

2018-06-01

The application of the unified protocol for transdiagnostic treatment of emotional disorders to chronic pain

John Otis. 2018. "The Application of the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders to Chronic Pain." *The Behavior Therapist*, Volume 41, Issue 5, pp. 248 - 253.

<https://hdl.handle.net/2144/38484>

"Downloaded from OpenBU. Boston University's institutional repository."

Running Head: UP FOR PAIN AND EMOTIONAL DISORDERS

The Application of the Unified Protocol for Transdiagnostic Treatment of Emotional
Disorders to Chronic Pain

John D. Otis, Ph.D.^{a, b}

^a *United States of America, Department of Veterans Affairs,
VA Boston Healthcare System,*

^b *Boston University, Department of Psychological and Brain Sciences*

Correspondence:

John D. Otis, Ph.D.

Center for Anxiety and Related Disorders

Boston University, Department of Psychological and Brain Sciences

648 Beacon Street, 6th Floor

Boston, MA 02215

Email: johnotis@bu.edu

Phone: (617) 353-9610

Chronic Pain

Chronic pain is currently one of the most common, impairing, and costliest conditions reported in the American adult population, affecting more people than heart disease, cancer and diabetes combined; about 100 million American adults suffer daily from functional impairment, disability, and distress caused by chronic pain and its sequelae (Institute of Medicine, 2011; Kroenke, 2003). Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. When pain persists for longer than 3 months is it considered chronic pain (IASP, 2017). The experience of chronic pain can be caused by many factors including diseases, accidents, violence and trauma, or normal degenerative changes that occur with age.

Chronic pain is one of the most frequent reasons that people seek healthcare. National statistics indicate that approximately 55% of individuals in the United States have experienced some level of pain in the last month, with at least 11% reporting chronic pain (Nahin, 2015). A more recent survey conducted by the U.S. Centers for Disease Control and Prevention indicated that 19.6% of adults endorsed having “pain most days or every day” for the past 6 months (Quickstats, 2017). The national costs of pain are astounding—ranging from \$560 to \$635 billion per year when considering annual healthcare costs and costs associated with lower productivity (Gaskin & Richard, 2012). In the VA Healthcare System, almost 50% of patients in primary care endorse experiencing pain on a regular basis (Kerns, Otis, Rosenberg, & Reid, 2003). Chronic pain is also a significant problem among recent military returnees, with 44% of soldiers

returning from deployment reporting chronic pain (Toblin, Quartana, Riviere, Walper, & Hoge, 2014).

Although many people are able to adaptively cope with pain, for some people the experience of pain contributes to functional disability, emotional distress, and reduced quality of life. Chronic pain can impact every aspect of a person's life including their work, recreational activities, relationships, and feelings of independence. Thus, understanding factors that maintain or contribute to the experience of pain is a critical topic of research. In fact, in 2011, the National Institute of Health enlisted the Institute of Medicine to assess the state of the science regarding pain research, care and education, as pain is currently considered one of our nation's greatest public health challenges. While research has made tremendous strides in understanding the psychological, biological, and cognitive underpinnings of pain, many gaps still persist in our knowledge of pain, and efficacious treatments for pain. Further, many challenges persist in the field. Perhaps now more than ever, there is a pressing need to expand the "reach" of our current treatments so that they can help more people, and there is a critical need to optimize the treatments that do exist so that patients show greater functional improvement. The field is greatly in need of novel psychological treatments that have the potential to more efficiently help diverse populations of patients with pain return to healthier physical and emotional functioning.

The Comorbidity between Chronic Pain and Emotional Disorders

One of the clinical challenges often faced by therapists when providing psychological treatment for chronic pain is the high rate of comorbidity between pain and emotional disorders such as anxiety and depression. Rates of depression in samples of chronic

pain patients are estimated to be 50% (Elliott, Renier, & Palcher, 2003) while anxiety is estimated to be high as 45% (Kroenke et al., 2013; Staerkle et al., 2004). As the frequency, intensity, and duration of pain increases so too does the likelihood of the presence of an emotional disorder (Bair, Robinson, Katon, & Kroenke, 2003). Research indicates that patients with chronic pain and emotional disorders experience significantly greater pain severity, pain-related disability, and impairments in health-related quality of life. In addition, the presence of an emotional disorder can contribute to poorer pain treatment outcomes including functional limitations, impaired social functioning, higher unemployment, and reduced treatment satisfaction (Bair et al., 2003; Bair, Wu, Damush, Sutherland, & Kroenke, 2008).

Vlaeyen and Linton (2000) proposed a cognitive behavioral fear-avoidance model to illustrate the process by which thoughts and emotions contribute to the experience of pain. According to this model, when a person interprets acute pain (i.e., pain lasting less than 3 months) as non-threatening they are more likely to maintain their engagement in everyday activities and experience recovery. However, when pain is interpreted as threatening, a process called “catastrophizing”, this interpretation may contribute to pain-related fear, anxiety, and avoidance of activities, as well as increased guarding behaviors (e.g., grimacing, bracing, and rubbing the pain location), and hypervigilance to bodily sensations. Catastrophic beliefs may include thoughts such as “This is never going to get better,” or negative views including “I’m worthless to my family because I can’t work.” When this pattern of thinking persists, feelings of depressed mood may increase. As pain and depressive symptoms continue, patients may withdraw or avoid doing everyday activities due to fear and anxiety over the

possibility of further injury or increased pain. In this way, avoidance may also contribute to increased disability and depressive symptoms. As the person becomes more depressed and inactive, fear and avoidance increases, and pain may be perceived as more intense. With continued inactivity, their muscles may become weaker, they may begin to gain weight, and their overall physical conditioning may decline. Thus, this cognitive behavioral fear-avoidance model has served to demonstrate the potential influences of avoidance and catastrophizing on the development and maintenance of chronic pain, and has guided the development and refinement of cognitive and behavioral treatments for chronic pain (Flink, Boersma, & Linton, 2013; Racine et al., 2016; Ramirez-Maestre, Esteve, Ruiz-Parraga, Gomez-Perez, & Lopez-Martinez, 2016).

There is also accumulating evidence that pain and emotional disorders share common neurobiological pathways (Bar et al., 2007; Wiech & Tracy, 2009). Studies have found correlations between brain responses involved during catastrophizing and in the modulation of pain including the dorsolateral prefrontal, insula, and anterior cingulate cortices (Seminowicz & Davis, 2006). Experimental studies of pain have found that inducing a depressed mood state and negative pain-specific cognitions is associated with increased pain unpleasantness and increased activity in the prefrontal cortex, subgenual anterior cingulate cortex, and hippocampus (Berna et al., 2010). Evidence of overlapping structures involved in pain and cognitions may explain how the presence of an emotional disorder may impact processing of painful stimuli.

The high rates of comorbidity between pain and emotional disorders is a risk factor for the abuse of opiates and other substances. Every day, more than 90 Americans die

after overdosing on opioids including prescription pain relievers, heroin, and synthetic opioids such as fentanyl (Rudd, Seth, David, & Scholl, 2016). Studies have shown that comorbid emotional disorders, such as anxiety, depression, and PTSD are critical factors in the initiation and maintenance of opioid use disorders (Goesling et al., 2015). Individuals seeking relief from emotional and physical pain may choose to self-medicate to relieve their symptoms; however, relief is temporary and as addiction to medications develop, pain symptoms are actually enhanced. Veterans have been particularly vulnerable to this pathway to addiction as many veterans with chronic, painful health conditions face challenges reintegrating back into society after serving in the military. One study found that veterans with PTSD and other mental health conditions were more than twice as likely to be prescribed an opioid for a pain diagnosis, to receive higher doses of opioids, and to have adverse outcomes when compared to veterans without mental health diagnoses (Seal et al., 2012). These data support the need to develop more effective and transportable non-pharmacological therapies for addressing the high rates of comorbidity between pain and emotional disorders.

Evidence-based Treatment for Chronic Pain

Based on our understanding of the biopsychosocial model of chronic pain, cognitive-behavioral therapies have been developed with the goal of addressing negative and catastrophic thoughts and behaviors that can serve to maintain and exacerbate the experience of pain (Turk & Fritz, 2005; Otis, 2007; Thorn, 2017). CBT for pain involves teaching patients ways to challenge maladaptive thoughts and safely reintroduce enjoyable activities (Otis, Pincus, & Murawski, 2010). Key components of CBT for chronic pain include cognitive restructuring focused on negative thoughts related to pain

(e.g., “This pain is going to kill me”), relaxation training (e.g., diaphragmatic breathing, progressive muscle relaxation, and meditation), time-based activity pacing (e.g., teaching patients how to safely increase activity level), and graded homework assignments designed to decrease patients’ avoidance of activity and reintroduce a healthy, more active lifestyle. CBT also focuses on promoting patients’ increased activity and productive functioning using techniques such as exercise homework, activity scheduling, and graded task assignments. A substantial literature exists documenting the efficacy of CBT for a variety of chronic pain conditions including osteoarthritis, chronic back and neck pain (Linton & Ryberg, 2001), diabetic neuropathic pain (Otis et al., 2013), and tension headache (Holroyd et al., 2001). In a meta-analysis of 22 randomized controlled trials of psychological treatments for chronic low back pain, cognitive-behavioral and self-regulatory treatments specifically were found to be efficacious (Hoffman, Papas, Chatkoff, & Kerns, 2007).

Although there is considerable evidence that CBT is a very effective approach for many people with chronic pain, symptoms related to emotional disorders can complicate and interfere with many elements of treatment including goal setting, plans for exercise, cognitive restructuring, and motivation to participate (Kerns & Haythornthwaite, 1988). For example, it is not uncommon for patients with pain and anxiety to catastrophize and worry about the meaning of pain, to avoid activities for fear of movement, or to socially isolate themselves. Similarly, patients with pain and depression may report that they understand the benefits of setting therapy goals but also report that they lack the motivation to take the first step to achieve them. Despite the high comorbidity rates of chronic pain and emotional disorders, and the negative impact of emotional disorders

on the experience of pain and its treatment, there is currently no established protocol for how to best address the needs of patients with chronic pain and comorbid emotional disorders. Patients with pain and emotional disorders would benefit greatly from learning more adaptive emotion regulation strategies that could be used across a variety of situations and contexts.

A Unified, Transdiagnostic Approach to Pain Management

One treatment approach that may have the potential to address shared mechanisms across chronic pain and comorbid emotional disorders is the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders (UP; Barlow et al., 2018a,b). The UP was developed based on evidence suggesting that the high rates of comorbidity among the various emotional disorders may be due to what has been called a “general neurotic syndrome” in which symptom-specific presentations are seen as a manifestation of an underlying syndrome. Neuroticism is a personality trait that is commonly associated with anxiety, mood, and substance use disorders (Ormel et al., 2013). Research has shown that neuroticism, which is also referred to as negative affectivity, may represent a psychological vulnerability across disorders that is demonstrated by a tendency to respond with increased emotional reactivity, a heightened tendency to view experiences as aversive, and attempts to alter, avoid, or control emotional responding. People who show high rates of neuroticism are often self-critical, sensitive to the criticisms of others, and feel personally inadequate. Although a number of studies have linked neuroticism to emotional disorders, recent studies suggest that it may play an influential role in the development of chronic pain through its influence on pain-related catastrophic thinking and avoidance, both of which are

considered key factors in the development of chronic pain as described in the cognitive-behavioral fear-avoidance model. For example, Goubert, Crombez, and Van Damme (2004) examined the interaction between pain severity, catastrophic thinking, pain related fear, and personality characteristics. Of the five personality dimensions that were investigated, only neuroticism was found to be consistently related to pain catastrophizing and fear. Further, neuroticism was found to moderate the relationship between pain severity and pain catastrophizing. Wong et al., (2014) found that neuroticism was significantly associated with catastrophizing, pain related fear, and pain anxiety. Wilner, Vranceanu, and Blashill, (2014) examined a sample of adolescents with pain and found that neuroticism predicted the odds of pain one year later. Taken together, these studies suggest that neuroticism may be an important construct in the development of chronic pain. When confronted with a stressful pain condition, neuroticism may lower the threshold at which pain is perceived as threatening, and at which pain elicits catastrophic thinking and pain-related fear. Thus, targeting the underlying characteristic of neuroticism, and reducing the threat value of pain, may be an effective way of addressing pain-related fears and anxiety that contribute to the development and maintenance of chronic pain.

The UP consists of 5 core modules that target characteristics underlying all anxiety, depressive, and related disorders including: (1) mindful emotion awareness, (2) cognitive flexibility, (3) identifying and preventing patterns of emotion avoidance, (4) increasing awareness and tolerance of emotion related physical sensations, and, (5) interoceptive and situational emotion focused exposures. The main premise of the UP is that people with emotional disorders use maladaptive emotion regulation strategies,

such as avoidance and catastrophizing, that are ultimately ineffective and counterproductive by preventing extinction of distress and anxiety to situational or interoceptive cues. The effectiveness of the UP was recently demonstrated in a randomized controlled trial comparing the efficacy of the UP to established single disorder protocols (SDPs) for patients with panic, generalized anxiety disorder, obsessive-compulsive disorder, and social anxiety disorder. The results of the study indicated that the UP produced equivalent symptom reduction when compared to the 4 different SDP psychological treatments at post-treatment and at 6-month follow-up, with less attrition (Barlow et al., 2017).

Preliminary support for the use of a unified approach to treating pain and emotional disorders was demonstrated by Allen, Tsao, Seidman, Ehrenreich-May, and Zeltzer (2012) who described the application of a modified version of the UP for two adolescents with pain and emotional disorders. The results indicated that both participants demonstrated improvements at post-treatment, some of which were more evident at the 3-month follow-up. A pilot study is currently underway at the Center for Anxiety and Related Disorders at Boston University to assess the feasibility, acceptability, and potential efficacy of the UP for patients who have chronic pain and comorbid emotional disorders. As part of this study, we are specifically examining the relationship between neuroticism and other mechanisms that may contribute to the development and maintenance of chronic pain including catastrophizing and avoidance. In addition to the self-report of pain, important outcome measures include pain-related interference in activity level, types of coping strategies utilized, and productive functioning (i.e., goal achievement and return to work). This line of research will include

the examination of physiological and biological markers associated with pain to assess potential changes associated with UP treatment outcome. We will also be examining whether integrating more traditional CBT pain management components to the UP, such as goal setting, time-based activity pacing, and increased physical activity, results in additional clinical benefit. In addition, we will be monitoring the extent to which the skills acquired by the UP can assist patients in developing and employing additional adaptive health-related behaviors including the management of other medical conditions that are often comorbid with chronic pain.

A unified approach that targets the underlying, shared mechanisms that are central to the development of both chronic pain and emotional disorders would have several advantages. First, using a unified, transdiagnostic treatment approach for patients with pain and emotional disorders may help patients improve more quickly and may produce more comprehensive improvement in symptoms across a range of emotional disorders. Second, using a transdiagnostic treatment approach that focuses on a single set of core therapeutic principles rather than several diverse protocols would simplify the training of therapists treating patients with those disorders. Additionally, this approach to the treatment of pain and emotional disorders would potentially be much more cost-effective, would simplify the dissemination of evidence-based treatments, and broaden the reach of treatment to those who need it most. A unified approach to treating patients with comorbid pain and emotional disorders has the transformative potential to overcome these problems in care.

References

Allen, L. B., Tsao, J. C. I., Seidman, L. C., Ehrenreich-May, J., & Zeltzer, L. K. (2012). A Unified, Transdiagnostic Treatment for Adolescents with Chronic Pain and Comorbid Anxiety and Depression. *Cognitive and Behavioral Practice, 19*(1), 56–67. doi.org/10.1016/j.cbpra.2011.04.007.

Bair, M. J., Robinson, R. L., Katon, W., & Kroenke, K. (2003). Depression and pain comorbidity: a literature review. *Archives of Internal Medicine, 163*, 2433–2445. doi: 10.1001/archinte.163.20.2433.

Bair, M. J., Wu, J., Damush, T. M., Sutherland, J. M., & Kroenke, K. (2008). Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. *Psychosomatic Medicine, 70*, 890–897. doi: 10.1097/PSY.0b013e318185c510.

Bar, K. J., Wagner, G., Koschke, M., Boettger, S., Boettger, M. K., Schlosser, R., & Sauer, H. (2007). Increased prefrontal activation during pain perception in major depression. *Biological Psychiatry, 62*(11), 1281-1287. doi: 10.1016/j.biopsych.2007.02.011.

Barlow D. H., Farchione T. J., Bullis J. R., Gallagher, M. W., Murray-Latin, H., Sauer-Zavala, S., ... Cassiello-Robbins, C. (2017). The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders Compared With Diagnosis-Specific Protocols for Anxiety Disorders: A Randomized Clinical Trial. *JAMA Psychiatry, 74*(9), 875–884. doi:10.1001/jamapsychiatry.2017.2164.

Barlow, D. H., Farchione, T. J., Sauer-Zavala, S., Latin, H., Ellard, K. K., Bullis, J. R., ... Cassiello-Robbins, C. (2018a). *Unified Protocol for Transdiagnostic Treatment of Emotional Disorders: Therapist Guide*. (2nd ed.) New York: Oxford University Press.

Barlow, D. H., Sauer-Zavala, S., Farchione, T. J., Latin, H., Ellard, K. K., Bullis, J. R., ... Cassiello-Robbins, C. (2018b). *Unified Protocol for Transdiagnostic Treatment of Emotional Disorders: Patient Workbook*. (2nd ed.) New York: Oxford University Press.

Berna, C., Leknes, S., Holmes, E. A., Edwards, R. R., Goodwin, G. M., & Tracy, I. (2010). Induction of depressed mood disrupts emotion regulation neurocircuitry and enhances pain unpleasantness. *Biological Psychiatry*, *67*, 1083-1090.

Elliott, T. E., Renier, C. M., & Palcher, J. A. (2003). Chronic pain, depression, and quality of life: correlations and predictive value of the SF-36. *Pain Medicine*, *4*(4), 331-339.

Flink, I. L., Boersma, K., & Linton, S. J. (2013). Pain Catastrophizing as repetitive negative thinking: A development of the conceptualization. *Cognitive Behaviour Therapy*, *42*(3), 215-223. doi: 10.1080/16506073.2013.769621.

Gaskin, D. J., & Richard, P. (2012). The Economic Costs of Pain in the United States. *The Journal of Pain*, *13*(8), 715-724. doi: 10.1016/j.jpain.2012.03.009.

Goesling, J., Henry, M. J., Moser, S. E., Rastogi, M., Hassett, A. L., Clauw, D. J., & Brummett, C. M. (2015). Symptoms of depression are associated with opioid use regardless of pain severity and physical functioning among treatment-seeking patients with chronic pain. *Journal of Pain*, *16*, 844-851. doi: 10.1016/j.jpain.2015.05.010.

Goubert, L., Crombez, G., & Van Damme S. (2004). The role of neuroticism, pain catastrophizing and pain related fear in vigilance to pain: a structural equations approach. *Pain, 107*(3), 234-241.

Hoffman, B. M., Papas, R. K., Chatkoff, D. K., & Kerns, R. D. (2007). Meta-analysis of psychological interventions for chronic low-back pain. *Health Psychology, 26*(1), 1-9. doi: 10.1037/0278-6133.26.1.1.

Holroyd, K. A., O'Donnell, F. J., Stensland, M., Lipchik, G. L., Cordingley, G. E., & Carlson, B. (2001). Management of chronic tension-type headache with tricyclic antidepressant medication, stress-management therapy, and their combination: A randomized controlled trial. *JAMA, 285*(17), 2208-2215.

Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education (2011). *Relieving pain in America: a blueprint for transforming prevention, care, education, and research*. National Academies Press, Washington, DC

International Association for the Study of Pain (IASP) Taxonomy (2011). *Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms, Second Edition*. Seattle: IASP Press.

Kerns, R. D., & Haythornthwaite, J. A. (1988). Depression among chronic pain patients: cognitive-behavioral analysis and effect on rehabilitation outcome. *Journal of Consulting and Clinical Psychology, 56*, 870- 876. doi.org/10.1037/0022-006X.56.6.870

Kerns, R. D., Otis, J. D., Rosenberg, R., & Reid C. (2003). Veterans' concerns about pain and their associations with ratings of health, health risk behaviors, affective distress, and use of the healthcare system. *Journal of Rehabilitation, Research and Development, 40*(5), 371-379.

Kroenke, K. (2003). Patients presenting with somatic complaints: epidemiology, psychiatric comorbidity and management. *International Journal of Methods in Psychiatric Research*, 12(1), 34-43.

Kroenke, K., Outcalt S., Kerbs, E., Bair, M. J., Wu, J., Chumbler, N., & Yu, Z. (2013). Association between anxiety, health-related quality of life and functional impairment in primary care patients with chronic pain. *General Hospital Psychiatry*, 35(4), 359-365. doi: 10.1016/j.genhosppsy.2013.03.020.

Linton, S. J., & Ryberg, M. (2001). A cognitive-behavioral group intervention as prevention for persistent neck and back pain in a non-patient population: A randomized controlled trial. *Pain*, 90, 83-90.

Nahin, R. L. (2015). Estimates of pain prevalence and severity in adults: United States, 2012. *Journal of Pain*, 16(8), 769-780. doi:10.1016/j.jpain.2015.05.002.

Ormel, J., Jeronimus, B. F., Kotov, R., Riese, H., Bos, E. H., Hankin, B.,... Oldehinkel, A. J. (2013). Neuroticism and common mental disorders: Meaning and utility of a complex relationship. *Clinical Psychology Review*, 33(5), 686-697. doi: 10.1016/j.cpr.2013.04.003.

Otis, J. D. (2007). *Managing Chronic Pain: A Cognitive-Behavioral Therapy Approach, Therapist Guide*. Treatments that Work Series, Oxford University Press, NY.

Otis, J. D., & Pincus, D. B. & Murawski, M. (2010). Cognitive Behavioral Therapy for Chronic Pain Management. Kerns, R.D. & Ebert M.E., (Eds.), *Behavioral and Psychopharmacologic Pain Management* (pp. 184-200). Cambridge University Press.

Otis, J. D., Sanderson, K., Hardway, C., Pincus, M., Tun, C., & Soumekh, S. (2013). A Randomized Controlled Pilot Study of a Cognitive Behavioral Therapy Approach for

Painful Diabetic Peripheral Neuropathy. *Journal of Pain*, 14(5), 475-482. doi: 10.1016/j.jpain.2012.12.013.

QuickStats: Age-Adjusted Percentage of Adults Aged ≥ 18 Years Who Were Never in Pain, in Pain Some Days, or in Pain Most Days or Every Day in the Past 6 Months, by Employment Status — National Health Interview Survey, United States, 2016. *MMWR Morbidity Mortality Weekly Report* 2017, 66, 796. doi: <http://dx.doi.org/10.15585/mmwr.mm6629a8>.

Racine, M., Moulin, D. E., Nielson, W. R., Morley-Forster, P. K., Lynch, M., Clark, A., ... Jensen, M. P. (2016). The reciprocal associations between catastrophizing and pain outcomes in patients being treated for neuropathic pain: A cross-lagged panel analysis study. *Pain*, 157(9), 1946-1953. doi: 10.1097/j.pain.0000000000000594.

Ramirez-Maestre, C., Esteve, R., Ruiz-Parraga, G., Gomez-Perez, L., & Lopez-Martinez, A. E. (2016). The key role of pain catastrophizing in the disability of patients with acute back pain. *International Journal of Behavioral Medicine*, 24(2), 239-248. doi: 10.1007/s12529-016-9600-9.

Rudd, R. A., Seth, P., David, F., & Scholl, L. (2016). Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015. *Morbidity and Mortality MWR Morbidity Mortal Weekly Report*. doi:10.15585/mmwr.mm655051e1.

Seal, K. H., Shi, Y., Cohen, G., Cohen, B. E., Maguen, S., Krebs, E. E., & Neylan, T. C. (2012). Association of mental health disorders with prescription opioids and high-risk opioid use in US veterans of Iraq and Afghanistan. *Journal of the American Medical Association*, 307(9), 940-947. doi: 10.1001/jama.2012.234.

Seminowicz, D. A., & Davis, K. D. (2006). Cortical responses to pain in healthy individuals depends on pain catastrophizing. *Pain, 120*, 297-306.

doi:10.1016/j.pain.2005.11.008.

Staerke, R., Mannion, A. F., Elfering, A., Junge, A., Semmer, N. K., Jacobshagen, N., ... Boos, N. (2004). Longitudinal validation of the fear-avoidance beliefs questionnaire (FABQ) in a Swiss-German sample of low back pain patients. *European Spine Journal, 13*(4), 332-340. doi: 10.1007/s00586-003-0663-3.

Thorn, B. (2017). *Cognitive therapy for chronic pain. A step by step guide*. Second Edition. The Guilford Press. New York, NY.

Toblin, R. L., Quartana, P. J., Riviere, L. A., Walper, K. C., & Hoge, C. W. (2014). Chronic pain and opioid use in US soldiers after combat deployment. *JAMA Internal Medicine, 174*(8), 1400–1401. doi: 10.1001/jamainternmed.2014.2726.

Turk, D. C., & Fritz, W. (2005). *The pain survival guide: How to reclaim your life*. American Psychological Association. APA Lifetools.

Vlaeyen, J. W. S., & Linton, S. J. (2000). Fear-avoidance and its consequences in musculoskeletal pain: A state of the art. *Pain, 85*, 317-332. doi: 10.1007/s10865-006-9085-0.

Wiech, K., & Tracy, I. (2009). The influence of negative emotions on pain: Behavioral effects and neural mechanisms. *Neuroimage. 47*, 987-994. doi: 10.1016/j.neuroimage.2009.05.059.

Wong, W. S., Lam, H. M. J., Chen, P. P., Chow, Y. F., Wong, S., Lim, H. S., ... Fielding, R. (2015). The Fear-Avoidance Model of Chronic Pain: Assessing the Role of Neuroticism and Negative Affect in Pain Catastrophizing Using Structural Equation

Modeling. *International Journal of Behavioral Medicine*, 22, 118-131. doi:

10.1007/s12529-014-9413-7.