A Randomized Controlled Trial of an Online Chronic Pain Treatment for Military, Police and Veterans

by

Jeremiah N. Buhler

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

MASTER OF ARTS

Department of Psychology

University of Manitoba

Winnipeg

Copyright © 2018 by Jeremiah Buhler
Abstract

Chronic pain is a serious health issue in Canada. Individuals who experience chronic pain often find it difficult to attend in-person treatment sessions for a variety of reasons including pain flare-ups, discomfort when travelling, pain-induced avoidant behaviours, and time constraints. These factors, if not addressed through appropriate treatment, serve as a detriment to the individual’s functioning by maintaining the pain cycle and preventing the individual from engaging in previously enjoyed activities. Online treatments have the potential to assist individuals who would otherwise have difficulty attending in-person treatment sessions. This study evaluated the efficacy of an online acceptance-based behavioural treatment for chronic pain designed for military, police, and veteran populations. Participants ($n = 29$) were randomized into either a treatment condition or wait-list control condition, and asked to complete a battery of measures which underscore the key facets of the fear-avoidance model of chronic pain. A series of $2 \times 2$ mixed model ANOVA’s revealed statistically significant Time x Condition interactions for pain disability, kinesiophobia, and pain acceptance, as well as statistically significant pre- to post-treatment simple main effect contrasts for pain catastrophizing, kinesiophobia, and pain acceptance. For those in the treatment group, no significant changes in scores were found between post-treatment and three-month follow-up; however, the sample size was too small to draw conclusions regarding this finding. Baseline PTSD and depression scores were found to be significant predictors of change in pain acceptance levels over the course of treatment. Overall, the results support the efficacy of the ABBT treatment for chronic pain for military, police and veterans.

Keywords: chronic pain, online treatment, military, police, acceptance-based therapy
Table of Contents

Abstract ......................................................................................................................... 2
Introduction .................................................................................................................... 5
   The Mechanisms of Chronic Pain ........................................................................... 5
   Fear-Avoidance Model of Chronic Pain ................................................................. 7
   Chronic Pain and Comorbid Disorders .................................................................. 12
   Military, Police, Veterans and Chronic Pain ......................................................... 13
   Psychological Interventions for Chronic Pain ....................................................... 16
   Internet-based Treatments ...................................................................................... 17
Study Overview ............................................................................................................ 20
Hypotheses ................................................................................................................... 21
Methods ...................................................................................................................... 21
   Participants ............................................................................................................. 21
   Procedures ............................................................................................................ 22
   Study Design ....................................................................................................... 24
   Study Measures .................................................................................................... 26
   Privacy and Confidentiality .................................................................................. 29
Results .......................................................................................................................... 29
   Data Preparation .................................................................................................. 29
   Reliability Analysis .............................................................................................. 30
   Descriptive Statistics ............................................................................................ 30
   Hypothesis One ..................................................................................................... 31
   Hypothesis Two ..................................................................................................... 32
Discussion ..................................................................................................................... 33
   Summary of Findings ............................................................................................. 33
   Wider Literature .................................................................................................... 34
   Limitations and Future Research ......................................................................... 37
   Conclusion ............................................................................................................. 37
References ................................................................................................................... 39
Table 1: Demographic Variables (Age, Pain Duration, Pain Locations)..................... 59
Table 2: Demographic Variables (Gender, RCMP/Military, Active-duty/Retired) ........ 60
Table 3: Depression and PTSD Symptoms Pre-Treatment

Table 4: Primary Outcome Variables for Pre-, Post-Treatment, and 3-Month Follow-up

Table 5: Summary of Intercorrelations for Dependent Variables (Time 1)

Table 6: Summary of Intercorrelations for Dependent Variables (Time 2)

Table 7: 2 X 2 Mixed Model ANOVAs for Dependent Variables

Table 8: Dependent Samples t-test Results for Pre-Post Treatment

Table 9: Dependent Samples t-test Results for Post-Treatment and 3-Month Follow-up

Table 10: Hierarchical Multiple Regressions for PTSD and Depression/Dependent Variables

Figure 1: Summary of Participant Flow

Figure 2: Randomization Procedure

Figure 3: Interaction effect plot for pain interference means (Time x Condition)

Figure 4: Interaction effect plot for pain catastrophizing means (Time x Condition)

Figure 5: Interaction effect plot for kinesiophobia means (Time x Condition)

Figure 6: Interaction effect plot for pain acceptance means (Time x Condition)

Figure 7: Dependent samples t-test for pain interference ratings (pre-post treatment)

Figure 8: Dependent samples t-test for pain catastrophizing ratings (pre-post treatment)

Figure 9: Dependent samples t-test for kinesiophobia ratings (pre-post treatment)

Figure 10: Dependent samples t-test for pain acceptance ratings (pre-post treatment)

Appendix A: Research Participant Information and Consent Form

Appendix B: Pain Disability Index (PDI)

Appendix C: Chronic Pain Acceptance Questionnaire (CPAQ)

Appendix D: Pain Catastrophizing Scale (PCS)

Appendix E: Tampa Scale for Kinesiophobia – 11 (TSK-11)

Appendix F: Posttraumatic Stress Disorder Checklist – 5 (PCL-5)

Appendix G: Patient Health Questionnaire-9 (PHQ-9)
Chronic pain remains a significant health issue in Canada, even with the widespread growth of psychological and pharmacological interventions. Prevalence studies estimate that 18.9-29% of Canadians experience chronic pain on a regular basis (Boulanger, Clark Squire, Cui, & Horbay, 2007; Moulin, Clark, Speechley, & Morley-Forster, 2002; Schopflocher, Taenzer, & Jovey, 2011). Data from the Survey on Transition to Civilian Life estimate that these rates are doubled in Canadian military veteran populations (Thompson et al., 2011). Worldwide, pain ranks third amongst the top major health concerns (Ferrell, 1995). Chronic pain is a burden to both individuals and communities. The Canadian Pain Society (2014) estimates the national health care and lost productivity costs to be roughly 56-60 billion dollars annually. Compared to those without a chronic pain condition, those who report chronic pain typically present with a greater number of comorbid disorders, report less social support, and take more disability/sick leaves (Häuser et al., 2014; Volders, Boddez, De Peuter, Meulders, Vlaeyen, 2015). A systematic review of psychological interventions for chronic pain found that pharmacological and psychological treatments demonstrated only modest effects in decreasing pain intensity and pain-related disability (Williams, Eccleston, & Morley, 2009). One possible way to improve chronic pain intervention outcomes is through increased tailoring of treatments to the specific populations they address.

The Mechanisms of Chronic Pain

Pain, as defined by the International Association for the Study of Pain (IASP), is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (IASP, 1994). It is important to recognize pain as both sensory and affective in order to best understand its mechanisms and purpose. The purpose of acute pain is adaptive; it serves as a signal of warning intended to draw an individual’s attention
to harmful, or potentially harmful, stimuli (Vlaeyen, Morley, & Crombez, 2016). In many studies chronic pain is defined as pain persisting longer than three, six, or twelve months. However, a more comprehensive definition of chronic pain also notes that it is a type of pain that has no inherent biological function, is persisting beyond the expected healing and rehabilitation period, and/or is not improving with the use of currently available treatments (Merskey & Bogduk, 1994).

**Biological mechanisms of pain.** In simple terms, pain is elicited when injury activates pain fibers and receptors (i.e. nociceptors), which stimulate nerve impulses that travel through the central nervous system to the pain centers in the brain (Melzack, 1999). Nociception is the response from the sensory nervous system relating to potential or actual harm. Nociception includes visceral pain (i.e., pain originating from stimuli in the organs) and somatic pain (i.e., pain originating from stimuli in the skin, muscles, joints and bones; Ness, 1999). Immediate pain sensations can result from physical stimuli, such as physical trauma or burns. There is also an assortment of chemical mediators which release as a consequence of an injury, which can, in turn, exacerbate the pain intensity (McHugh & McHugh, 2000).

**Measuring pain.** The experience of pain is difficult to quantify. Individuals each describe and identify their pain experience as they perceive it to be; however, this subjectivity creates an obvious dilemma for measuring pain in an objective manner. Pain is a multidimensional experience that is influenced by an individual’s “cultural background, the meaning of the situation, personality variables, attention, arousal level, emotions, and reinforcement contingencies” (Turk & Melzack, 2001, p. 5). Individuals are commonly asked by their medical professional to rate their pain intensity on a scale (e.g., 0 to 10), though trying to capture the pain experience while only measuring one dimension is, at the very least, inadequate.
Objective measures of pain are infrequently used and can be expensive to administer, whereas self-report measures have been found to adequately capture the patient’s pain experience (Breivik et al., 2008).

**Transition of pain from acute to chronic.** Although it is still unclear by what mechanisms pain evolves from acute to chronic, numerous empirically supported theories have proposed paradigms to explain this transition (Chou & McCarberg, 2011; Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995; Young Casey, Greenberg, Nicassio, Harpin, & Hubbard, 2008). Studies have found that an individual’s fear of pain, catastrophic thinking, pain anxiety, level of depression, pain intensity, and pain permanence beliefs contribute to the development of chronic pain (Hasenbring, Chehadi, Titze, & Kreddig, 2014; Heinricher, 2016; Young et al., 2008). It has also been found that exposure to severe stressors has the ability to alter neurobiological processes, which in turn can negatively influence one’s pain arousal threshold and their capacity for managing subsequent stressors (Von Korff & Simon, 1996).

**Fear-Avoidance Model of Chronic Pain**

The fear-avoidance (FA) model of chronic pain is a widely recognized and empirically supported model describing the psychological variables involved in the transition of acute pain to chronic (Crombez, Eccleston, Van Damme, Vlaeyen, & Karoly, 2012). Lethem and colleagues (1983) first introduced the FA model, which has been further developed by Vlaeyen and colleagues, (1995) to include a more comprehensive structure for “cognitive-perceptual, psychophysiological, and motoric-environmental factors” (p. 235). The FA model’s primary analyses are of an individual’s interpretations, beliefs, and interactions with their pain experience. It identifies not only the negative cyclical pattern of chronic pain, but also the typical experience of an acute pain episode. Generally, following an acute injury, the individual is not
overwhelmed with disproportionate fears as to how their pain will significantly disrupt their life and aspirations. This common processing leads to a confrontation and acceptance of one’s current situation, identifying temporal inconveniences, allowing for the appropriate healing time, and behaving in a manner which facilitates this remedial process. At the end of this process is recovery, and in most regards, life as usual. In contrast to the normal pattern of rehabilitation, beliefs, and reactions to an acute pain experience, individuals can enter into a negative cycle of misinterpretations and avoidant behaviours.

The first identified contributor to the chronic pain cycle in the FA model is pain catastrophizing. Catastrophic thinking, which has been recognized as a risk factor in the development of chronic pain, is a tendency to focus on the negative experience of pain, and impacts one’s ability to cope with their pain (Martorella, Côté, & Choiniére, 2008). In addition to catastrophic thinking, pain-related fear can further exacerbate the pain cycle. The fear of movement and (re)injury (i.e., kinesiophobia) is a common fear amongst chronic pain experiencers, and has been found to compound the development of pain perceptions/beliefs, as well as chronic symptoms (Monticone et al., 2013). Further propelling the pain cycle proposed by the FA model, researchers have found avoidance behaviours to be instrumental in the maintenance and development of chronic pain (Zale, Lange, Fields, & Ditre, 2013). To summarize, the literature has found that catastrophic misinterpretations concerning one’s pain experience can and often do lead to pain-related fear, which in turn has the potential to prompt avoidance behaviours designed to remove the individual from a threatening situation (Volders et al., 2015). The FA model concludes the cycle with the development or perpetuation of disuse, disability, and depression. A strong relationship has been found between chronic pain and depression (Currie & Wang, 2004; Munce & Stewart, 2007), as well as chronic pain and
disability (Tripp, Van Den Kerkhof, & McAlister, 2006); highlighting the compounding nature and manner in which these attributes influence one another. This triad, chronic pain, depression, and disability, clearly contributes to decreasing quality of life; however, the causal relationship between these variables is unclear (Arnow et al., 2006).

**Pain catastrophizing.** Pain catastrophizing has been defined as an irrational, over-exaggerated, aversive orientation to an actual or potential pain experience (Sullivan et al., 2001). More specifically, pain catastrophizing “can involve repetitive thoughts about pain (rumination), exaggerated concern about negative consequences of pain (magnification), and the belief that nothing will change the pain (helplessness)” (Emami, Woodcock, Swanson, Kapphahn, & Pulvers, 2016, p. 455). Pain catastrophizing has been found to have a significant negative correlation to quality of life and health, and a positive correlation with disability (Borsbo, Gerdle, & Peolsson, 2010). There are varying theories concerning the construct of pain catastrophizing. Some have argued that pain catastrophizing is not an independent concept but a redundant construct that is confounded with other negative affective variables included in experimental studies (Leung, 2012). A study by Hirsh and colleagues (2007) found that self-reported depression, anxiety and anger accounted for 69% of the variance in pain catastrophizing for participants with chronic pain conditions. Interestingly, many studies have found higher rates of catastrophic pain ideation in females (vs. males; Jensen et al., 1994; Sullivan et al., 2001), African-Americans (vs. White Americans; Forsythe et al., 2011), and individuals with lower levels of education (vs. individuals with higher levels of education; Edwards et al., 2006). Pain catastrophizing has also been studied in the context of employment. Sansone, Watts and Wiederman (2014) found that while the percentage of time worked was not significantly influenced by an individual’s level of pain catastrophizing, those with higher levels of
catastrophizing were more likely to have been fired from a job, get paid ‘under-the-table’, and have more conflict, on average, with their fellow employees.

**Kinesiophobia: Fear of movement and (re)injury.** In the early 1990’s, Kori and colleagues (1990) introduced the term *kinesiophobia*. Derived from the Greek word *kinesis* (meaning ‘movement’), the term describes the “excessive, irrational, and debilitating fear of movement and activity resulting from a feeling of vulnerability to painful injury or re-injury” (p. 36). Studies have shown that fear of movement and (re)injury plays a negative role in rehabilitation, and in turn has been associated with increased self-reported disability (Buer & Linton, 2002; Vlaeyen & Linton, 2000). A close relationship has been identified between kinesiophobia and catastrophizing, possibly suggesting that individuals presenting catastrophic thoughts about their pain experience engage more with negative aspects of their situation and can, in turn, more frequently interpret physical stimuli as pain cues (Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995). Researchers have advised practitioners to be aware of the role fear of pain and movement plays (Bäck, Cider, Herlitz, Lundberg, Jansson, 2013); however, this can often be a difficult task as many chronic pain sufferers “perceive their disability as a consequence of their pain rather than the fear of movement/(re)injury” (Vlaeyen, de Jong, Sieben, & Crombez, 2002, p. 212). The fear of movement and (re)injury has been proposed as a significant variable in predicting the transition from acute pain to chronic (Hapidou et al., 2012). In a study by Crombez (1994), participants with chronic low back pain (CLBP) were identified as either *Avoiders* or *Confronters*. When participants in this study underwent a painful experience, individuals who displayed avoidant behaviours reported significantly more fearful responses of pain and injury than their confronting counterparts.
**Avoidance and acceptance.** As stated earlier, pain is a useful adaptive function that signals immediate or potential danger, thus, avoidance of potentially dangerous stimuli is often the optimal response. However, when pain becomes chronic, there is typically no present threat to the individual, and thus, avoidant behaviours can be, and often are, counterproductive in promoting an individual’s health (Zale et al., 2013). Persistent avoidance of activity that has the potential to trigger a pain episode can be detrimental as it reduces the level of physical activity, can result in a significant loss of bone calcium, produces a reduction in muscle dexterity and strength, and can contribute to social isolation (Crombez, Vervaet, Lysens, Baeyens, & Eelen, 1998). There is a growing body of chronic pain literature that has highlighted the benefits of reducing avoidance behaviours in regards to one’s pain experience (Crombez, Eccleston, De Vlieger, Van Damme & De Clercq, 2008; Kollman, Brown, & Barlow, 2009; McCracken & Eccleston, 2005). Acceptance, in many ways, contrasts avoidance as it involves confrontation of one’s situation without repeated efforts to control the pain experience, and helps to reengage the individual in valued and important life experiences/activities (Esteve & Ramírez-Maestre, 2013).

Two key facets of pain acceptance are pain willingness and activity engagement. Pain willingness refers to the deliberate interaction with one’s pain experience without avoidance or attempts to control these experiences, whereas activity engagement involves the pursuit of important, valued, and reinforcing activities irrespective of the presence of a pain episode (McCracken, Carson, Eccleston, & Keefe, 2004). Pain acceptance has been identified as a negative correlate with pain-related disability, accounting for more variance than both self-reported hope and optimism (Wright et al., 2011). On the whole, pain acceptance has been found to be negatively correlated with distress and healthcare utilization, and is a significant component in pain recovery (Esteve & Ramírez-Maestre, 2013).
Chronic Pain and Comorbid Disorders.

Chronic pain accompanies many disorders, as an antecedent, a symptom, and/or a consequence (Osterweis, Kleinman, & Mechanic, 1987). In a literature review, Watson and Pennebaker (1989) revealed that psychological and physical symptoms increased together with a moderately large correlation of $r = .5$. Similarly, in a large-scale study conducted by the World Health Organization, patients from 14 countries who reported pain lasting longer than six months were four times more likely to exhibit depressive and anxiety disorders; these associations were present and consistent across the numerous cultures studied (Gureje, Simon, & Von Korff, 2001).

**Depression and chronic pain.** Depression and chronic pain have long been known to be closely related. In the Canadian Community Health Survey conducted by Statistics Canada (2012), researchers found that 4.7% of Canadians met the diagnostic criteria for major depression. Schopflocher et al. (2011) revealed that nearly 19% of Canadians over the age of 18 suffered from chronic pain. The results from two Canadian studies reported that the comorbidity rates of pain and depression ranged from 11 – 20% (Currie & Wang, 2004; Munce & Stewart, 2007). Individuals with depression, chronic pain, or both conditions tend to be older, female, and less employed compared to individuals who have neither condition (Miller & Cano, 2009). Researchers have hypothesized that the interconnectedness of depression and chronic pain is due to shared pathological changes. This idea posits that the brain structures responsible for emotional processing and regulation are the same structures involved in the processing and modulation of pain (Surah, Baranidharan, & Morley, 2014). Thus, the similarity in neuro-processing and structure could play an instrumental role in the development of comorbid depression and chronic pain. Clinically, the complexities in treatment increase significantly, and
less favourable treatment outcomes are more likely among individuals with comorbid depression and chronic pain than with either of the two conditions in isolation (Ohayon & Schatzberg, 2003).

**PTSD and chronic pain.** PTSD and chronic pain are frequently comorbid conditions. Roughly 20-30% of the general populous with PTSD, and 50–80% of military and paramilitary with PTSD, also report chronic musculoskeletal pain (Asmundson, Coons, Taylor, & Katz, 2002; McWilliams, Cox, & Enns, 2003). PTSD in conjunction with chronic pain has been associated with “increased work and social impairment, poor treatment prognosis, overuse of opioid medications, and considerable personal and societal cost” (Asmundson, 2014, p. 717).

Researchers have identified a number of events which commonly instigate the development of co-occurring PTSD and chronic pain: these are work-related injury, motor-vehicle accidents, and service in combat and emergency rooms (Asmundson, Norton, Allerdings, Norton, & Larsen, 1998; Beckham et al., 1997; Blanchard & Hickling, 2004; Taylor & Koch, 1995). The precise mechanisms perpetuating this comorbid relationship are still unclear, though two theories have been postulated. The first suggests that PTSD and chronic pain are influenced by the same risk factors, such as anxiety sensitivity. The second proposes that each condition exacerbates the other as they share common cognitive, emotional and behavioural symptoms (Defrin et al., 2008). Much like its relationship with depression, those who experience comorbid chronic pain and PTSD tend to report greater disability, emotional distress, and pain intensity than those experiencing only one of the conditions (Asmundson et al., 2002; Geisser, Roth, Bachman, & Eckert, 1996; Turk & Okifuji, 1996).

**Military, Police, Veterans and Chronic Pain**
Statistics are limited for chronic pain incidence and prevalence rates among active Canadian military, and even scarcer for Canadian police personnel. In a survey conducted in 2011 assessing U.S. soldiers deployed to Afghanistan, researchers found that over 40% reported chronic pain, and over 50% of these individuals reported daily or constant pain episodes (Toblin, Quartana, Riviere, Walper, & Hoge, 2014). Data gathered from the Survey on Transition to Civilian Life (Vandenkerkhof et al., 2015) found that 41% of Canadian military veterans reported constant pain or discomfort, with another 23% reporting reoccurring pain, totalling 64% when the weight-adjusted combined prevalence is accounted for. Although research on chronic pain in Canadian police populations is scarce, a recent study investigating the comorbidity of chronic pain and mental health conditions amongst public safety personnel found that 43% of RCMP respondents reported some form of chronic pain (Carleton et al., 2018). There is limited research that has investigated the cause of the increased prevalence of chronic pain within military and police populations, thus, future research should be conducted to bridge the gap in our understanding of this phenomenon.

**The culture of military masculinity.** One possible explanation for the increased prevalence of chronic pain in the military and para-military organizations is the culture of military masculinity. Military masculinity, conceived from the larger conceptualization of hegemonic masculinity, is associated with assertions of toughness, strength, and aggressive heterosexuality (Duncanson, 2009). In her conceptualization of treating male trauma survivors, Mejia (2005) stated that “the primary function of the ideology of masculinity has always been to confront particular aspects of human biology and to suppress them—to train individuals to disregard their biological signals to run in fear or to cry in grief and pain” (p.34). Fox and Pease (2012) rationalize this idea in light of the military culture: “military training and culture adopts
and enhances that conditioning in order to prepare men for combat” (p. 22). Inadvertently, the training in, and culture throughout, the military drills a certain ‘suck-it-up’ mentality whereby one’s identity and worth are measured based on one’s efficiency and ability to function in all environments. Understanding the psychological and biological factors perpetuating the transition of pain from acute to chronic, one can conceive that though aspects in the culture of military masculinity might be functional in preserving an individual in combat, it can conversely exacerbate the development of chronic pain. The ‘suck-it-up’ and push through mentality can lead to over-exertion, and attempts to ignore the pain one is feeling. By not addressing the biological warning signs of potential or actual tissue damage, one is in danger of worsening the injury and subsequent pain experience. Pushing through activity when one should stop, and activity avoidance behaviours are nearly the opposites of each other, and yet they may both play a critical role in the development and maintenance of chronic pain. The fear-avoidance model of chronic pain does not capture the phenomenon of pushing through and ignoring one’s pain, however, it can be conceived that these patterns of behaviours have the potential to exacerbate one’s pain condition and further act as a perpetuator of the pain experience.

**Military and mental disorders.** Within military organizations, mental disorders are widespread and significant (Sareen et al., 2007). A recent study found that, from a sample of 6996 Canadian regular force personnel, 16.5% presented with at least one mental disorder (i.e. PTSD, MDE, generalized anxiety disorder (GAD), panic disorder (PD), and social phobia), which is an increase from the 15.7% found in 2002 (Zamorski et al., 2016). In another study, Boulos and Zamorski (2016) found that an estimated 19% of military personnel who deployed on the Afghanistan mission from 2001 to 2008 were found to have a mental disorder diagnosis, with 13.5% of those individuals presenting an Afghanistan service–related mental disorder. It has
been found that exposure to operational duties can induce psychological trauma in military members, which in turn increases the risk of personnel developing service-related mental health conditions (Weeks, Garber, & Zamorski, 2016).

Psychological Interventions for Chronic Pain

**Cognitive-behavioural therapy (CBT) for chronic pain.** As described previously, pain is complex, and chronic pain even more so. The majority of pain management interventions concentrate solely on the biological component of pain (e.g. surgery, pharmacology) and do not cover the entire pain experience (Boschen et al., 2016). Many psychological treatments have been proposed and studied for alleviating chronic pain and its related conditions; such as cognitive-behavioural therapy (CBT, e.g., Macea, Gajos, Daglia Calil, & Fregni, 2010; Thorn et al., 2011; Thorn & Kuhajda, 2006), acceptance and commitment therapy (e.g., Veehof, Oskam, Schreurs, & Bohlmeijer, 2011; Vowles, McCracken, & O’Brien, 2011; Vowles, Wetherell, & Sorrell, 2009), behavioural therapy (e.g., Smeets, Severens, Beelen, Vlaeyen, & Knottnerus, 2009; Van Tulder et al., 2001), cognitive therapy (e.g., Thorn, 2004), and mindfulness-based stress reduction (e.g., Grossman, Niemann, Schmidt, & Walach, 2004; Rosenzweig et al., 2010). Cognitive-behavioural therapy has been studied extensively and is a commonly used psychotherapy for chronic pain. The chief principle underlying CBT for chronic pain “is that patients must take some measure of responsibility for improvement and maintenance of gains by changing body mechanics, exercising, altering pain-related cognitions, and maintaining these gains to better cope with persistent pain” (Burns et al., 2015, p. 2). Treatments utilizing a CBT approach for chronic pain vary in their application, however they commonly include behavioural goal setting (e.g. gradual increase of physical activity and recreational involvement), identifying
Intermediate and core beliefs, communication and problem-solving, behavioural activation, and cognitive restructuring (Thorn, 2004; Turner & Romano, 2001).

**Acceptance-based treatments for chronic pain.** Acceptance and commitment therapy (ACT) is a treatment approach found within the CBT family, and has been used widely in the treatment of chronic pain (McCracken & Vowles, 2014). Though ACT has been critiqued as to whether it adds any meaningful contributions to the traditional CBT framework (Hofmann & Asmundson, 2008), McCracken and Vowles (2014) argue that clinicians who classify themselves within the acceptance-based orientation distinctly utilize “exposure, mindfulness, and family systems techniques and a wider range of total techniques” in far greater frequency than their traditional CBT counterparts (p. 182). Moreover, ACT differs from traditional CBT in its philosophical assumptions, as well as the scientific strategies it implements (McCracken & Vowles, 2014). ACT’s theoretical framework is based upon the *psychological flexibility model*, which is divided into six core processes: acceptance, present-focused attention, cognitive diffusion, values, self-as-context, and committed action (Hayes, Villatte, Levin, & Hildebrandt, 2011). The majority of acceptance-based treatments incorporate/address most if not all of these core processes. In regards to pain, acceptance-based treatments commonly utilize mindfulness techniques in conjunction with behaviour change, goal setting, activity pacing, homework, and committed action, all geared to increase psychological flexibility (Cosio & Schafer, 2015).

**Internet-based Treatments**

With the influx of technological advances, and the rapid rate these advances are transpiring, developments in tech-based treatment administration are likewise on the rise. Computers have been used for decades by health care providers to record, track, store, and communicate health information. With the conception of the internet, health care providers were
able to disseminate health and treatment information to the general public and more specific clinical populations. With 93.3% of Canadians having regular access to the internet (Miniwatts Marketing Group, 2014), more and more Canadians are able to access health information and receive interventions online. A meta-analysis conducted by Barak and colleagues (2008) found that online interventions of various orientations (i.e. behavioural, psycho-educational, CBT) have an average effect size of $d = 0.53$, which is similar to that found in traditional face-to-face treatments. A number of studies have also found that ACT administered via the internet can be an effective treatment for chronic pain (Buhrman et al., 2013; Trompetter, Bohlmeijer, Veehof, & Schreurs, 2015).

**Benefits.** In a review of the online therapy literature, Rochlen and colleagues (2004) addressed a number of benefits in regards to online interventions. Convenience and access, both on the part of the therapist and the client, is atop the list for online administration benefits. For individuals dealing with limited mobility, and/or finding it difficult to access psychological services due to where they reside, online treatments create opportunities for these individuals to find the help they need. More specifically, individuals suffering from chronic pain can experience ‘pain flare-ups’ that make it especially difficult for them to travel to appointments; therefore, online formats, which can be accessed from the comfort of one’s home, can be particularly useful to this population (Holens, Klassen, Simister, & Gilberto, 2013). Negative stigmas around mental health and receiving services for such conditions is still pervasive in our societies (Sickel, Nabors, & Seacat, 2014), thus the perceived anonymity created by the online therapeutic setting can attract individuals needing services who might be hesitant to meet in the traditional face-to-face setting (Mitchell & Murphy, 1998). Another potential benefit is the economy of online treatments compared to their face-to-face counterpart. Initial estimates of
online treatments conclude that they are less expensive, on average, than traditional face-to-face treatments (Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006; Klein, Richards, & Austin, 2006; Mihalopoulos et al., 2005).

**Challenges and concerns.** Amongst the interest and excitement over this novel medium for treatment, there is also a distinct hesitancy and concern over ethical and practical issues. One of the most prominent concerns is the issue of privacy and confidentiality. Safeguarding clients’ personal health information online can present challenges to the clinician, especially if open forums are used as a therapeutic tool. One way to address this issue is by the use of passwords and registration, as this enables the clinician to control who has access to treatment materials. As with any treatment, suitability is a concern with online treatments as it may not be a good fit for certain clients, and may be inappropriate for others (Suler, 2001). Further issues have been raised about the nature and quality of the therapeutic relationship (Chu et al., 2004). It has been well documented that the quality of the therapeutic relationship has a strong correlation with positive treatment outcomes (Castonguay, Constantino, & Holtforth, 2006), and thus plays a unique and important role for online interventions. The distinction here, as highlighted by Scharff (2013), is that there is a “built-in deficit” with the absence of physical presence of both the client and clinician. Another salient concern is that of crisis intervention. In a situation where a client is suspected of being suicidal or homicidal, it can be difficult for the clinician to intervene when conducting treatment via an online application (Mitchell & Murphy, 1998). Many of the above-noted concerns have been addressed in the designs of online treatments which utilize stringent screening, assessment, and feedback processes.

**Suitability of potential clients.** In contrast to traditional face-to-face treatments, online treatments are structured in such a way that they require particular skill sets, as well as various personality traits that augment successful treatment. The presence of psychosis and high levels of
suicidality are flagged when screening potential clients for online treatments (Rochlen et al., 2004). Depending on the online platform of the intervention, it can be very difficult to accurately monitor and assess for serious psychological issues in clients. The Australian Psychological Society has also posited that individuals with “psychiatric disorders in which they experience distortions of reality, suicidal ideation, are currently a victim of violence or sexual abuse, or are experiencing a high rate of secondary, comorbid psychiatric disturbance” may not be appropriate for online treatments (Abbott, Klein, & Ciechomski, 2008, p. 365). Individuals with low literacy skills may not be suitable for an online format as they will not be able to adequately communicate their thoughts and feelings in a meaningful way (Suler, 2001). Marks and colleagues (2003) assessed the efficacy of a computer-aided self-help intervention for anxiety and depression and found that nearly 80% of those screened for the treatment were eligible for continuing in the program.

**Study Overview**

My master’s research is an extension of my honour’s research, in which a pilot study was conducted investigating an online acceptance-based behavioural therapy (ABBT) for chronic pain (Holens, Buhler, Klassen, & Sharpe, 2017). The online treatment involves 8 online modules and includes interactive content to promote the participant’s engagement with the treatment material. The treatment has been specifically tailored for military, police and veteran populations as it uses language and audio vignettes which are relatable to military, police and veterans. Based on promising results from the pilot study using the online ABBT program, a randomized control trial (RCT) of the treatment was conducted by randomly allocating participants into either a treatment condition, or a wait-list control condition. Treatment efficacy was gauged by the statistically significant differences found between the treatment and wait-list control conditions,
in favour of the treatment condition; as well as the magnitude of change between the pre-treatment and post-treatment scores on the chosen dependant variables.

**Hypotheses**

Based upon the pilot study and other aforementioned studies, the following hypotheses were made.

**Hypothesis 1**

We hypothesized that there would be a significant decrease in self-reported pain interference ratings, kinesiophobia, and pain-related catastrophizing, and an increase in level of pain acceptance among participants in the treatment condition as compared to the wait-list control condition. Furthermore, we anticipated that treatment gains would be maintained when measured at 3-month follow-up.

**Hypothesis 2**

Smaller treatment gains, as measured by changes from pre- to post-treatment on the pain-related variables, were anticipated among individuals reporting high levels of depression or PTSD symptoms at baseline.

**Methods**

**Participants**

Participants \((n = 29)\) were military, RCMP, and veterans recruited through the Operational Stress Injury Clinic (OSIC) located at Deer Lodge Centre. A statistical power analysis was performed for sample size estimation based on data from the previous pilot study. The effect sizes (ES) in the pilot study were \((d = .42, \text{to} \; d = 1.49)\), values that are considered to range from medium to extremely large using Cohen's (1988) criteria. With an alpha = .05 and power = 0.80, the projected sample size needed, based on the medium effect size, is
approximately \( n = 32 \) (i.e., 16 in the treatment condition, and 16 in the waitlist-control condition). Figure 1 displays participant flow from intake to study sample.

**Inclusion criteria.** Eligible participants were individuals who reported chronic pain lasting longer than 6 months, and who were referred for treatment at the OSIC. Participants, male or female, were either an active RCMP officer, an active member of the Canadian Forces, or a veteran of the Canadian Forces or RCMP. The participants were required to have access to a computer with internet access for a minimum of 60 minutes per week.

**Exclusion criteria.** Any individual who did not meet the requirements listed above were not eligible for this study. Likewise, any individual with seriously impaired concentration, psychosis, suicidality, unstable living situation, or any other similar disorder or condition that would render them unfit for a self-help based treatment were not considered eligible for this study. Potential participants who could neither read nor write in English, as well as those who were unable to provide informed consent (e.g. significant cognitive impairment) were also considered ineligible.

**Procedures**

Clients who are new to the OSIC participate in an intake appointment with the clinic’s intake nurse, and during this appointment are informed about the different research projects currently being run at the clinic. Participants interested in the study were screened for inclusion and exclusion criteria during their intake appointment. For this study, all eligible participants were asked to complete an informed consent form prior to being issued a unique password and user ID for access to the online portion of the treatment.

**Informed consent.** Participants were issued the Participant Information and Consent form (see Appendix A) which was approved by the Human Research Ethics Board (HREB) at
the University of Manitoba. All participants were provided with the consent form during one of their initial meetings at the OSIC. Each participant was given an appropriate amount of time to read through the document, as well as an opportunity to ask any questions they may have about any of the study’s components. If the eligible individual wished to participate, he or she was given the option of signing the consent form during the meeting, or at a later date, and was asked to return the form in person or through the mail.

**Treatment plan.** The treatment program is an eight module (8-week) ABBT for chronic pain. The treatment was based on modules from a pilot study for the treatment of fibromyalgia, and was modified to be more applicable to any chronic pain condition, as well as tailored specifically to military and police populations. The eight modules cover the following topics: introduction, acceptance, values, cognitive defusion, mindfulness, exercise, pacing, communication, self as context, sleep hygiene, and willingness and committed action. The online treatment material is administered via the WebCAPSI Therapy program. This is an online password-protected program which allows participants to progress through the treatment modules at their own pace. Each module is designed to cover a specific component of ABBT and to facilitate understanding of the components through audio files, veteran, military and RCMP-specific vignettes, text-based material, and homework exercises/assignments. Each module is designed to be completed in 60 minutes or less and participants have the option to return to the program and the modules as often as they like during the course of the treatment period. On the completion of each module, and facilitated through the WebCAPSI Therapy program, the participants are asked to complete a homework exercise to which they answer questions previously encountered throughout the module. The principal therapist responds (via WebCAPSI’s online messaging, and/or by phone if additional questions are asked) to each
homework exercise within 24-hours of its online submission, with feedback and encouragement.

In addition to the online modules, participants have the option to attend biweekly in-person group sessions at the OSIC while they are working through the online modules. The in-person sessions were initially designed to fulfill a recommendation from the HREB that participants should be seen in person at the beginning, middle, and endpoint of treatment. Client feedback received during the pilot study indicated that more frequent in-person sessions were desired by most participants, leading to a decision to offer these sessions on a biweekly basis. The in-person group component of the treatment is considered optional, as participants can choose to check in with the principal therapist individually, rather than as part of a group. For those who choose to attend the group-based sessions, there is an initial introductory session, and subsequent group sessions every two weeks until the end of the eight weeks. The initial group session encompasses an overview of the treatment, and preliminary education on chronic pain. Each subsequent session revolves around discussing issues pertinent to the last two modules which were completed online by the participants, previewing the next two modules, and providing a small amount of supplementary pain education material. Participants are able to contact the principal therapist using the WebCAPSI Therapy website if they have any comments or concerns regarding the treatment material.

**Study Design**

A randomized controlled trial was conducted by randomly allocating participants into either the treatment condition or a wait-list control group. Given the nature of the treatment and size of the clinic, a maximum of 10 participants can progress through the treatment at a time, thus influencing the design of our randomization procedure. The initial randomization assigned participants into either group. Once the treatment group had completed the 8-week treatment,
those in the wait-list control condition could then begin the treatment along with the newly randomized participants for the treatment condition (see Figure 2). This process continued until enough participants successfully completed their assigned conditions. Only one set of data was used from each participant, in that, whatever condition they were allotted to first was the data we used in our analyses. The participants completed a battery of measures at the outset of the randomization process (both treatment and wait-list control conditions), and again at the end of the 8-weeks. For those in the treatment condition, a 3-month follow-up assessment was conducted to evaluate the maintenance of treatment gains. Only participants who completed at least five out of the eight modules were considered to have “completed” the treatment, and therefore included in the analyses. The rationale for needing to have completed five out of the eight modules was that participants needed to have a meaningful base of knowledge to be considered “completers” of the treatment. Based on clinical judgement, once participants reached the fifth module they would have completed a sufficient portion of the core components of the ABBT intervention used in this study.

A 2 x 2 mixed model ANOVA was conducted (treatment vs. wait-list control; and pre-post), to assess the magnitude of changes for main outcome variables between the treatment and wait-list control conditions (i.e., hypothesis 1). All Time x Condition interactions were followed up by simple main effect contrasts (dependent samples t-tests). Treatment efficacy was based on the significance and magnitude of the differences between the conditions. To assess maintenance of treatment gains, a series of paired samples t-tests, utilizing the post-treatment and 3-month follow-up scores for each of the dependent variables for those in the treatment condition, were conducted. Hierarchical linear regression analyses were used to evaluate the influence of PTSD
and depression symptoms on the change scores of the four dependent variables (i.e., hypothesis 2).

Participants allocated to the wait-list condition were given the option to attend a series of four basic Cognitive Behavioural Therapy with Mindfulness (CBTm) classes, to which they could elect to bring a spouse/partner/friend, while they waited for the ABBT treatment. The CBTm classes were designed to orient participants to CBT and mindfulness skills and how these skills work. The classes provided participants with quick access to treatment strategies that could help with symptoms, and gave participants additional resources for further learning. The CBTm classes are considered “treatment as usual” at the OSIC.

**Study Measures**

All participants in the treatment group were asked to complete a series of self-report measures prior to the onset of treatment, upon completion of treatment, and once again during a 3-month follow-up. Those in the waitlist group completed the measures at the beginning and end of their time on the waitlist (generally approximately 8 weeks’ time). The self-report measures assessed participants’ pain and pain-related concerns as well as symptoms of depression and post-traumatic stress. The measures included: the Pain Disability Index (PDI; see Appendix B), the Chronic Pain Acceptance Questionnaire (CPAQ; see Appendix C), the Pain Catastrophizing Scale (PCS; see Appendix D), the Tampa Scale for Kinesiophobia (TSK-11; see Appendix E), the Posttraumatic Stress Disorder Checklist – 5 (PCL-5; see Appendix F), and the Patient Health Questionnaire-9 (PHQ-9; see Appendix G). All of these scales are standardized and exhibit good psychometric properties, as detailed below.

**Pain Disability Index (PDI).** The Pain Disability Index (PDI) is a 7-item scale which captures the respondent’s perception of the degree of interference pain plays in his or her life in
seven domains: family/home responsibilities recreation, social activity, occupation, sexual behavior, self-care, and life-support activity (Tait, Chibnall, & Krause, 1990). Unlike some scales which are designed to measure only one type of pain condition, the PDI has been used in studies assessing mixed chronic pain conditions (Geisser, Roth, Theisen, Robinson, & Riley, 2000; Moulin et al., 1996), osteroporosis (Kerschan et al., 1998), chronic low back pain (Rittweger, Just, Kautzsch, Reeg, & Felsenberg, 2002; Simpson, Edmondson, Constant, & Collier, 1997), and breast cancer (Bishop & Warr, 2003). The PDI has been found to have good internal consistency, as well as good test-retest reliability (Soer et al., 2013).

**Chronic Pain Acceptance Questionnaire (CPAQ).** The Chronic Pain Acceptance Questionnaire (CPAQ), a 20-item scale designed to measure acceptance in individuals dealing with pain, was first introduced by Geiser (1992), and has since been modified by McCracken and colleagues (2004). Items of the questionnaire are rated on a Likert scale (0 = *Never True* to 6 = *Always True*; McCracken, Vowles, & Eccleston, 2004). The CPAQ has a two-factor solution which incorporates (1) Activity engagement, which is a measure of an individual’s involvement in daily functions while in pain, and (2) Pain Willingness, which considers the amount of pain an individual copes with without taking avoidant or controlling actions (Vowles, McCracken, McLeod, & Eccleston, 2008). The efficacy of these factors as subscales to the construct “pain acceptance” has been supported by numerous studies (Mason, Mathias, & Skevington, 2008; McCracken & Eccleston, 2003; McCracken & Eccleston 2006).

**Pain Catastrophizing Scale (PCS).** The Pain Catastrophizing Scale (PCS) is a short 13-item measure which evaluates the pain-related catastrophizing behaviours and cognitions of individuals (Meyer, Sprott, & Frances Mannion, 2008) on a Likert scale (0 = *Not at All* to 4 = *All the Time*). The PCS contains three subscales that assess (1) Helplessness, (2) Magnification, and
(3) Rumination (Meyer et al., 2008). Data from the PCS has shown high internal consistency (Osman et al., 2000), and sound factorial validity (D’Eon, Harris, Ellis, 2004; Van Damme, Crombez, Bijttebier, Goubert, & Van Houdenhove, 2002),

**Tampa Scale for Kinesiophobia (TSK-11).** The Tampa Scale for Kinesiophobia 11-item version (TSK-11) is a self-report measure that contains 11 questions designed to assess a client’s fear of movement and re-injury (Burwinkle, Robinson, & Turk, 2005). The TSK-11 was derived from the original Tampa Scale for Kinesiophobia (TSK) 17 item scale, and has shown equally good levels of internal consistency, test-retest reliability, and responsiveness to change in clients who have experienced a significant decrease in their fear of movement (Woby, Roach, Urmston, & Watson, 2005). The TSK-11 has been shown to have good psychometric qualities in populations with shoulder pain (Mintken, Cleland, Whitman, & George, 2010), chronic lower-back pain (Woby et al., 2005), and general chronic pain (Hapidou et al., 2012; Tkachuk & Harris, 2012).

**Posttraumatic Stress Disorder Checklist – 5 (PCL-5).** The Posttraumatic Stress Disorder Checklist – 5 (PCL-5) is a self-report measure designed to assess the 20 DSM-5 symptoms of Posttraumatic stress disorder (Weathers, Marx, Friedman, & Schnurr, 2014). The intended use for the scale is to aid practitioners in screening individuals for PTSD, making provisional PTSD diagnoses, and monitoring PTSD symptom change throughout treatment (Weathers et al., 2013). The PCL-5 has shown strong internal consistency, test-retest reliability, and convergent and discriminant validity (Ashbaugh, Houle-Johnson, Herbert, El-Hage, & Brunet, 2016; Blevins, Weathers, Davis, Witte, & Domino, 2015). The PCL-5 has exhibited robust psychometric properties in both active military (Wortmann et al., 2016) and veteran (Bovin et al., 2015) populations.
Patient Health Questionnaire-9 (PHQ-9). The Patient Health Questionnaire – 9 (PSQ-9) is a nine-item depression scale designed to screen, monitor, diagnose, and measure depression severity (Kroenke, Spitzer, & Williams, 2001). The PHQ-9 has exhibited strong internal consistency (Feng et al., 2016) and good convergent and discriminant validity (Titov et al., 2011). The PHQ-9 has been found to be equally as sensitive and accurate at screening for depressive symptoms as the Beck Depression Inventory (Watnick, Wang, Demadura, & Ganzini, 2005). It has been found to be a valid tool for assessing depressive symptoms in a variety of populations (Janssen et al., 2016; Richardson et al., 2010; Williams et al., 2005).

Privacy and Confidentiality

All participating individuals received a unique ID number which was used to compare pre-, post-, and- follow-up treatment measure outcomes. The ID numbers served as both user ID and password for accessing the online treatment website; the participants were asked to change their password following their initial access to the website. A master list containing participants’ initials was kept at the OSIC for the duration of the treatment in the event participants lost or forgot their user ID. All media containing sensitive information was kept on a password-protected computer and all websites were secure and encrypted. Finally, all information gathered was accessible only to the principal investigator and research advisor, and was kept strictly confidential.

Results

Data Preparation

Based on examination of the data, normality was reasonably assumed as skewness and kurtosis values were found to be within an acceptable range. This was further validated by a visual inspection of the boxplots and histograms created from each scale, from which no serious outliers were identified. One question on the PDI (at Time 1) was unanswered for a participant in
the wait-list control condition, and one question from the CPAQ (at Time 2) from a different participant in the wait-list control condition. In both cases, the average response for that question, from the wait-list condition, was used in place of the missing entries.

**Reliability Analysis**

Internal consistency was calculated, using Cronbach’s alpha, for each of the scales (i.e., PDI, CPAQ, TSK-11, PCS, PCL-5, and the PHQ-9). Reliability of the scales was found to be acceptable, with PDI (T1 = .801; T2 = .854; T3 = .559), CPAQ (T1 = .751; T2 = .801; T3 = .800), TSK-11 (T1 = .751; T2 = .841; T3 = .855), PCS (T1 = .927; T2 = .93; T3 = .95), PCL-5 (T1 = .944), and PHQ-9 (T1 = .79). For the PDI Time 3, only seven participants completed the scale, which is likely why the reliability is much lower than at Time 1 and Time 2. Given that with the full sample reliability was found to be good, the lower Time 3 result was not considered particularly concerning.

**Descriptive Statistics**

Table 1 includes means, standard deviations, and ranges for the following demographic variables: age, pain duration, and pain location. There were no statistically significant differences found between the treatment condition and wait-list control condition on these variables. Table 2 includes the frequencies and percentages for the following demographic variables: Gender, RCMP/military, and active-duty/retired. Similarly, there were no statistically significant differences found between the treatment and wait-list conditions on these variables. Table 3 depicts the pre-treatment means, standard deviations, and ranges for depression and PTSD symptoms. Table 4 provides the means, standard deviations, and ranges (at pre-treatment, post-treatment, and 3-month follow-up) for the primary outcome variables: pain interference, pain catastrophizing, kinesiophobia, and pain acceptance.
Hypothesis One

To assess the first hypothesis, that there would be a significant decrease in self-reported pain interference ratings, pain-related catastrophizing and kinesiophobia, and an increase in level of pain acceptance among participants in the treatment condition as compared to the wait-list control condition, 2 x 2 mixed model ANOVAs were calculated utilizing the pre-treatment (Time 1) and post-treatment (Time 2) scores from both the treatment and waitlist control conditions for each primary outcome variable (i.e., pain interference, pain catastrophizing, kinesiophobia, and pain acceptance).

Prior to the ANOVA calculation, a correlation matrix was computed to assess the strength and directional relationship between the four dependent variables (for both Time 1 and Time 2 of measure administration). Tables 5 and 6 show the result of this analysis. As expected, the dependent variables are correlated with each other, though not to an extent where there is concern for multicollinearity. Since the constructs are related to one another, and since we are measuring participants from the same sample, it was expected that we would see small to moderate correlations between dependent variables.

Table 7 and Figures 3-6 display the results for each mixed model ANOVA. The interactions from the mixed model ANOVA analyses were statistically significant for changes in pain interference, kinesiophobia, and pain acceptance. Regarding the main effects of Time, only change in pain acceptance was found to be significant, whereas no main effect of Condition was found to be statistically significant (see Table 7).

For the treatment condition, dependent t-tests were conducted to further assess mean differences between the pre-treatment, post-treatment, and follow-up scores on each of the four dependent variables. Tables 8 and 9, and Figures 7-10 display the results from the dependent t-
tests for the four dependent variables. The results for the pre- to-post-test dependent t-tests revealed statistically significant differences for all of the dependent variables except for pain interference, although even this measurement was close to statistical significance with $t(13) = 2.07, p = .059$. As expected, there were no statistically significant differences between post-treatment and follow-up for each of the dependent variables (see Table 9).

**Hypothesis Two**

To evaluate the second hypothesis, that smaller treatment gains, as measured by changes from pre- to post-treatment on the pain-related variables, would be found among individuals reporting high levels of depression or PTSD symptoms at baseline, a series of hierarchal multiple regression analyses were performed. Upon assessing the Cook’s distance scores for each of the multiple regression analyses, no scores stood out as concerning, or as exerting too great an influence on the model fit.

Baseline PTSD and depression symptom scores revealed a positive, moderately large correlation of $r = .512$, although this was not a statistically significant relationship ($p = .061$). The moderately large positive relationship between the PTSD and depression scores indicates that they likely do not contribute uniquely to predicting scores on each of the four dependent variables. As such, the relationship between the predictor variables was included in the interpretation of the regression analyses results.

As can be seen in Table 10, only change in pain acceptance scores was significantly predicted by participants scores on both measures of PTSD and depression symptoms. Concerning pain acceptance, using analysis of variance to assess the model, we can see that the full model is statistically significant with $F (2, 11) = 9.295, p = 0.004$. We can see that Model 1 can predict 62% (R-squared: 0.628) of the variance of scores in pain acceptance given the scores
in both PTSD and depression symptoms. Model 2, which includes the predictor PTSD x Depression, was not statistically significant with $F (1, 10) = 3.09, p = 0.109$. Therefore, adding the interaction variable (PTSD x Depression) did not significantly improve the predictability of the model.

**Discussion**

The primary goal of this study was to assess the efficacy of an online acceptance-based treatment for chronic pain, by examining changes on pain-related self-report measures between treatment and wait-list control conditions.

**Summary of Findings**

**Hypothesis one.** The first hypothesis, that significant reductions in self-reported pain interference ratings, pain-related catastrophizing, and kinesiophobia, and a significant increase in pain acceptance would be found among participants in the treatment condition as compared to the wait-list control condition, was largely supported. This study found significant Time x Condition interactions for pain interferences ratings, kinesiophobia, and pain acceptance (see Table 7). The Time x Condition interaction from the 2 x 2 ANOVA for pain catastrophizing was not statistically significant, though nearing significance with $F (1, 27) = 3.461, p = 0.074$. All Time x Condition interactions were followed up by simple main effect contrasts (i.e., dependant samples t-tests). Regarding the pre-to-post treatment analyses (treatment condition only), pain catastrophizing, kinesiophobia, and pain acceptance revealed statistically significant changes (see Table 8). Changes in pain interference were not found to be significant, though neared significance with $t (13), p = 0.059$. As anticipated, the maintenance of treatment gains was found for each of the four dependent variables as revealed in the post-treatment to 3-month follow-up analyses (see Table 9).
**Hypothesis two.** It was hypothesized that smaller treatment gains on the primary outcome variables would be exhibited by participants who reported higher levels of depression and PTSD symptoms at baseline. The results of this study revealed that only change scores for participants pain acceptance ratings was significantly predicted by participants baseline scores of PTSD and depression symptoms. Results from a literature review by Bair and colleagues (2003) highlight the negative influence depression exerts on chronic pain treatment outcomes. Likewise, PTSD is thought to play a similar role in impacting treatment outcomes as comorbid PTSD and chronic pain increase the likelihood of symptom severity and additional psychiatric diagnoses (Asmundson & Katz, 2009; Palacio, Krikorian, Saldarriaga, & Vargas, 2012). Thus, the results that only change scores for pain acceptance can be significantly predicted by baseline scores of PTSD and depression is surprising. Several studies have found level of pain acceptance to be a significant predictor of depression (e.g., Esteve, Ramírez-Maestre, & López-Martínez, 2007; McCracken, 1998; Vowles, McCracken, & Eccleston, 2007) and PTSD outcomes (e.g., Ruiz-Párraga & López-Martínez, 2015; Tsui, Stein, & Sonty, 2010), however, there is a paucity of literature that has examined the predictive nature of both PTSD and depression symptoms for predicting levels of pain acceptance. Aspects of PTSD symptomology, such as experiential avoidance, can be seen as an opposing force to acceptance (Orsillo, Roemer, & Barlow, 2003), and thus potentially influencing participants’ progress on this construct in treatment. Likewise, components of depression symptomology, such as markedly diminished interest in previously enjoyed, meaningful activities, may play a role in inhibiting progress in increasing pain acceptance, which embodies the notion of engagement and continual reduction of avoidance behaviours (Dindo, Recober, Marchman, O’Hara, & Turvey, 2015).

**Wider Literature**
**Pain interference.** A significant Time (pre-treatment/post-treatment) x Condition (waitlist control/treatment) interaction was found for pain interference and though the simple main effect contrast (i.e., pre- to post-treatment) was not found to be statistically significant, it was certainly nearing significance, $t(13) = 2.067, p = 0.059$. The present study found comparable results to other studies assessing the effectiveness of acceptance-based treatments for chronic pain in reducing pain interference and disability (e.g., Olsson et al., 2012; Wicksell, Ahlqvist, Bring, Melin, & Olsson, 2008). This is an important finding as pain disability has been linked to lower levels of well-being (Urquhart, Shortreed, Davis, Cicuttini, & Bell, 2009), deficits in memory and learning (Legarreta et al., 2016), and emotional numbing (Katz, Asmundson, Mcrae, & Halket, 2009). As stated prior, pain disability is a likely outcome within the cyclical pattern of the fear avoidance model of chronic pain. Seeing notable reductions in participants’ pain disability highlights the effectiveness of the treatment to target known contributors of pain disability.

**Pain catastrophizing.** The Time x Condition interaction for pain catastrophizing was not found to be statistically significant, though nearing significance with $F(1,27) = 3.461, p = 0.074$. Similar to the pilot study conducted for this treatment (Holens et al., 2017), differences in pre- to post-treatment scores for pain catastrophizing were found to be significant with a medium-large effect size (i.e., pilot study PCS $d = .77$, RCT study PCS $d = .64$). Pain catastrophizing has been noted as a key component in the fear avoidance model of chronic pain, and is a significant predictor of change for various treatment outcomes (Vowles, McCracken, & Eccleston, 2007). Cognitive fusion, in which an individual’s experience becomes dominated by their thoughts, more specifically the content of those thoughts, is a similar construct to that of catastrophizing (see McCracken, Barker, & Chilcot, 2014). The treatment in this study contains a module on
cognitive defusion, which is a process geared at untangling an individual with the potentially negative content within their thoughts, and could be the mechanism which is instrumental at targeting and reducing pain-related catastrophizing.

**Kinesiophobia.** Another promising result from this study is the significant reduction of participants’ kinesiophobia ratings following treatment. Both the Time x Condition interaction, and the pre- to post-treatment analyses were found to be statistically significant (see Tables 7 and 8). This is a meaningful finding as Picavet and colleagues (2002) have found that high levels of kinesiophobia significantly predict disability and lower back pain at a 6-month follow-up period. Similarly, kinesiophobia is theorised to be prompted by catastrophic thinking, and to lead to activity limitation, pain, disability, and the maintenance of avoidance behaviours (Bailey, Carleton, Vlaeyen, & Asmundson, 2010). Kinesiophobia has been defined as “an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury” (Vlaeyen & Crombez, 1999, p. 190). It is understandable that a psychotherapy, such as the ABBT intervention used in this study, aimed at changing the individual’s relationship to their pain, would be effective in reducing pain-related fear, and the subsequent consequences of that fear.

**Pain acceptance.** Utilizing an acceptance-based behavioural treatment, it is not surprising that participants’ pain acceptance ratings were more notably influenced by participation in the treatment condition than any other dependent variable. Similar to other online acceptance-based interventions for chronic pain (e.g., Baranoff, Hanrahan, Burke, & Connor, 2016; Simister et al., 2018) this study found significant improvements on self-reported pain acceptance from pre- to post-post treatment as compared to the wait-list control condition. Higher self- ratings of pain acceptance have been associated with lower levels of pain intensity,
less disability, lower levels of depression, and a more positive work status (Mccracken, 1998). The treatment used in this study has a module solely geared towards educating participants on the concept of acceptance, and how accepting one’s pain experience allows them to move on with their life irrespective of their pain intensity or frequency. These positive findings highlight the clinical utility of the treatment in question.

**Limitations and Future Research**

With these positive results, there are also limitations to this study. Firstly, only participants who completed five out of the eight modules were included in the analysis. Valuable data concerning the benefits (if present) of completing 4 or fewer modules, as compared to five or more modules, was not explored. Moreover, participants who dropped out were not pursued as to the reasons that contributed to their dropping out of treatment. Another notable limitation of this study was the high attrition rate. The drop out rate for this study was 39%, which is similar to that of other internet-based treatments for chronic pain (Macea et al., 2010). Utilizing a wait-list control condition may have introduced differing expectations on behalf of the participants in the two conditions; this has the potential to instill bias. Due to time constraints, only seven participants’ data were available for the three-month follow-up analysis. This small sample may not give an accurate picture of the maintenance of treatment gains.

Future studies should include in-depth analyses concerning the outcomes related to completing less than five treatment modules. Future research should also explore facets that increase the maintenance of treatment gains.

**Conclusion**

The results from this study provide further empirical support for the use of acceptance-based behavioural interventions for treating various chronic pain conditions, and thus add to the
recent growing body of literature for acceptance-based treatments for chronic pain (e.g. Buhrman et al., 2013; Trompetter, Bohlmeijer, Veehof, & Schreurs, 2015; Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016). These results also highlight how this acceptance-based behavioural treatment helps to significantly decrease pain interference and kinesiophobia, as well as increase pain acceptance. This study adds a unique contribution to the understanding of how depression and PTSD symptoms influence treatment gains for pain acceptance, when utilizing an acceptance-based behavioural intervention for chronic pain. These positive findings provide further support for the use of this acceptance-based behavioural treatment for chronic pain within police and military populations.
References


disorders and perceived need for mental health care: Findings from a large representative sample of military personnel. *Archives of General Psychiatry, 64*(7), 843–852.


doi:10.1016/j.cbpra.2008.08.001


Table 1

Demographic Variables (Age, Pain Duration, Pain Locations)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>50.40</td>
<td>12.69</td>
<td>46</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>51.93</td>
<td>5.92</td>
<td>22</td>
</tr>
<tr>
<td><strong>Pain Duration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>20.97</td>
<td>12.37</td>
<td>39</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>14.12</td>
<td>10.14</td>
<td>32.5</td>
</tr>
<tr>
<td><strong>Pain Locations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>3.73</td>
<td>1.87</td>
<td>6</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>3.93</td>
<td>2.09</td>
<td>7</td>
</tr>
</tbody>
</table>

*SD* = Standard deviation

* No statistically significant differences were found between the treatment condition and the waitlist control condition on any of the demographic variables.
Table 2

Demographic Variables (Gender, RCMP/Military, Active-duty/Retired)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Wait-list</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4(26.7%)</td>
<td>5(35.7%)</td>
</tr>
<tr>
<td>Male</td>
<td>11(73.3%)</td>
<td>9(64.3%)</td>
</tr>
<tr>
<td><strong>RCMP/Military</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCMP</td>
<td>0</td>
<td>2(14.3%)</td>
</tr>
<tr>
<td>Military</td>
<td>15</td>
<td>12(85.7%)</td>
</tr>
<tr>
<td><strong>Active-duty/Retired</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active-duty</td>
<td>3(20%)</td>
<td>6(42.9%)</td>
</tr>
<tr>
<td>Retired</td>
<td>12(80%)</td>
<td>8(57.1%)</td>
</tr>
</tbody>
</table>

*No statistically significant differences were found between the treatment condition and the waitlist control condition on any of the demographic variables.*
Table 3

**Depression and PTSD Symptoms Pre-Treatment (Means, SD's, and Ranges)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depression Symptoms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>14.8</td>
<td>5.77</td>
<td>16</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>15.5</td>
<td>3.94</td>
<td>15</td>
</tr>
<tr>
<td><strong>PTSD Symptoms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>38.53</td>
<td>16.26</td>
<td>46</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>32.07</td>
<td>19.43</td>
<td>65</td>
</tr>
</tbody>
</table>

*Note. n = 29. Depression symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9), and PTSD symptoms were measured using the Posttraumatic Stress Disorder Checklist – 5 (PCL-5).

* No statistically significant differences were found between the treatment condition and the waitlist control condition on either of the variables.*
Table 4

Primary Outcome Variables for Pre-Treatment, Post-Treatment, and 3-Month Follow-up (Means, Standard Deviations, and Ranges)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>3-Month Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Pain Interference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>41.667 (12.2)</td>
<td>43</td>
<td>45.467 (9.8)</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>44.893 (9.5)</td>
<td>32</td>
<td>39.643 (11.7)</td>
</tr>
<tr>
<td>Pain Catastrophizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>27.167 (12.5)</td>
<td>40</td>
<td>28.133 (13.9)</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>31 (9.5)</td>
<td>30</td>
<td>25.214 (8.6)</td>
</tr>
<tr>
<td>Kinesiophobia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>29.8 (4.5)</td>
<td>18</td>
<td>32.033 (6.1)</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>32.357 (6.4)</td>
<td>24</td>
<td>28.143 (6.1)</td>
</tr>
<tr>
<td>Pain Acceptance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waitlist Condition</td>
<td>52.067 (12.9)</td>
<td>55</td>
<td>50.933 (11.5)</td>
</tr>
<tr>
<td>Treatment Condition</td>
<td>50 (9.8)</td>
<td>35</td>
<td>60.429 (10.9)</td>
</tr>
</tbody>
</table>

*Note.* Pain interference was measured using the Pain Disability Index (PDI), pain catastrophizing was measured using the Pain Catastrophizing Scale (PCS), kinesiophobia was measured using the Tampa Scale for Kinesiophobia (TSK), and pain acceptance was measured using the Chronic Pain Acceptance Questionnaire (CPAQ). Waitlist Condition (*n* = 15), Treatment Condition (*n* = 14). 3-month follow-up data (*n* = 7).
Table 5

Summary of Intercorrelation, Means, and Standard Deviations for Dependent Variables (Time 1)

<table>
<thead>
<tr>
<th>Measure</th>
<th>PDI</th>
<th>PSC</th>
<th>TSK</th>
<th>CPAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI</td>
<td></td>
<td>.551**</td>
<td>.456*</td>
<td>-.734**</td>
</tr>
<tr>
<td>PSC</td>
<td>.551**</td>
<td></td>
<td>.510**</td>
<td>-.632**</td>
</tr>
<tr>
<td>TSK</td>
<td>.456*</td>
<td>.510**</td>
<td></td>
<td>-.376*</td>
</tr>
<tr>
<td>CPAQ</td>
<td>-.734**</td>
<td>-.632**</td>
<td>-.376*</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>43.22</td>
<td>29.02</td>
<td>31.03</td>
<td>51.07</td>
</tr>
<tr>
<td>SD</td>
<td>10.92</td>
<td>11.12</td>
<td>5.56</td>
<td>11.41</td>
</tr>
</tbody>
</table>

Note. Intercorrelations for participants (n = 29) scores on the four dependent variables. PDI = Pain Disability Index; PSC = Pain Catastrophizing Scale; TSK = Tampa Scale of Kinesiophobia; CPAQ = Chronic Pain Acceptance Questionnaire.

*p < .05 (2-tailed)

**p < .01 (2-tailed)
Table 6

Summary of Intercorrelation, Means, and Standard Deviations for Dependent Variables (Time 2)

<table>
<thead>
<tr>
<th>Measure</th>
<th>PDI</th>
<th>PSC</th>
<th>TSK</th>
<th>CPAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI</td>
<td>−</td>
<td>.553**</td>
<td>.509**</td>
<td>-.792**</td>
</tr>
<tr>
<td>PSC</td>
<td>.553**</td>
<td>−</td>
<td>.631**</td>
<td>-.585**</td>
</tr>
<tr>
<td>TSK</td>
<td>.509**</td>
<td>.631**</td>
<td>−</td>
<td>-.614*</td>
</tr>
<tr>
<td>CPAQ</td>
<td>-.792**</td>
<td>-.585**</td>
<td>-.614*</td>
<td>−</td>
</tr>
<tr>
<td>$M$</td>
<td>42.66</td>
<td>26.72</td>
<td>30.16</td>
<td>55.52</td>
</tr>
<tr>
<td>$SD$</td>
<td>10.94</td>
<td>11.54</td>
<td>6.30</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Note. Intercorrelations for participants ($n = 29$) scores on the four dependent variables. PDI = Pain Disability Index; PSC = Pain Catastrophizing Scale; TSK = Tampa Scale of Kinesiophobia; CPAQ = Chronic Pain Acceptance Questionnaire. *$p < .01$ (2-tailed)
Table 7

2 X 2 Mixed Model ANOVAs for Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect</th>
<th>df</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Interference</td>
<td>Main (Condition)</td>
<td>1,27</td>
<td>0.137</td>
<td>0.715</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Main (Time)</td>
<td>1,27</td>
<td>0.133</td>
<td>0.718</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1,27</td>
<td>5.193</td>
<td><strong>0.031</strong></td>
<td>0.161</td>
</tr>
<tr>
<td>Pain Catastrophizing</td>
<td>Main (Condition)</td>
<td>1,27</td>
<td>0.014</td>
<td>0.906</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Main (Time)</td>
<td>1,27</td>
<td>1.763</td>
<td>0.195</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1,27</td>
<td>3.461</td>
<td>0.074</td>
<td>0.114</td>
</tr>
<tr>
<td>Kinesiophobia</td>
<td>Main (Condition)</td>
<td>1,27</td>
<td>0.117</td>
<td>0.735</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Main (Time)</td>
<td>1,27</td>
<td>1.152</td>
<td>0.293</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1,27</td>
<td>12.208</td>
<td><strong>0.002</strong></td>
<td>0.311</td>
</tr>
<tr>
<td>Pain Acceptance</td>
<td>Main (Condition)</td>
<td>1,27</td>
<td>0.903</td>
<td>0.35</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>Main (Time)</td>
<td>1,27</td>
<td>8.236</td>
<td><strong>0.008</strong></td>
<td>0.234</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1,27</td>
<td>12.742</td>
<td><strong>0.001</strong></td>
<td>0.321</td>
</tr>
</tbody>
</table>

*Note.* Effect size was measured using Partial Eta Squared (i.e., η²)
Table 8

*Dependent Samples t-test Results Comparing pre-treatment and post-treatment Mean Scores*

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI (Pre)</td>
<td>14</td>
<td>44.89</td>
<td>9.52</td>
<td>2.066</td>
<td>13</td>
<td>0.059</td>
</tr>
<tr>
<td>PDI (Post)</td>
<td>14</td>
<td>39.64</td>
<td>11.69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS (Pre)</td>
<td>14</td>
<td>31</td>
<td>9.53</td>
<td>2.364</td>
<td>13</td>
<td><strong>0.034</strong></td>
</tr>
<tr>
<td>PCS (Post)</td>
<td>14</td>
<td>25.21</td>
<td>8.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSK (Pre)</td>
<td>14</td>
<td>32.36</td>
<td>6.44</td>
<td>2.573</td>
<td>13</td>
<td><strong>0.023</strong></td>
</tr>
<tr>
<td>TSK (Post)</td>
<td>14</td>
<td>28.14</td>
<td>6.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPAQ (Pre)</td>
<td>14</td>
<td>50</td>
<td>9.81</td>
<td>-3.841</td>
<td>13</td>
<td><strong>0.002</strong></td>
</tr>
<tr>
<td>CPAQ (Post)</td>
<td>14</td>
<td>60.43</td>
<td>10.85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* SD = Standard Deviation, $t = t$-critical, df = Degrees of Freedom, $p =$ Probability. PDI = Pain Disability Index; PSC = Pain Catastrophizing Scale; TSK = Tampa Scale of Kinesiophobia; CPAQ = Chronic Pain Acceptance Questionnaire.
Table 10

*Dependent Samples t-test Results Comparing post-treatment and follow-up Mean Scores*

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI (Post)</td>
<td>7</td>
<td>38.29</td>
<td>11.6</td>
<td>-0.19</td>
<td>6</td>
<td>0.85</td>
</tr>
<tr>
<td>PDI (Follow-up)</td>
<td>7</td>
<td>39.71</td>
<td>7.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS (Post)</td>
<td>7</td>
<td>25.57</td>
<td>8.72</td>
<td>0.52</td>
<td>6</td>
<td>0.62</td>
</tr>
<tr>
<td>PCS (Follow-up)</td>
<td>7</td>
<td>23.57</td>
<td>9.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSK (Post)</td>
<td>7</td>
<td>29.57</td>
<td>7.57</td>
<td>0.64</td>
<td>6</td>
<td>0.55</td>
</tr>
<tr>
<td>TSK (Follow-up)</td>
<td>7</td>
<td>28.21</td>
<td>5.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPAQ (Post)</td>
<td>7</td>
<td>61.00</td>
<td>11.55</td>
<td>-0.38</td>
<td>6</td>
<td>0.72</td>
</tr>
<tr>
<td>CPAQ (Follow-up)</td>
<td>7</td>
<td>62.14</td>
<td>10.92</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* SD = Standard Deviation, t = t-critical, df = Degrees of Freedom, p = Probability. PDI = Pain Disability Index; PSC = Pain Catastrophizing Scale; TSK = Tampa Scale of Kinesiophobia; CPAQ = Chronic Pain Acceptance Questionnaire.
Table 11

Summary of Hierarchical Multiple Regression for Each of the Four Dependent Variables Change Scores

<table>
<thead>
<tr>
<th>Models</th>
<th>Variables</th>
<th>Beta</th>
<th>R²</th>
<th>Adj R²</th>
<th>R² change</th>
<th>F change</th>
<th>p for F change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 PTSD and Depression</td>
<td>PDI</td>
<td>0.199</td>
<td>-0.585</td>
<td>0.263</td>
<td>0.129</td>
<td>0.263</td>
<td>1.96</td>
</tr>
<tr>
<td>Step 2 PTSD and Depression,</td>
<td>0.342</td>
<td>-0.522</td>
<td>0.188</td>
<td>0.264</td>
<td>0.043</td>
<td>0.001</td>
<td>0.02</td>
</tr>
<tr>
<td>and PTSD x Depression</td>
<td>0.188</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1 PTSD and Depression</td>
<td>PCS</td>
<td>0.291</td>
<td>-0.280</td>
<td>0.08</td>
<td>-0.088</td>
<td>0.08</td>
<td>0.476</td>
</tr>
<tr>
<td>Step 2 PTSD and Depression,</td>
<td>0.976</td>
<td>0.023</td>
<td>-0.899</td>
<td>0.113</td>
<td>-0.153</td>
<td>0.033</td>
<td>0.376</td>
</tr>
<tr>
<td>and PTSD x Depression</td>
<td>0.132</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1 PTSD and Depression</td>
<td>TSK</td>
<td>-0.058</td>
<td>-0.278</td>
<td>0.097</td>
<td>-0.067</td>
<td>0.097</td>
<td>0.592</td>
</tr>
<tr>
<td>Step 2 PTSD and Depression,</td>
<td>-1.094</td>
<td>-0.736</td>
<td>1.358</td>
<td>0.173</td>
<td>-0.075</td>
<td>0.076</td>
<td>0.922</td>
</tr>
<tr>
<td>and PTSD x Depression</td>
<td>0.063</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1 PTSD and Depression</td>
<td>CPAQ</td>
<td>-0.895</td>
<td>0.264</td>
<td>0.628</td>
<td>0.561</td>
<td>0.628</td>
<td>9.295</td>
</tr>
<tr>
<td>Step 2 PTSD and Depression,</td>
<td>0.216</td>
<td>0.756</td>
<td>-1.457</td>
<td>0.716</td>
<td>0.631</td>
<td>0.088</td>
<td>3.09</td>
</tr>
<tr>
<td>and PTSD x Depression</td>
<td>0.063</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Beta, Standardized regression coefficient, R², proportion variance explained.
SUMMARY OF PARTICIPANT FLOW

Figure 1. Participant flow diagram displaying participating sample and excluded individuals.
Figure 2. Randomization procedure outlining participant progression through study.
Figure 3. Interaction effect plot for pain interference means (Time x Condition). Pain interference was measured using the Pain Disability Index. Interaction: $F(1,27) = 5.193$, $p = 0.031$; Main effect of Time: $F(1,27) = 0.133$, $p = 0.718$; Main effect of Condition: $F(1,27) = 0.137$, $p = 0.715$. 
Figure 4. Interaction effect plot for pain catastrophizing means (Time x Condition). Pain catastrophizing was measured using the Pain Catastrophizing Scale. Interaction: $F(1,27) = 3.461, p = 0.074$; Main effect of Time: $F(1,27) = 1.763, p = 0.195$; Main effect of Condition: $F(1,27) = 0.014, p = 0.906$. 
Figure 5. Interaction effect plot for kinesiophobia means (Time x Condition). Kinesiophobia was measured using the Tampa Scale for Kinesiophobia. Interaction: $F (1,27) = 12.208, p = 0.002$; Main effect of Time: $F (1,27) = 1.152, p = 0.293$; Main effect of Condition: $F (1,27) = 0.117, p = 0.735$. 
Figure 6. Interaction effect plot for pain acceptance means (Time x Condition). Pain acceptance was measured using the Chronic Pain Acceptance Questionnaire. Interaction: $F(1,27) = 12.742, p = 0.001$; Main effect of Time: $F(1,27) = 8.236, p = 0.008$; Main effect of Condition: $F(1,27) = 0.903, p = 0.35$. 
Figure 7. Dependent samples $t$-test for pain interference ratings (pre- to post-treatment); $t (13) = 2.066$, $p = 0.059$, $n = 14$. Pain interference was measured using the Pain Disability Index. Figure also shows 3-month follow-up mean for pain interference ratings ($n = 7$).
Figure 8. Dependent samples \( t \)-test for pain catastrophizing ratings (pre- to post-treatment); \( t(13) = 2.364, p = 0.034, n = 14 \). Pain catastrophizing was measured using the Pain Catastrophizing Scale. Figure also shows 3-month follow-up mean for pain catastrophizing ratings \((n = 7)\).
Figure 9. Dependent samples $t$-test for kinesiophobia ratings (pre- to post-treatment); $t$ (13) = 2.573, $p = 0.023$, $n = 14$. Kinesiophobia was measured using the Tampa Scale for Kinesiophobia. Figure also shows 3-month follow-up mean for kinesiophobia ($n = 7$).
Figure 10. Dependent samples $t$-test for pain acceptance ratings (pre- to post-treatment); $t (13) = -3.841, p = 0.002, n = 14$. Pain acceptance was measured using the Chronic Pain Acceptance Questionnaire. Figure also shows 3-month follow-up mean for pain acceptance ($n = 7$).
Appendix A

RESEARCH PARTICIPANT INFORMATION AND CONSENT FORM

Title of Study: Efficacy of Online Chronic Pain Treatment for Military, RCMP and Veterans: A Randomized Controlled Trial

Principal Investigator: Jeremiah Buhler
Department of Psychology
University of Manitoba
P404 Duff Roblin Bldg, 190 Dysart Rd
Winnipeg, MB, R3T 2N2

Research Advisor: Dr. Pamela Holens, Assistant Professor
Department of Clinical Heath Psychology
University of Manitoba
Staff Psychologist, Operational Stress Injury Clinic
Deer Lodge Centre, 2109 Portage Avenue
Winnipeg, MB, R3J 0L3

You are being asked to participate in a research study. Please take your time to review this consent form and discuss any questions you may have with the study staff. You may take your time to make your decision about participating in this study and you may discuss it with your friends, family or (if applicable) your doctor before you make your decision. This consent form may contain words that you do not understand. Please ask the study staff to explain any words or information that you do not clearly understand.

Background Information and Purpose of Study:

This research is being conducted to study an online, self-directed treatment for chronic pain designed specifically for those who are currently or have previously served in the military or RCMP. You are being asked to take part in this study because you have chronic pain.

The purpose of this study is to evaluate the effectiveness of an internet-based format of Acceptance-Based Behavioural Therapy (ABBT) that has been tailored for military and RCMP
personnel with chronic pain. ABBT consists of strategies that promote acceptance of and willingness to experience the present moment, creating distance from thoughts, feelings, images, and sensations, and helping individuals reconnect to their most important values.

This research is being done because evidence suggests that ABBT can be used to effectively treat individuals with chronic pain conditions such as back pain, cancer pain, arthritis, headaches, and Fibromyalgia. There are currently no online acceptance-based therapies developed specifically for the unique needs of individuals with a military background. If online ABBT treatment is effective, wait times could be reduced and therapy could be made more accessible for people who find it difficult to attend the clinic on a weekly basis.

**Study procedures:** If you agree to participate in this study, you will be asked to:

- **Give your consent for the brief demographic information that you would normally provide during your intake assessment to be included in this study.** This will include items such as age, marital status, education, employment, and years of military service in order to describe the characteristics of the participants in the study.

- **Complete a brief questionnaire asking about the history of your experience with chronic pain.** This would include information about the type of pain you have and any treatments that you have had in the past or are having at the present time.

- **Complete eight online sessions of ABBT.** These sessions will include general education about living with chronic pain, information and practical exercises on acceptance, getting in touch with values, letting go of troubling thoughts, mindfulness, and increasing self-awareness. (8 hours total)

- **Attend in-person check-in group sessions (optional).** Approximately every 2-weeks.

- **Complete several brief questionnaires on three different occasions: once before treatment, once immediately following treatment, and once again three months later.** These questionnaires will ask a variety of questions about your experience of pain.

- **Complete one additional brief questionnaire immediately following treatment.** This questionnaire will ask about your level of satisfaction with the online program.

Participation in the study is anticipated to take eight weeks if participants complete one ABBT session per week.

The researchers may decide to take you off this study if it is in your medical best interest.

**Risks and Discomforts:** While no significant risks or discomfort are anticipated as you participate in this study, any type of psychological treatment always carries a small risk of initial worsening of symptoms as participants learn to experience their distressing thoughts, feelings, and sensation rather than avoiding them. You may contact the principal investigator or research advisor during the study for assistance if you are concerned about worsening of symptoms and you will also be given contact information for additional resources.

**Benefits:** There may or may not be direct benefit to you from participating in this study. We hope the online version of ABBT is an effective alternative to standard care for chronic pain and allows more participants improved access to care.
**Costs:** All the treatment materials and any testing that will be performed as part of this study are provided at no cost to you. You may incur some costs associated with accessing the Internet if you do not currently have access to a computer with an Internet connection at least on a weekly basis.

**Alternatives:** Instead of participating in this study of an online treatment, you may request in-person treatment for your chronic pain condition. You may also request in-person treatment sessions for your chronic pain condition after completion of this online treatment.

*You do not have to participate in this study to receive treatment for your condition. Please talk to your regular doctor or therapist about all your treatment options.*

**Confidentiality:** Medical records that contain your identity will be treated as confidential in accordance with the Personal Health Information Act of Manitoba.

The University of Manitoba Psychology/Sociology Research Ethics Board and Deer Lodge Centre may review records related to the study for quality assurance purposes. The only other individuals who will access your study data will be the principal investigator, staff and research associates.

All records will be kept in a locked secure area and only those persons identified above will have access to these records. No information revealing any personal information such as your name, address or telephone number will leave the OSI Clinic at Deer Lodge Centre.

Results of this research may be published or presented in public forums; however your name and other identifying information will not be used or revealed. All study documents related to you will bear only your assigned study number. Despite efforts to keep your personal information confidential, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law.

Participants wishing to view results of the study once they are finished may request a summary of results from the principal investigator.

**Voluntary Participation/Withdrawal from the Study:** Your decision to take part in this study is voluntary. You may refuse to participate or you may withdraw from the study at any time. Your decision not to participate or to withdraw from the study will not affect your care at this clinic. If the study staff feels that it is in your best interest to withdraw you from the study, they will remove you without your consent. We will tell you about any new information that may affect your health, welfare, or willingness to stay in this study.

**Medical Care for Injury Related to the Study:** You are not waiving any of your legal rights by signing this consent form nor releasing the investigator(s) or the sponsor(s) from their legal and professional responsibilities.
Do not sign this consent form unless you have had a chance to ask questions and have received satisfactory answers to all of your questions.

Statement of Consent

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology/Sociology Research Ethics Board (PSREB). If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator at 204-474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

I agree that the brief demographic information that I would normally provide during my intake assessment can be included in the study:

Yes ___ No ___ Participant Initials ______

I agree to participate in this study which involves completing eight online ABBT modules as well as questionnaires related to my experience of pain and related conditions and my satisfaction with the program.

Yes ___ No ___ Participant Initials ______

I agree to be contacted for future follow-up in relation to this study:

Yes ___ No ___ Participant Initials ______

Participant signature: ______________________________ Date: __________________ (day/month/year)
Participant printed name: ___________________________
I, the undersigned, have fully explained the relevant details of this research study to the participant names above and believe that the participant has understood and has knowingly given their consent.

Signature of person obtaining consent: ______________________________       Date: _______________ (day/month/year)

Printed name of person obtaining consent: ____________________________

Role in the study: ___________________________

Results of the Study: Would you like to receive the results of this study once it is completed? If yes, the results will be mailed or emailed to you. Please provide us with an address (mail or email) where a summary of the project can be sent. We anticipate that a summary will be available by May 2018.

Yes ___       No ___

If yes, provide address (mail or email): ______________________________

__________________________________

__________________________________

__________________________________
Appendix B

Pain Disability Index

Pain Disability Index: The rating scales below are designed to measure the degree to which aspects of your life are disrupted by chronic pain. In other words, we would like to know how much pain is preventing you from doing what you would normally do or from doing it as well as you normally would. Respond to each category indicating the overall impact of pain in your life, not just when pain is at its worst.

For each of the 7 categories of life activity listed, please circle the number on the scale that describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

Family/Home Responsibilities: This category refers to activities of the home or family. It includes chores or duties performed around the house (e.g. yard work) and errands or favors for other family members (e.g. driving the children to school).

For each of the 7 categories of life activity listed, please circle the number on the scale that describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

Recreation: This disability includes hobbies, sports, and other similar leisure time activities.

Social Activity: This category refers to activities, which involve participation with friends and acquaintances other than family members. It includes parties, theater, concerts, dining out, and other social functions.

Occupation: This category refers to activities that are part of or directly related to one’s job. This includes non-paying jobs as well, such as that of a housewife or volunteer.

Sexual Behavior: This category refers to the frequency and quality of one’s sex life.

Self Care: This category includes activities, which involve personal maintenance and independent daily living (e.g. taking a shower, driving, getting dressed, etc.)

Life-Support Activities: This category refers to basic life supporting behaviors such as eating, sleeping and breathing.

Signature_________________________ Please Print_____________________

Date ____________
Appendix C

Chronic Pain Acceptance Questionnaire (CPAQ)

DIRECTIONS: Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is “Always True,” you would write a 6 in the blank next to that statement.

1. Very Rarely
2. Seldom True
3. Sometimes True
4. Often True
5. Almost Always True
6. Always True

_____ 1. I am getting on with the business of living no matter what my level of pain is
_____ 2. My life is going well, even though I have chronic pain
_____ 3. It’s okay to experience pain
_____ 4. I would gladly sacrifice important things in my life to control this pain better
_____ 5. It’s not necessary for me to control my pain in order to handle my life well
_____ 6. Although things have changed, I am living a normal life despite my chronic pain
_____ 7. I need to concentrate on getting rid of my pain
_____ 8. There are many activities I do when I feel pain
_____ 9. I lead a full life even though I have chronic pain
_____ 10. Controlling pain is less important than any other goals in my life
_____ 11. My thoughts and feelings about pain must change before I can take important steps in my life
_____ 12. Despite the pain, I am now sticking to a certain course in my life
_____ 13. Keeping my pain level under control takes first priority whenever I’m doing something
_____ 14. Before I can make any serious plans, I have to get some control over my pain
_____ 15. When my pain increases, I can still take care of my responsibilities
_____ 16. I will have better control over my life if I can control my negative thoughts about pain
_____ 17. I avoid putting myself in situations where my pain might increase
18. My worries and fears about what pain will do to me are true
19. It’s a relief to realize that I don’t have to change my pain to get on with my life
20. I have to struggle to do things when I have pain

Appendix D

PCS-EN

Client No.: __________  Age: _____  Sex: M(____) F(____)  Date: _______________

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feelings that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

0 – not at all  1 – to a slight degree  2 – to a moderate degree  3 – to a great degree  4 – all the time

---

When I’m in pain …

1☐ I worry all the time about whether the pain will end.
2☐ I feel I can’t go on.
3☐ It’s terrible and I think it’s never going to get any better.
4☐ It’s awful and I feel that it overwhelms me.
5☐ I feel I can’t stand it anymore.
6☐ I become afraid that the pain will get worse.
7☐ I keep thinking of other painful events.
8☐ I anxiously want the pain to go away.
9☐ I can’t seem to keep it out of my mind.
10☐ I keep thinking about how much it hurts.
11☐ I keep thinking about how badly I want the pain to stop.
12☐ There’s nothing I can do to reduce the intensity of the pain.
13☐ I wonder whether something serious may happen.

____________________________
Appendix E

THE TAMPA SCALE (11-item) TSK-11

ID Number: _________________________ Date: __________________

In these days of high-tech medicine, one of the most important sources of information about you is often missing from your medical records: your own feeling or intuitions about what is happening with your body. We hope that the following information will help to fill that gap.

Please answer the following questions according to the scale listed on the right. Please answer according to your true feelings, not according to what others think you should believe. This is not a test of medical knowledge; we want to know how you see it. Circle the number next to each question that best corresponds to how you feel.

Please answer these questions by yourself. We want to know how you feel, not someone else.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. People aren’t taking my medical condition seriously enough.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. My body is telling me I have something dangerously wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. My condition has put my body at risk for the rest of my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. If I were to try to overcome it, my pain would increase.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I wouldn’t have this much pain if there weren’t something potentially dangerous going on in my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Pain always means I have injured my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Pain let’s me know when to stop exercising so that I don’t injure myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I’m afraid that I might injure myself if I exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I can’t do all the things normal people do because it’s too easy for me to get injured.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. No one should have to exercise when she/he is in pain.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix F

PCL-5

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

<table>
<thead>
<tr>
<th>In the past month, how much were you bothered by:</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repeated, disturbing, and unwanted memories of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Repeated, disturbing dreams of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Feeling very upset when something reminded you of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Avoiding memories, thoughts, or feelings related to the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Trouble remembering important parts of the stressful experience?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Blaming yourself or someone else for the stressful experience or what happened after it?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Having strong negative feelings such as fear, horror, anger, guilt, or shame?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Loss of interest in activities that you used to enjoy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Feeling distant or cut off from other people?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>Irritable behavior, angry outbursts, or acting aggressively?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>Taking too many risks or doing things that could cause you harm?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>Being “superalert” or watchful or on guard?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Feeling jumpy or easily startled?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>Having difficulty concentrating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>Trouble falling or staying asleep?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

PCL-5 (8/14/2013) Weathers, Litz, Keane, Palmieri, Marx, & Schnurr -- National Center for PTSD
# Appendix G

## Patient Health Questionnaire-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?

(Use “✔” to indicate your answer)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Feeling down, depressed, or hopeless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Trouble falling or staying asleep, or sleeping too much</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Feeling tired or having little energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Poor appetite or overeating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. Thoughts that you would be better off dead or of hurting yourself in some way</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**For office coding** $0 + + + + = \text{Total Score: \_\_\_\_\_\_\_}$

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

<table>
<thead>
<tr>
<th>Difficulty Level</th>
<th>Not difficult at all</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
<th>Extremely difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display or distribute.