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## Alexithymia and anxiety sensitivity in patients with non-cardiac chest pain<sup>☆</sup>

Kamila S. White<sup>a,\*</sup>, Cassandra J. McDonnell<sup>a</sup>, Ernest V. Gervino<sup>b</sup><sup>a</sup> Department of Psychology, University of Missouri-Saint Louis, One University Boulevard, 212 Stadler Hall, Saint Louis, Missouri 63121, USA<sup>b</sup> Department of Medicine, Cardiovascular Division, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA

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### ABSTRACT

The aim of this study was to examine independent and combined influences of alexithymia and anxiety sensitivity on chest pain and life interference in patients with non-cardiac chest pain (NCCP). Theories of NCCP posit a central role for emotion in the experience of chest pain, however, studies have not examined how alexithymia characterized by a difficulty identifying or verbalizing emotions, may influence this relationship. This study examined 231 patients (56% females, *M* age = 50 years) with chest pain seeking cardiac evaluation, who showed no abnormalities during exercise tolerance testing. Forty percent (40%) scored at or above the moderate range of alexithymia. Whereas health care utilization was associated with elevated alexithymia among men, health care utilization was associated with elevated anxiety sensitivity among women. Hierarchical regression analyses revealed that alexithymia and anxiety sensitivity were both uniquely and independently associated with pain severity and life interference due to pain. Alexithymia-pain links were stronger for men compared to women. Secondary analyses conducted with a subsample suggest that alexithymia may be increasingly stable over time (i.e., 18-month follow-up). Findings are largely congruent with theoretical models of NCCP showing that personality and emotional factors are important in this medically unexplained syndrome.

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### 1. Introduction

Chest pain is one of the most common medical complaints. Since it may be a warning sign of coronary artery disease or myocardial infarction, it is also one of the most frightening pains. More than half of patients referred for coronary angiography suffer chest pain that is not cardiac in origin (Papanicolaou et al., 1986), and many chest pain patients do not receive a medical explanation for their pain (Kroenke & Mangelsdorff, 1989; Mayou, Bryant, Forfar, & Clark, 1994). Non-cardiac chest pain (NCCP) is the experience of angina-like chest discomfort in the absence of coronary artery disease or other apparent cardiac etiology – sometimes regarded as the sensitive heart because of the abnormal cardiac pain perception in this pain population (Cannon, 2009), for review (White, 2007). With few exceptions (Bodegard, Erikssen, Bjornholt, Thelle, & Erikssen, 2004; Eslick & Talley, 2008), patients with NCCP following a normal coronary angiography have a better prognosis than patients with coronary artery disease (CAD) (Lichtlen, Bargheer, & Wenzlaff, 1995; Papanicolaou et al., 1986). Despite this prognosis, the syndrome of

NCCP is associated with impaired psychosocial functioning, reduced quality of life (Mayou, 1998), and discomfort and disability comparable to patients with CAD (Eifert, Hodson, Tracey, Seville, & Gunsawardane, 1996). Many patients experience worry, anxious preoccupation with heart functioning, and recurrent chest pain (Esler & Bock, 2004; White & Raffa, 2004) that results in increased health care costs due to repeat hospitalizations, emergency department visits, and cardiac catheterizations (Johnson et al., 2004; Ockene, Shay, Alpert, Weiner, & Dalen, 1980).

Early conceptualizations of cardiophobia characterized this syndrome by fears of heart attack and death, suggesting that NCCP patients may focus attention on their heart when experiencing stress and arousal (Eifert, 1992). Modern theoretical models of NCCP are multi-causal (Eifert, Zvolensky, & Lejuez, 2000; Mayou, 1998) and underscore the multidisciplinary nature of the problem (White & Raffa, 2004). Because emotional disorders often co-occur with NCCP (White et al., 2008), especially anxiety disorders, empirically-supported models of anxiety disorders have been shown to be relevant for patients with NCCP (White & Barlow, 2002). One model that has foundations in empirically supported models of panic disorder (White & Barlow, 2002) draws upon Eifert's early cardiophobia work, and emphasizes the importance of biological vulnerability, stress, and psychological vulnerability leading to anxious apprehension and learned alarm (White & Raffa, 2004). This theoretical model is supported by research showing

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\* Corresponding author. Tel.: +1 314 516 7122; fax: +1 314 516 5392.  
E-mail address: [whiteks@umsl.edu](mailto:whiteks@umsl.edu) (K.S. White).

that psychological factors that affect the cognitive interpretation of bodily sensations are an important component of NCCP etiology (Mayou, 1998). One of these factors is anxiety sensitivity, the trait tendency to fear anxiety-related physiological sensations based on the belief that they signal impending harm (Reiss, 1991). Anxiety sensitivity is considered a psychological vulnerability to developing anxiety symptoms, including chest pain (Lipsitz et al., 2004). NCCP patients are thought to develop hypersensitivity to benign physical sensations that they perceive as indications of catastrophic danger, specifically a heart attack (Esler & Bock, 2004). Indeed, research demonstrates that these patients fear heart-related sensations as much as heart disease inpatients, and that this fear is associated with the intensity of cardiac complaints, including chest pain (Aikens, Michael, Levin, & Lowry, 1999; Eifert et al., 1996; Lipsitz et al., 2004). The syndrome of NCCP is thought to persist partly due to conscious hypervigilance to physical sensations (White, Craft, & Gervino, 2010), and anxiety sensitivity may also account for some of the high health care utilization by NCCP patients. Research suggests that worry about and monitoring of physical symptoms may have a greater impact than the nature of the physical symptom on the decision to go to a hospital emergency department (Wulsin & Yingling, 1991). In fact, in a survey of NCCP patients, worry over chest pain was the most commonly reported reason for seeking medical attention (Eslick & Talley, 2004).

Another psychological vulnerability factor that may be significant for patients with NCCP is alexithymia. Alexithymia – literally “no words for feelings” – is a personality construct characterized by deficits in the cognitive processing and regulation of emotions (Sifneos, 1973; Spitzer, Siebel-Jurges, Barnow, Grabe, & Freyberger, 2005). The idea that alexithymia might influence physical complaints is tied to the knowledge that physiological alterations accompany affective arousal. Individuals with alexithymia have difficulty identifying emotions and may be unaware of this relationship between affect and physiological alterations. Consequently, they may experience these alterations not as emotional experiences, but as undifferentiated, uncomfortable, and confusing physical sensations (Kooiman, Bolk, Brand, Trijsburg, & Rooijmans, 2000; Lumley, Stattner, & Wehmer, 1996). These physical sensations are often misinterpreted and reported as symptoms of a physical illness (Taylor, Bagby, & Parker, 1991). A tendency to misinterpret emotional arousal may make individuals with alexithymia more likely to be present with NCCP, since they may experience and report physiological emotional symptoms (e.g., chest tightness) as signs of a physical heart problem. Indeed, in the only published study reporting alexithymia prevalence in a NCCP population, a small patient sample demonstrated moderately high levels of alexithymia that were greater than cardiac patients with chest pain (Lumley, Tomakowsky, & Torosian, 1997). In samples with medically unexplained physical symptoms and chronic pain patients, alexithymia scores were comparable to those of normal populations (Kooiman, Bolk, Rooijmans, & Trijsburg, 2004; Kosturek, Gregory, Sousou, & Trief, 1998). Moreover, people who score high on measures of alexithymia may be more at risk for experiencing future psychological problems (Spitzer et al., 2005).

Anxiety sensitivity and alexithymia both share a focus on physical sensations. For instance, whereas anxiety sensitivity is associated with a tendency to concentrate on physical sensations because of their feared consequences (Reiss & McNally, 1985), alexithymia is associated with a tendency to concentrate on the physical sensations associated with emotional arousal (Bagby & Taylor, 1997a). In both cases, the individual may mistake the physical sensations as signs of a medical problem or physical illness. Despite a similar and shared focus, research has shown that they tap into related but differing aspects of concern about physical sensations. For instance, Mueller and Alpers (2006) demonstrated

the independence of the constructs of anxiety sensitivity and alexithymia via common factor analysis as assessed by gold standard self-report measures (i.e., anxiety sensitivity index and Toronto alexithymia scale) with minimal item overlap (Mueller & Alpers, 2006). In Muellers and Alper's study conducted with patients diagnosed with psychosomatic disorders, broadly-defined, anxiety sensitivity and alexithymia were distinct, moderately correlated constructs. Another study conducted with chronic pain sample showed that anxiety sensitivity was correlated with alexithymia at high levels, but this association was not supported at low levels (Cox, Kuch, Parker, Shulman, & Evens, 1994). Others have confirmed a moderate correlation between anxiety sensitivity and alexithymia in psychiatric samples (Simpson, Jakupcat, & Luterek, 2006; Zeitlin & McNally, 1993; Zahradnik, Stewart, Marshall, Schell, & Jaycox, 2009) and undergraduate samples (Devine, Stewart, & Watt, 1999). It is important to examine the link between anxiety sensitivity and alexithymia in a NCCP sample of patients, as it remains unclear to what extent alexithymia and anxiety sensitivity are associated with the experience of chest pain and health care utilization. Unlike in any past samples characterized by bodily symptoms of a chronic nature (i.e., chronic pain, psychosomatic patients), alexithymia may be particularly relevant for NCCP, characterized by chest pain, a bodily symptom not usually coupled with an emotional cause.

Alexithymia has been conceptualized as a stable personality trait that predisposes individuals to psychiatric disorders (Devine et al., 1999; Nemiah, 1996; Spitzer et al., 2005), however, the exact nature of this construct is a matter of continuing debate (Taylor & Bagby, 2004). Some have characterized alexithymia as a reaction to unpleasant emotional states, in which individuals restrict or eliminate emotional range to mitigate painful affect (Ahrens & Deffner, 1986). Others posit that alexithymia may function as both a personality trait, referred to as primary alexithymia, and a state reaction, referred to as secondary alexithymia (Marchesi, Fonto, Balista, Cimmino, & Maggini, 2005; Muftuoglu, Herken, Demirci, Virit, & Neyal, 2004). Secondary alexithymia is conceptualized as a coping mechanism through which individuals avoid unpleasant affective states by severely restricting emotional range (Berthoz, Consoll, Perez-Diaz, & Jouvent, 1999). An important distinction between primary and secondary alexithymia is their stability over time, which is a basic theoretical assumption underlying any personality trait construct (De Gucht, Fontaine, & Fischler, 2004). Primary alexithymia, as a trait, is thought to remain stable across time and affective state. Secondary alexithymia may fluctuate across time, according to changes in emotional distress (Martínez-Sánchez, Ato-García, & Ortiz-Soria, 2003). Longitudinal studies show a mixed characterization of the stability of alexithymia. Whereas alexithymia is rather stable in the general population (Salminen, Saarrijarvi, Toikka, Kauhanen, & Aarela, 2006) it has been found to be state-dependent to some extent in clinical samples (Honkalampi et al., 2001; Keltikangas-Jarvinen, 1987). We are not aware of any published reports examining the stability of alexithymia in NCCP patients.

A subset of patients with NCCP consumes sizeable health care resources. As this utilization results in considerable medical costs and systems level impairment (Eslick, Jones, & Talley, 2003), it is important to understand the components of the NCCP syndrome that may account for high health care utilization rates. There is a paucity of research examining the impact of alexithymia on health care utilization among patients with NCCP. Limited evidence suggests that higher alexithymia scores are associated with increased medical treatment in general patient populations (Lumley & Norman, 1996). An increased tendency to report physical symptoms could partially account for increased utilization by individuals with high alexithymia. Such a tendency was

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