients with recurring headaches. A total of 108 patients (88% female) with chronic recurring headaches (mean duration = 205.6 months) provided complete responses to a self-report inventory administered during a treatment visit to an outpatient neurology clinic. The inventory included measures of depression, trait anger, trait anxiety, fear of pain, AS, and the impact of headache on daily living. AS and fear of pain were used in accordance with their multidimensional conceptualizations. Hierarchical multiple regression analyses were conducted to determine the variables that contributed significantly to the prediction of current over-the-counter analgesic and prescription medication use. After controlling for pain severity, the cognitive anxiety dimension of fear of pain was the only significant predictor of over-the-counter analgesic use. For prescription medication use, the fear of physical catastrophe dimension of AS and the physiological anxiety dimension of fear of pain were significant predictors, although the predictive direction of the former was opposite to that found in prior studies. The models, while significant, accounted for relatively small amounts of variance.
Implications of these results and issues of medication abuse and dependency are discussed. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Anxiety sensitivity; Headache; Analgesic abuse; Dependency; Emotion

1. Introduction

Anxiety sensitivity (AS) refers to the fear of bodily sensations that arise from the notion that they may have detrimental physical, social, or psychological consequences (Reiss & McNally, 1985). AS is most commonly measured using the Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1992), an instrument that has been demonstrated to be reliable and valid (McNally, 1996). AS, as measured by the ASI, comprises three lower-order components corresponding to fear of social concerns (e.g., embarrassment), fear of physical catastrophe (e.g., heart attack), and fear of mental incapacitation (e.g., going insane) (Zinbarg, Barlow, & Brown, 1997; Zinbarg, Mohlman, & Hong, 1999) and is, itself, a lower-order yet distinct component of trait anxiety (Lilienfeld, 1996; McNally, 1996; Reiss, 1997; Taylor, 1995).

McNally (1996) has suggested that AS may be positively associated with the use of substances that reduce arousal and associated feelings of tension and anxiety (e.g., alcohol) and, conversely, negatively associated with the use of substances that increase arousal (e.g., cocaine). To date, some (Norton et al., 1997; Stewart, Karp, Pihl, & Peterson, 1997; Stewart & Zeitlin, 1995), but not all (McWilliams & Asmundson, 2001), investigations support this suggestion (also see Stewart, Samoluk, & MacDonald, 1999). Stewart et al. (1997), for example, examined the relationship between AS, alcohol, and other substance use and found, irrespective of sex, that ASI scores were positively correlated with the use of alcohol for the specific intent of reducing or avoiding negative affective states. Similarly, Norton et al. (1997) found that male substance abuse program outpatients with high AS preferred depressants, especially alcohol, when compared to those with low or medium AS. AS did not influence the substance preferences of the female outpatients, with all preferring alcohol. We (McWilliams & Asmundson, 2001) have recently failed to find significant associations between use of two stimulants—nicotine and caffeine—and levels of AS (and trait anxiety) in a sample of university students. Collectively, these results suggest greater support for positive associations of AS with use of arousal-dampening substances than for negative associations with use of arousal-enhancing substances.

In the past few years, the AS construct has received considerable attention with regard to chronic pain (Asmundson, Wright, & Hadjistavropoulos, 2000). In this context, AS is viewed as a trait disposition that contributes to the maintenance of fear of pain and pain-related avoidance behaviour which, in turn, contribute to the maintenance of pain over extended periods of time (Asmundson, 1999). The basic fear and avoidance model can be conceptualized as a vicious cycle in which negative expectancies about the harmfulness of pain initiate avoidance behavior, which then contributes to deconditioning (e.g., muscular atrophy, decreased mobility, weight gain), further pain experiences, negative expectancies, and further
avoidance behaviour. There is mounting evidence to support the postulates of this model (for recent reviews, see Asmundson, Norton, & Norton, 1999; Vlaeyen & Linton, 2000) and, of relevance here, some of these pieces of evidence have implications to McNally’s hypothesis in the context of analgesic use and abuse.

In a preliminary assessment of AS and pain-related fear and avoidance (Asmundson & Norton, 1995), we observed that patients with chronic back pain who were high on AS were more likely to be taking analgesics (71%) than those who had medium and low levels of AS (34% and 25%, respectively). This unanticipated observation was intriguing because the AS groups did not differ in reported levels of pain severity. We interpreted the increased prevalence of analgesic use in those chronic back pain patients with high AS as an attempt to avoid (or reduce) unpleasant anxiety-related sensations. In a subsequent investigation, we demonstrated that the association between AS and avoidance behaviour, defined in part by use of analgesics, in patients with chronic musculoskeletal pain was explained by the positive association of AS with the construct of fear of pain (Asmundson & Taylor, 1996). That is, the influence of AS on avoidance behaviour occurred indirectly through fear of pain. Most recently, several investigations have identified that one of the lower-order components of AS—fear of physical catastrophe—is most relevant to avoidance behaviour and related functional limitations in patients with chronic pain (Asmundson, Frombach, & Hadjistavropoulos, 1998; Plehn, Peterson, & Williams, 1998). These findings suggest that careful assessment of AS, particularly the fear of physical catastrophe component, and pain-related fears may be a useful strategy in identifying those chronic pain patients at risk for developing dysfunctional avoidance, including excessive use and abuse of analgesics.

However, Conrod, Pihl, Stewart, and Dongier (2000) have shown that AS is not a significant predictor of opiate analgesic dependence in a sample of substance-abusing women. Measures of negative affect (i.e., hopelessness, pessimism) were, on the other hand, identified as significant predictors of opiate analgesic dependence. Similarly, we (Asmundson, Norton, & Veloso, 1999) recently found that recurrent headache patients with high AS were just as likely as those with medium or low levels of AS to be taking over-the-counter analgesics (70% vs. 66% vs. 55%, respectively) or prescription headache medications (50% vs. 70% vs. 82%, respectively), although there was a seemingly counterintuitive trend in the latter case (i.e., patients with low AS were more likely to be taking prescription medications). These findings are discrepant with those we reported for chronic back pain patients (Asmundson & Norton, 1995); but, given that the vast majority (93%) of the headache patients in our sample were taking some form of headache medication to control their pain, it is not overly surprising that the proportional analysis of between-AS groups differences in medication use was not sensitive to potential influences of AS.

What is the association between AS and analgesic use? Why are the findings divergent in preliminary investigations with chronic musculoskeletal and recurrent headache samples? Clarification of these questions is important before drawing firm conclusions regarding the utility of assessing AS for purposes of identifying those potentially at risk for analgesic abuse. But, given that analgesic abuse is commonly noted in patients seeking treatment for headache (Radat, 2000), it is critical that early risk indicators are identified. The primary
purpose of the present investigation was to clarify the role of AS and conceptually related constructs as predictors of headache medication use in patients with recurring headaches. Headache medications include not only over-the-counter (e.g., acetaminophen, ibuprofen, codeine) and prescription (e.g., naproxen) analgesics, but also selective 5-hydroxytryptamine$_1$-like receptor agonists (e.g., naratriptan hydrochloride, rizatriptan benzoate, sumatriptan succinate) with abortive properties, and beta-blockers (e.g., atenolol, propranolol hydrochloride) and tricyclic antidepressants (e.g., amitriptyline hydrochloride, nortriptyline hydrochloride) with preventive, arousal-dampening properties. Opioid analgesics are prescribed less often for headache but may be used in some cases (Markley, 1994). Of these medications, it is the analgesics, both over-the-counter and prescription, that have the greatest potential for being abused and, in the case of the opioid analgesics, for being dependence-producing.

We employed two analytic approaches to address our purpose. First, we sought to determine whether the profile of current over-the-counter analgesic and prescription medication use for the high, medium, and low AS groups reported by Asmundson, Norton, and Veloso (1999) would replicate in a larger sample of patients with recurring headaches. In particular, we were interested in determining if the counterintuitive trend (of increased prescription medication use in patients with low AS) would become significant within the context of a larger sample. Second, the contributions of the various lower-order components of AS and related constructs of emotion (e.g., fear of pain, depression, anger, trait anxiety, impact of headache on daily living) to headache medication use have not previously been considered. Thus, hierarchical multiple regression was used to identify those variables that made significant and unique contributions to the prediction of medication use after controlling for headache severity (Tabachnick & Fidell, 1996). Since the effort required to obtain over-the-counter and prescription headache medications differs, we used each as a criterion variable in the regression analyses in order to establish whether predictors of use were similar or different. Given the mixed nature of earlier findings (Asmundson & Norton, 1995; Asmundson & Taylor, 1996; Asmundson, Norton, & Veloso, 1999; Conrod et al., 2000), we opted to employ the regression analyses in an exploratory, rather than hypothesis-testing, manner.

2. Method

2.1. Participants

Of 212 consecutive patients attending an outpatient neurology clinic for treatment of chronic recurring headaches who agreed to participate, 104 failed to complete at least one of the measures pertinent to this study and were dropped from further analysis. The remaining 108 patients provided complete information and were included in this study. These patients represent an expansion of a sample previously reported on Asmundson, Norton, and Veloso (1999), but the nature of the questions addressed herein is unique relative to the earlier report. The mean age of the sample was 42.3 years (S.D. = 12.0) and
most \( n = 95; 88\% \) were female. They reported being bothered by frequent and recurrent headaches for a mean duration of 205.6 months (S.D. = 156.7 months; range = 1–600 months). The majority suffered from migraine \( n = 85; 79\% \). Mean headache severity was 3.9 (S.D. = 0.9; range 1–5), as reported on a standard headache intensity scale ranging from \( 0 = \text{no headache} \) to \( 5 = \text{extremely painful} \). Approximately 93% \( n = 100 \) of patients reported current use of headache medications for pain control, abortion, or prevention. Of these, 20% \( n = 22 \) were using only over-the-counter analgesics, 32% \( n = 35 \) were using only prescription medications (e.g., with analgesic, abortive, and/or preventive properties), and 40% \( n = 43 \) were using both.

2.2. Measures and procedure

Participants were provided verbal and written explanation of the investigation and its purposes following a scheduled treatment visit to an outpatient neurology clinic. Participants then provided informed consent and completed a self-report inventory that included the following measures.

2.2.1. ASI

The ASI (Peterson & Reiss, 1992) comprises 16 items that are designed to measure fear of anxiety and its associated signs and symptoms. The items load onto three lower-order components corresponding to fear of social concerns, fear of physical catastrophe, and fear of mental incapacitation (Zinbarg et al., 1997, 1999). The ASI and its subscales have demonstrated excellent reliability and validity (see McNally, 1996; Peterson & Reiss, 1992; Zinbarg et al., 1999).

2.2.2. Headache Questionnaire (HQ)

The HQ (Asmundson, Norton, & Veloso, 1999) consists of questions regarding distinct aspects of the patient’s experience with headaches. Questions query the duration having experienced recurrent headaches (in months), severity of typical headache \( 0 = \text{no headache} \) to \( 5 = \text{extremely painful} \), current over-the-counter headache medication use \( 0 = \text{no}, 1 = \text{yes} \), current prescription headache medication use \( 0 = \text{no}, 1 = \text{yes} \), other bodily pain and its duration (location and number of months), the disturbing/distressing nature of headaches \( 0 = \text{not at all} \) to \( 4 = \text{extremely} \), and the degree to which headaches have restricted or changed one’s lifestyle \( 0 = \text{no change} \) to \( 4 = \text{extreme change} \). Specific types of headache medications are not queried on the HQ.

2.2.3. McGill Pain Questionnaire—short form (SF-MPQ)

The SF-MPQ (Melzack, 1987) is widely used to assess the pain experience in a variety of pain populations (e.g., chronic low-back pain, headache, labour). It comprises a 15-item adjective checklist, tapping factorially distinct sensory and affective dimensions of pain (Wright, Asmundson, & McCreary, in press), and two scales (one visual analogue and the other Likert style) for rating pain severity. The SF-MPQ has shown to possess good reliability and validity (Melzack, 1987).
2.2.4. Pain Anxiety Symptoms Scale (PASS)

The PASS (McCracken, Gross, Sorg, & Edmands, 1993; McCracken, Zayfert, & Gross, 1992) is a 40-item questionnaire designed to assess four dimensions of fear of pain. These dimensions include pain-specific cognitive anxiety (e.g., I find it hard to concentrate when I hurt.), physiological anxiety (e.g., Pain seems to cause my heart to pound or race.), escape/avoidance behaviours (e.g., I try to avoid activities that cause pain.), and fearful appraisals of pain (e.g., Pain sensations are terrifying). The PASS subscales possess good reliability and validity (Asmundson & Larson, 2000; McCracken et al., 1992, 1993).

2.2.5. Beck Depression Inventory (BDI)

The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is a 21-item instrument designed to measure depressive symptoms. Its psychometric properties have been examined extensively and have shown excellent reliability and validity (Beck, Steer, & Garbin, 1988).

2.2.6. State–Trait Anxiety Inventory—trait form (STAI-T)

The STAI-T (Spielberger, Gorsuch, & Luschene, 1970) is a 20-item measure designed to assess trait anxiety. The psychometric properties of the STAI-T have been shown to be strong (Spielberger, Gorsuch, Luschene, Vagg, & Jacobs, 1993).

2.2.7. State–Trait Anger Expression Inventory—trait form (STAXI-T)

The STAXI-T (Spielberger, 1988) comprises 10-items that are designed to assess trait anger. According to available data, the STAXI-T is a reliable and valid measure (Spielberger et al., 1985).

3. Results

3.1. ASI groups and medication use

In order to compare findings with those reported by Asmundson and Norton (1995) and Asmundson, Norton, and Veloso (1999), we classified patients on the basis of their level of AS and compared the proportion within each group currently using medication for headache control. AS was generally elevated in the sample ($M = 22.6$; S.D. = 11.3). Thus, we followed the procedure of Asmundson, Norton, and Veloso and classified patients as having high, medium, or low AS based on normative data (i.e., high ASI = scores $\geq 30$; medium ASI = scores between 13 and 29; low ASI = scores $\leq 12$). Those with high AS ($n = 26$) did not differ significantly from those with medium ($n = 61$) or low ($n = 21$) AS on HQ and MPQ measures of pain severity (all $F$ values < 1).

Consistent with the results reported by Asmundson, Norton, and Veloso (1999), the proportion of patients reporting current use of over-the-counter analgesics did not differ between the AS groups [$\chi^2(2) = 0.41, P = .82$]. Similarly, the proportion of patients reporting
current use of prescription headache medications did not differ between the AS groups \[\chi^2(2) = 3.39, P = .18\]. However, within the larger sample, the trend of greater prescription medication use in the low AS group reported by Asmundson, Norton, and Veloso was no longer noteworthy (see Table 1). The proportions of patients reporting use of none, one of either over-the-counter analgesics or prescription headache medication, or both also did not differ as a function of AS group \[\chi^2(4) = 2.35, P = .67\] (see Table 2).

### 3.2. Prediction of medication use

Hierarchical multiple regression analysis was used to determine whether the components of AS and measures of related emotional constructs (i.e., fear of pain, depression, trait anger, trait anxiety, impact of headache on daily living) (Asmundson, Norton, & Veloso, 1999; Taylor, 1999) were significant predictors of current headache medication use. As noted above, separate analyses were conducted for over-the-counter analgesic and prescription medication use. In each analysis, severity of pain, as measured by the MPQ visual analogue scale, was entered into Step 1 in order to control for current headache pain severity. All other variables were entered (stepwise) into Step 2 in order to test for their main effects on medication use after controlling for pain severity. Bivariate correlations between all study variables are shown in Table 3.

#### 3.2.1. Prediction of over-the-counter analgesic use

In Step 1, MPQ current pain severity did not contribute significantly to use of over-the-counter analgesics. In Step 2, after controlling for pain severity, a significant model emerged \[F(2,99) = 3.0, P < .05\], with PASS pain-specific cognitive anxiety being the only

### Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Over-the-counter analgesics</th>
<th>Prescription medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>High AS</td>
<td>26</td>
<td>65.4% (17)</td>
<td>61.5% (16)</td>
</tr>
<tr>
<td>Medium AS</td>
<td>61</td>
<td>59.0% (36)</td>
<td>72.1% (44)</td>
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<tr>
<td>Low AS</td>
<td>21</td>
<td>65.4% (17)</td>
<td>85.7% (18)</td>
</tr>
</tbody>
</table>

\[a\] \[\chi^2(2) = 0.41, P = .82\]

\[b\] \[\chi^2(2) = 3.39, P = .18\]

### Table 2

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>None</th>
<th>Either OTC or P</th>
<th>Both OTC and P</th>
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<td>High AS</td>
<td>26</td>
<td>7.7% (2)</td>
<td>57.7% (15)</td>
<td>34.6% (9)</td>
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<tr>
<td>Medium AS</td>
<td>61</td>
<td>6.6% (4)</td>
<td>55.7% (34)</td>
<td>37.7% (23)</td>
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<tr>
<td>Low AS</td>
<td>21</td>
<td>9.5% (2)</td>
<td>38.1% (8)</td>
<td>52.4% (11)</td>
</tr>
</tbody>
</table>

\[\chi^2(4) = 2.35, P = .67\]
Table 3

Correlations between variables entered in the hierarchical multiple regressions as well as with over-the-counter analgesic and prescription headache medication use

<table>
<thead>
<tr>
<th></th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<th>(11)</th>
<th>(12)</th>
<th>(13)</th>
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<td>(1) AS SC</td>
<td>.49**</td>
<td>.47**</td>
<td>.29**</td>
<td>.21*</td>
<td>.27**</td>
<td>.30**</td>
<td>.39**</td>
<td>.44**</td>
<td>.23*</td>
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<td>-.06</td>
<td>-.08</td>
<td>-.02</td>
<td>-.04</td>
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<tr>
<td>(2) AS C</td>
<td>-</td>
<td>.49**</td>
<td>.19*</td>
<td>.36**</td>
<td>.25**</td>
<td>.37**</td>
<td>.61**</td>
<td>.57**</td>
<td>.42**</td>
<td>.10</td>
<td>.10</td>
<td>.11</td>
<td>.05</td>
<td>-.05</td>
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<tr>
<td>(3) AS PC</td>
<td>-</td>
<td>-.36**</td>
<td>.29**</td>
<td>.34**</td>
<td>.58**</td>
<td>.27**</td>
<td>.29**</td>
<td>.25**</td>
<td>.01</td>
<td>-.02</td>
<td>-.09</td>
<td>.08</td>
<td>-.21*</td>
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<tr>
<td>(4) PASS PA</td>
<td>-</td>
<td>-.58**</td>
<td>.54**</td>
<td>.47**</td>
<td>.31**</td>
<td>.32**</td>
<td>.09</td>
<td>.30**</td>
<td>.39**</td>
<td>.12</td>
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<tr>
<td>(5) PASS CA</td>
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<td>.57**</td>
<td>.48**</td>
<td>.48**</td>
<td>.28**</td>
<td>.35**</td>
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<td>.27**</td>
<td>.24*</td>
<td>.09</td>
<td>.34**</td>
<td>.39**</td>
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<td>.11</td>
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<td>(7) PASS FA</td>
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<td>-.41**</td>
<td>.44**</td>
<td>.28**</td>
<td>.28**</td>
<td>.15</td>
<td>.15</td>
<td>.08</td>
<td>.20*</td>
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<td>.50**</td>
<td>.11</td>
<td>.08</td>
<td>.02</td>
<td>.14</td>
<td>.04</td>
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<td>(9) STAI-T</td>
<td>-</td>
<td>-.48**</td>
<td>.02</td>
<td>.05</td>
<td>.04</td>
<td>.04</td>
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<td>(10) STAXI-T</td>
<td>-</td>
<td>-.10</td>
<td>-.10</td>
<td>.02</td>
<td>.08</td>
<td>-.06</td>
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<tr>
<td>(11) HQ disturb</td>
<td>-</td>
<td>-.64**</td>
<td>.36**</td>
<td>.05</td>
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<tr>
<td>(12) HQ lifesty</td>
<td>-</td>
<td>-.41**</td>
<td>.07</td>
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<td>(13) Pain sev</td>
<td>-</td>
<td>-.12</td>
<td>-.22*</td>
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<tr>
<td>(14) OTC use</td>
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<td>(15) Presc use</td>
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</table>

* P < .05
** P < .01.

AS = anxiety sensitivity; SC = fear of social concerns; C = fear of mental incapacitation; PC = fear of physical catastrophe; PASS = Pain Anxiety Symptoms Scale; PA = physiological anxiety; CA = cognitive anxiety; EA = escape/avoidance; FA = fearful appraisals; BDI = Beck Depression Inventory; STAI-T = trait anxiety; STAXI-T = trait anger; HQ disturb = disturbing/distressing nature of headaches; HQ lifesty = degree of lifestyle change; Pain sev = pain severity; OTC use = over-the-counter analgesic use; Presc use = prescription headache medication use.
variable to meet the $P < .05$ criterion for entry into the significant model (see Table 4). This analysis indicated that 3.8% of the variance in over-the-counter analgesic use was accounted for by pain-specific cognitive anxiety, with higher cognitive anxiety being associated with greater use.

### 3.2.2. Prediction of prescription medication use

In Step 1, MPQ current pain severity was found to contribute significantly to use of prescription headache medications \( F(1,100) = 5.1, P < .05 \). However, as shown in Table 5, those with less severe pain were more likely to be taking prescription medications (possibly indicating effectiveness of the medications in alleviating pain severity). In Step 2, after controlling for pain severity, the fear of physical catastrophe dimension of AS and the pain-specific physiological anxiety subscale of the PASS met the $P < .05$ criterion for entry into the significant model \( F(3, 98) = 5.6, P < .001 \). The model accounted for 11.9% of the variance in prescription medication use. Lower scores on the fear of physical catastrophe dimension of AS and higher scores on the PASS physiological anxiety subscale were associated with use of prescription headache medications.

### 4. Discussion

Previous investigations of analgesic use have yielded results that, in patients with chronic back pain, confirm (Asmundson & Norton, 1995) and, in patients with recurrent headaches (Asmundson, Norton, & Veloso, 1999), fail to support McNally’s (1996) hypothesis that AS is positively associated with the use of arousal-dampening substances. The discrepant results have been attributed to the large proportion (>90%) of recurrent headache patients who are

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**Table 4**

Summary of hierarchical regression analysis for current over-the-counter analgesic use

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>$R^2$ change</th>
<th>$P$</th>
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<tbody>
<tr>
<td>1</td>
<td>Pain Severity</td>
<td>0.095</td>
<td>0.96</td>
<td>.014</td>
<td>.004</td>
<td>.014</td>
<td>.34</td>
</tr>
<tr>
<td>2</td>
<td>PASS-CA</td>
<td>0.208</td>
<td>2.11</td>
<td>.057</td>
<td>.038</td>
<td>.043</td>
<td>.04</td>
</tr>
</tbody>
</table>

PASS-CA = Pain Anxiety Symptoms Scale—cognitive anxiety.

**Table 5**

Summary of hierarchical regression analysis for current prescription headache medication use

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>$R^2$ change</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pain Severity</td>
<td>−0.275</td>
<td>−2.90</td>
<td>.049</td>
<td>.039</td>
<td>.049</td>
<td>.005</td>
</tr>
<tr>
<td>2</td>
<td>ASI-PC</td>
<td>−0.299</td>
<td>−3.00</td>
<td>.095</td>
<td>.077</td>
<td>.046</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>PASS-PA</td>
<td>0.241</td>
<td>2.40</td>
<td>.145</td>
<td>.119</td>
<td>.050</td>
<td>.018</td>
</tr>
</tbody>
</table>

ASI-PC = Anxiety Sensitivity Index—fear of physical catastrophe; PASS-PA = Pain Anxiety Symptoms Scale—physiological anxiety.
taking analgesics and other headache medications, and to the resulting lack of sensitivity of
proportional analysis to detect potential associations with AS (Asmundson, Norton, &
Veloso, 1999; Asmundson et al., 2000). The purpose of the present study was to apply both
proportional and regression analyses to further explore AS, as well as related trait character-
istics (e.g., fear of pain, depression, trait anxiety, trait anger), in the context of current use of
headache medication in patients with recurrent headaches. Our intent was to further evaluate
the utility of assessing AS (and related constructs of emotionality) for purposes of identifying
patients who are potentially at risk for analgesic abuse.

The results of the proportional analysis were similar to those reported by Asmundson,
Norton, and Veloso (1999), indicating that current use of over-the-counter analgesics and/or
prescription headache medications did not differ as a function of having high (≥30), medium
(13–29), or low (≤12) levels of AS. As anticipated, the larger sample led to diminution of
the trend for patients with low AS to be more likely to be using prescription medications
(Asmundson, Norton, & Veloso, 1999). However, since most patients (93%) were once again
observed to be taking some form of medication to control and/or prevent their headache pain,
this type of statistical analysis is not likely to be sensitive to more subtle influences of AS on
mediation use. Nor does it allow for the assessment of lower-order components of the ASI or
of related constructs of emotionality and their association with patterns of medication use.

The results of the hierarchical multiple regression analyses yielded some intriguing results
regarding the unique contributions of the components of AS and other constructs of
emotionality, fear of pain in particular, to use of the general classes of headache medications.
In each case, one or more of these constructs made a unique and significant contribution to
the final model after controlling for headache pain severity (which, in the case of over-the-
counter analgesics, was not even a significant predictor of use). For use of current over-the-
counter analgesics, the only significant predictor was pain-specific cognitive anxiety
(positive) and, for current prescription headache medication use, ASI fear of physical
catastrophe component (negative) and pain-specific physiological anxiety (positive). These
results suggest that use of medication for headache relief, whether readily available over-the-
counter or prescription medications with controlling, abortive, or preventive properties, is
associated with constructs that denote fear of symptoms of anxiety and pain, albeit in subtly
different ways.

The PASS cognitive and physiological anxiety subscales denote cognitive (e.g., I find it
hard to concentrate when I hurt; I can’t think straight when in pain.) and physiological (e.g.,
My body gets shaky when I hurt; When I sense pain, I feel dizzy or faint.) symptoms.
However, ASI fear of physical catastrophe (e.g., It scares me when my heart beats rapidly.) is
different in that it represents emotional, fear-based reactions to the potential catastrophe that
can result from symptoms. Our findings indicate that more symptoms (cognitive in the case
of over-the-counter analgesic use; physiological in the case of prescribed medication use), but
an attenuated emotional reaction to them (in the case of prescription medication use), are
associated with greater use of headache medications.

This medication–symptom relationship supports, in a general sense, McNally’s (1996)
hypothesis that fear of symptoms of anxiety (i.e., AS) is positively associated with the use of
arousal-dampening substances (e.g., analgesics, beta-blockers, benzodiazepines). An import-
ant observation though, and one contrary to McNally’s hypothesis, is that the headache patients who had a greater emotional reaction (i.e., more fear) to their symptoms were less likely to use prescription headache medications. Why? Perhaps they are less inclined to believe that what they are experiencing is just a headache (e.g., it might be a tumor or a stroke) and, thus, do not believe that the prescribed treatments will be effective in alleviating their symptoms. It is equally plausible that, when used, these medications are effective in attenuating or alleviating the emotional reaction to symptoms arising from pain. While fear of pain and AS has been shown to be disruptive to cognition and behaviour, independent of headache frequency or severity (Asmundson, Norton, & Veloso, 1999; Hursey & Jacks, 1992), further research is needed to more fully understand their influence. In particular, longitudinal investigations are required to ultimately clarify this issue and questions about direction of causality.

We (Asmundson & Norton, 1995) previously suggested that AS may be an indicator of risk for developing a dependency for analgesic medications in patients with chronic low back pain. This remains a suggestion that has considerable potential for clinical utility and, for this reason, warrants careful inspection in additional samples of chronic back pain patients as well as patients with other persistent and potentially disabling painful conditions (e.g., temporomandibular joint dysfunction, fibromyalgia). The present findings suggest that the AS construct, at least as measured by the ASI, may not be a particularly good indicator of headache medication use and, by inference, of the potential of an acquired dependency. Indeed, the fear of physical catastrophe component of AS was the only AS component that was predictive of prescription headache medication use, and importantly, it was negatively associated with use. Moreover, both regression models, while significant, accounted for relatively small amounts of variance in headache medication use. Additional investigation is needed to determine whether patients with chronic back pain versus recurrent headaches differ in ways that might explain the discrepant findings between these populations.

On the other hand, pain-specific cognitive anxiety, which has moderate to high correlations with AS (see Table 3; Asmundson, 1999), was a significant predictor of over-the-counter analgesic use, the most common of which in our clinic is ibuprofen or acetaminophen (often in combination with codeine). While the prescribed medications taken by our sample of patients (i.e., naproxen, selective 5-hydroxytryptamine1-like receptor agonists, beta-blockers, and tricyclic antidepressants) all have a low likelihood for acquired dependency, ibuprofen and acetaminophen have potential for being abused and codeine is an opioid analgesic (α-receptor agonist) with a moderate likelihood for acquired dependency. Thus, the association of over-the-counter analgesic use with the fear of pain-specific cognitive anxiety is in line with the notion that measures of these constructs (i.e., ASI, PASS) may be useful in screening for those most likely to develop analgesic dependencies. However, additional investigation, including follow-up assessment of dependency, is required before suggestions for a clinically practical and definitive screening package are offered.

Opiate analgesics are often prescribed to patients with migraine headaches and, as a class of medications, have a high potential for dependency (Markley, 1994). The patients in our sample were not taking opiate analgesics for control of their headache pain and, in the case of patients participating in the current study, these medications were not prescribed. We cannot, therefore,
draw any firm conclusion regarding the potential role of AS, its lower-order components, and similar fear constructs (i.e., fear of pain) in their use or abuse. Given the pattern of results observed for the over-the-counter analgesics (particularly in absence of a significant role for pain severity), it seems plausible that AS and other pain-specific fear constructs will be associated with opiate analgesic use and, possibly, abuse. Their powerful sedative effects may make them a particularly attractive means of ameliorating fear-based arousal associated with catastrophic misinterpretations of the benign symptoms that accompany recurrent headaches. This speculation, being in line with our findings as well as those regarding the association between AS and the use and abuse of substances with anxiolytic effects (for review, see Stewart et al., 1999), warrants careful empirical scrutiny. The present investigation, having provided a foundation from which these studies can be based and improved—e.g., through inclusion of assessment of patterns and quantities (i.e., frequency, dose) of analgesic use, rather than dichotomous measures of use, and of acquired dependencies and documented abuse, rather than just current use—will, we hope, prove heuristic in this regard.

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References


