The Psychology of Pain Relief

By

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Chapter 1

The Normal Psychology of Pain

Practical Takeaways for Clinicians

1. An analgesic problem-solving model can help to capture how normal pain operates to interrupt attention and promote problem-solving behaviors.
2. There are non-physiological factors that contribute to the perception of pain.
3. Interventions using different mechanisms should be implemented to change the patient's perception of pain.
4. A transactional coping model can help providers determine which approaches to use in the psychological treatment of chronic pain.

Pain is a normal feature of the human experience. Commonplace pain has a particular psychology that provides the foundation for all pain management behavior. A normal psychology of pain seeks to explain the shared experience of pain that is uncomplicated and short-lived. It is straightforward in the sense that it is diagnostically minor (such as headaches) or related to slight trauma that does not require clinical intervention (such as bruises) (Eccleston, 2012). There are two core aspects beyond the sensory features of normal pain:

1. Its social or communicative function (Goubert et al., 2005)

2. Its interruption of mental preoccupations or escape/avoidance (Eccleston & Crombez, 1999)

Pain is hard-wired as a social alarm of a threat, which is then selected over other competing demands and triggers behaviors that interfere with normal life functioning (Eccleston, 2012). Everyone's experience of pain and its expression is a product of:

- The sensory experience
- The person's background
- The interpersonal context
- The meaning it has for the individual (Craig, 1984)

A Model of Analgesic Problem-Solving

In 2007, an exploratory model of analgesic problem-solving was proposed (see A Closer Look) (Eccleston & Crombez, 2007). This model helps to capture how normal pain operates to interrupt attention and promote problem-solving behaviors, which range from impassive and persevering to highly dramatic and panic-stricken (Craig, 1984).

- It begins when pain interrupts the person's attention and forces them into an unwanted and unwelcome focus on their body
- The pain is then appraised as a threat and makes them more vigilant to and drives them towards problem-solving behaviors

Oftentimes, patients are faced with no options, techniques, or methods at their disposal to achieve escape. Whichever solution the person follows will then either be effective or ineffective

- If it is effective, then they return to a pre-interruption state
- If it is ineffective, the person can become stuck in the perseverance loop. In other words, they may be actively and repeatedly engaged in effortful attempts to solve the wrong problem (Eccleston & Crombez, 2007). For example, a patient

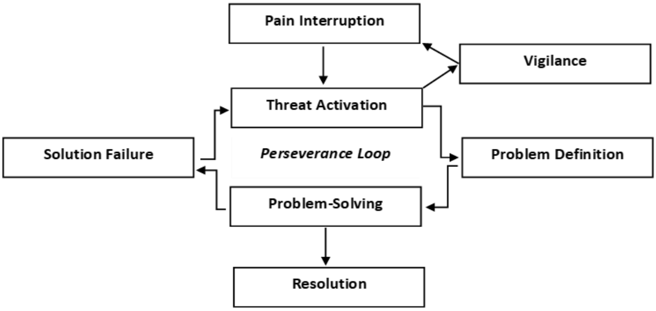
may persist with medication consumption despite the lack of any effect because they are from an analgesic culture, which avoids pain and distress (Eccleston, 2012). These effortful attempts will then fail because pain falls outside of the individual's expectations, lasts too long, does not respond to treatment, and/or impairs their social function (Eccleston, 2012).

A Closer Look

What is the model of analgesic problem-solving?

An exploratory model that was proposed in 2007 that helps capture how normal pain operates to interrupt attention and promote problem-solving behaviors.

Figure 1. *A Model of Analgesic Problem-Solving*



The Perception of Pain

The experience of pain has been found to have two distinct neural pathways (Wlassoff, 2015). When a pain signal comes from any part of the body to the brain, the anterior cingulate cortex is activated which is associated with the perception of pain. However, people react differently to this stimulation because the feeling is determined by the activation of the medial prefrontal cortex and nucleus accumbens, which are associated with motivation and emotion (Wlassoff, 2015).

Furthermore, there are non-physiological factors that contribute to the perception of pain, including personality, cognitions, beliefs, socio-cultural variables, learning, and emotional reactivity (Cianfrini & Doleys, 2017).

Personality

The perception of pain may be determined by the attachment style of the patient, whether anxious or avoidant. Individuals with an anxious attachment style crave close and intimate relationships but tend to sacrifice their needs to keep their partner happy. Individuals with this attachment style tend to feel more pain in the presence of a person who does not empathize with their condition. Individuals with an avoidant attachment style tend to value independence and self-sufficiency more than intimacy. Individuals with this attachment style report less pain when alone than when in the presence of another person (Wlassoff, 2015). These two attachment styles are related to a wide variety of close relationship processes and outcomes, specifically personality constructs (Shaver & Brennan, 1992). Over the past few decades, several theories have been proposed about personality in the chronic pain population (Conrad, Wegener, Geiser, & Kleiman, 2013). With the advent of the biopsychosocial approach in the 1980s, the diathesis-stress model dominated the field. The model accentuates the interplay between an individual's biological predisposition and the impact of the environment to explain the different responses to chronic pain (Conrad, Wegener, Geiser, & Kleiman, 2013). Overall, chronic pain patients are characterized by prevailing harm avoidance and lower self-directedness (Conrad, Wegener, Geiser, & Kleiman, 2013; Gustin et al., 2016).

Cognitions

The study of cognitive processes underlying all patterns of behavior can be broken down into two categories: its form and/or structure, and the contents of thoughts (Craig, 1984). The cognitive structures organize and carry out the direction of the pain experience through attention, memory, decision-making, and other self-regulatory processes. One particular response to pain, which may be predictive of its severity, is catastrophic thinking. Catastrophic thinking is defined as "an exaggerated negative mental set brought to bear during actual or anticipated pain experiences (Sullivan et al., 2001)." Current conceptualizations of catastrophic thinking most often describe it in terms of appraisal or a set of maladaptive beliefs (Tagg, 1996). Maladaptive thinking falls into four broad categories, or types of cognitive distortions, including overgeneralization, mental filter, jumping to conclusions, and emotional reasoning (International Association for the Study of Pain, 1986).

Beliefs

There are other principles that have an impact on how much pain patients feel, including self-efficacy, locus of control, involvement in the sick role, and the placebo/nocebo effect (Hansen & Streltzer, 2005). Self-efficacy is a personal judgment of the patient on how well they can execute a course of action required to deal with a prospective situation. Locus of control is the degree to which a patient believes that they have control over the outcome of events in their lives, as opposed to external forces beyond their control. A patient is involved in the sick role when they adhere to the specifically patterned social role of being sick. The placebo response occurs when a non-specific treatment proves to be effective as an analgesic when administered by an enthusiastic, credible proponent of their efficacy (Craig, 1984). If the patient's beliefs inadvertently increase their anxiety and expectations of pain, it is assumed they have had a nocebo effect (Hansen & Streltzer, 2005).

Socio-cultural Variables

Early theories of the psychology of pain assessed global factors, such as gender, age, and culture (Eccleston, 2001). In most studies, women generally report experiencing more recurrent, severe, and longer-lasting pain than men (Unruh, 1996). Past research has also shown that pain thresholds increase with age (Lautenbacher et al., 2017). It was once believed that we as human beings differed culturally in some way, which affected how we experienced pain. For example, there was a notion in the 19th century that racial groups varied in their physiological experiences of pain, which was later found to be unsubstantiated. However, we now understand that there are differences within cultural groups that may affect their pain experience, including generation, acculturation, SES, ties to the mother country, primary language, degree of isolation, and residence in ethnic neighborhoods. These factors may mediate the relationship between culture and pain.

Learning

Pain can be a conditioned response or learned behavior, rather than only a physical problem (Hansen & Streltzer, 2005). The behavior begins purely in response to the presence of an injury, and then it is reinforced and becomes a conditioned response. Pain behaviors, such as guarding, bracing, rubbing, grimacing, and sighing, may lead patients to perceive that they have more pain if reinforced. Similarly, inactivity may relieve pain in some patients but leads to a vicious cycle of deconditioning and further worsening of pain. Pain can result from these conditioned fear reactions, or avoidance behaviors, that persist even after the resolution of pain (Hansen & Streltzer, 2005).

Emotional reactivity

Relative to other negative emotions, such as fear, sadness, guilt, self-denigration, and shame (Eccleston, 2001), anger is the most prominent emotion in chronic pain patients (Fernandez & Milburn, 1994). Anger refers to an emotional experience that can be a current mood state or a general predisposition toward feeling angry. However, the experience of pain may help reduce anger by developing empathy. Empathy is the capacity for a patient to understand or feel what another person is experiencing from within their frame of reference, that is, the capacity to see the world from another person's eyes. It is the capacity to recognize pain in other people. Research has shown that human beings tend to be more empathic towards their friends and that stress may deter people's ability to empathize (Wlassoff, 2015).

Interventions

Interventions aimed at enabling patients to break out of the perseverance loop and change their perception of pain may be more effective than interventions that appear to endorse the patient's view of the problem as one that can only be solved by pain relief (Eccleston & Crombez, 2007). Psychotherapy produces long-term changes in behavior through learning, which generates changes in gene expression that alter the anatomical pattern of interconnections between nerve cells of the brain (Cianfrini & Doleys, 2017). The regulation of gene expression by psychosocial factors makes all bodily functions, including the brain, susceptible to psychosocial influences (Cianfrini & Doleys, 2017).

Mechanisms of Change

There appears to be a lack of awareness and understanding of the mechanisms of change involved in psychotherapy. There is the:

- Physiological process--includes musculoskeletal activity, heart rate, blood pressure, EEG patterns, sympathetic arousal, production of endogenous opioids, production of neurotransmitters, neurohormonal activity, and cortical functioning (Cianfrini & Doleys, 2017). Interventions based only on the biomedical approach may appease the patient who is focused on solving their pain by relief.
- Cognitions--addresses the patient's covert self-talk, thoughts, and beliefs. The focus of treatment in these interventions is to reduce the rigidity of belief in pain as requiring a biomedical approach and in changing the problem frame from one of needing a cure to one of managing a chronic illness (Turk & Gatchel, 2002).
- Overt behavior--includes the way one acts and talks. A behavioral therapeutic treatment may be focused on addressing the anxiety and hypervigilance for signals of possible pain with heightened fear of possible consequences of pain (Vlaeyen & Linton, 2000).
- Emotional reactivity--focus of treatment may be more of a full accommodation of life, which is changed to one in which pain is a feature and not the center (McCracken, 2005).

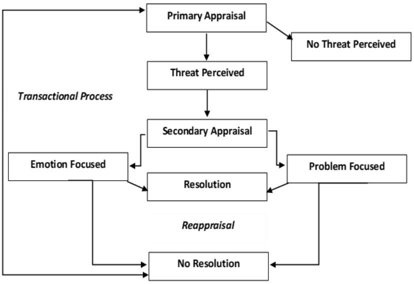
A transactional coping model (see A Closer Look) can help providers determine which approaches to use in the psychological treatment of chronic pain.

A Closer Look

What is the Transactional Model of Stress and Coping?

Lazarus and Folkman's (1984) Transactional Model is one of the most comprehensive theories of stress and coping in the psychological literature, but has received little empirical attention in chronically ill populations.23 The model assumes that it is a person-situation interaction, or transactional process, when a patient perceives a threat.

Figure 2. *Transactional Model of Stress & Coping*



Transactional Model of Stress & Coping

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- Problem-focused coping--aimed at solving or changing the problem, such as obtaining information about the pain or seeking medical attention.
- Emotion-focused coping--manages or regulates the emotional response to the pain, such as exercising, meditating, or engaging in activity to help forget about the pain.

Then there is a reappraisal, which determines the effectiveness of the coping strategy and the patient's psychological adjustment. According to this model's goodness-of-fit hypothesis, problem-focused coping is most appropriate when situations are appraised as changeable, while emotion-focused coping is most ideal when situations are less changeable. If the wrong approach is used, the stress remains unresolved and creates its own perseverance loop.

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Chapter 2

Psychological Impacts on Pain

Practical Takeaways for Clinicians

1. Patients with chronic pain experience considerable losses as a result of the multiple impacts it has on different aspects of their lives.
2. Fear-avoidance is a sensitive issue which challenges both the pain medicine experts and the individuals who suffer from chronic pain.
3. Frontline practitioners should consider the person who is suffering in front of them, but also the people directly standing behind them as they too may need support and education about pain management.
4. There are several different levels of intervention to address stigma, including intrapersonal, interpersonal, and structural.
5. Minoritized patients are at a higher risk of physician bias and treatment discrimination, resulting in undertreated pain symptoms.

Stages of Grief of Pain

All human beings have three common experiences, namely life, death, and grief. However, despite grief being a universal experience that everyone will face in some form during their lifetime, the literature dealing with this critical topic is conspicuously scarce (Roy, 2004). Loss related to grief is not just about death, but can include several situations, including loss caused by chronic pain (Furnes & Dysvik, 2010; Harvey, 1998). The fear of being incapacitated due to pain for some patients may be like the fear of death (Miller, 1995). When a person suffers the loss of a loved one, it feels like losing a part of oneself (Minsky, 1999). In addition, past literature has described the reactions to loss due to death as being like other forms of loss (Parkes, 1972), including chronic pain and illness (Palomino, Nicassio, Greenberg, & Medina, 2007).

Patients with chronic pain experience considerable losses because of the multiple impacts it has on different aspects of their lives (Gatchel, Adams, Polatin, & Kishino, 2002; Roy, 2008; Walker, Sofaer, & Holloway, 2006). Earlier research has found that patients suffering from chronic pain experience a loss in their ability to engage in meaningful activities, in relations with others, and of self (Walker, Sofaer, & Holloway, 2006). More specifically, research has found sub-themes, including loss of abilities and roles, employment-related losses, financial and related losses, relationship losses, and loss of identity and hope (Walker, Sofaer, & Holloway, 2006). Other themes have been reported, including not being understood by those around them and feeling changed as a person (White & Seibold, 2008). These losses, in turn, potentially change how these individuals perceive the world.

What is the Normal Grieving Process?

There is no single way to grieve and no single definition of “normal” grief (Hart, 2012). It is normal for people to experience a range of intense emotions, negative cognitions, and altered behaviors for some time after the loss. The most widely cited framework, the Kübler-Ross model, is popularly known as the “Five Stages of Grief” (Kübler-Ross & Kessler, 2014). The five stages are:

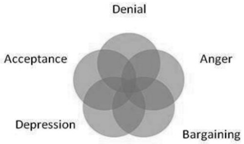
- **Denial**--During stage one, denial and shock help a person to cope and make survival possible. But as the individual proceeds, all the feelings they were denying begin to surface, such as anger.
- **Anger**--During the second stage, there are many other emotions underneath, such as guilt. But anger is the emotion people are most used to managing. Guilt is often bargaining's companion during stage three.
- **Bargaining**--Folks want life returned to what it was or want to go back in time. After bargaining, their attention moves squarely into the present.
- **Depression**--The fourth stage, depression, feels as though it will last forever, but it is a necessary step along the way to healing or acceptance.
- **Acceptance**--The final stage, acceptance, is often confused with the notion that people must accept needless suffering. However, acceptance does mean having to accept living with a certain amount of pain. Acceptance does not mean that a person must give up all hope and feel defeated. Rather, people can maintain hope for a better future while accepting today's unpleasant realities. Acceptance does not mean that they must accept someone else's version of their condition (e.g., being given a bleak prognosis and later proving the doctor wrong). Acceptance does not mean "not caring." Healthy acceptance means recognizing that no amount of agonizing over and bemoaning fate is going to make things any better. True acceptance means coming to terms mentally and emotionally with the person's unpleasant reality. This stage is about accepting the new reality as the permanent reality (Kübler-Ross & Kessler, 2014). This concept is supported by research, which has shown that there are two key factors in the grieving process,

"relearning the world" and "adaptation" (Furnes & Dysvik, 2010). People can begin to live again, but they cannot do so until they have given grief its time.

A Closer Look

What is the sequential process of the stages of grief?

Individuals tend to go in one stage and out of another and then may be back to a former stage. They do not enter and leave each individual stage in a linear fashion.



They are a part of the framework that makes up our learning to live with loss. It has been criticized by others because it seemingly follows a sequential process, or it is believed the stages last only weeks or months. People forget that the stages are responses to feelings that can last for minutes or hours. Individuals tend to go in one stage and out of another and then may be back to the former stage. They do not enter and linearly leave each stage. This more accurately describes the experience of patients with a chronic illness, such as persistent pain (Kübler-Ross & Kessler, 2014).

What can Providers Do to Help?

Past research has shown that loss and grief related to chronic pain may be less obvious to health care workers working in pain clinics

(Lindgren, 2000). This may be because grief resembles chronic pain (Minsky, 1999). Frontline practitioners should start (Hart, 2012) by:

- **Acknowledging the losses**--The primary step in helping patients is to talk with them about their losses. Talking about these losses may help explain the patient's circumstances. However, often providers are unsure how to speak to their patients about their loss. Providers must address their anxieties about loss first. This way, they will be in a much stronger position to respond well to their patient, the person most directly affected. If providers avoid their patients' grief because they don't know what to say, this avoidance serves only the provider's needs. Remember that the isolation the patient feels is almost as painful as the shock and the sadness of the loss itself. It's ok for providers to admit that they don't know what to say. Often, the best thing to say is "I'm so sorry you're going through this. I just wanted you to know I care and am here with you." As part of their in-depth interviews, patients should be invited to "tell their story" (Walker, Sofaer, & Holloway, 2006). Providers need to listen to their story without interrupting. They can sit with their patients, side by side, so they don't feel quite so alone. That requires only intention, a willingness to feel awkward, and an open heart (Carroll, 2016).
- **Assessing their needs**-- The various types of grief often follow loss or change. Frequently, people are somewhere along the continuum of grief, which starts with normal sadness and moves into normal grief. If grief persists beyond 6-12 months and is associated with other cognitive, emotional, and behavioral symptoms, then it is considered complicated grief. Complications are evident when the manifestations of grief are absent, are of extreme intensity, are prolonged, develop into a prolonged major depression, or become distorted in some

manner (Brown & Stoudemire, 1983). Thus, complicated grief can lead to major depression. The new Diagnostic and Statistical Manual of Mental Disorders (DSM-5) abolished the bereavement exclusion applied to depressive symptoms lasting less than two months (American Psychiatric Association, 2013). The exclusion was omitted for several reasons, including to remove the implication that bereavement typically lasts only two months, to recognize it as a severe psychosocial stressor that can precipitate a major depressive episode, to underscore its genetic influence, and to note that it responds to the same psychosocial and medication treatments as non-bereavement-related depression (American Psychiatric Association, 2013). It has been noted that depressive symptoms are common following bereavement, with as many as 45% of patients meeting the criteria within the first year of the loss (Brown & Stoudemire, 1983). The provider should also watch for a resurgence of symptoms during anniversaries and holidays.

- **Connecting them with resources**--Frontline practitioners should inquire about a patient's support system and suggest ways to build that support, such as with friends, family, a support group, a spiritual leader, or in a psychotherapeutic setting (Hart, 2012). Support groups give people who are grieving another opportunity for empathy, a sense that they are not alone, and an opportunity for learning new insights and coping skills (Dysvik & Furnes, 2010). The American Chronic Pain Association (ACPA) offers a wonderful opportunity for patients with chronic pain to connect with a support group in their area, or they will help the patient develop a group (American Chronic Pain Association, 2019). The goal of an ACPA group is to provide support, validation, and education in basic pain management and life skills. Inquiring about a patient's spiritual beliefs can help providers identify the role such principles play in their lives, whether it be religion, nature, art, or traditional healers. In terms of psychotherapy, the goal of grief treatment should be to learn to live with the loss related to their pain (Harvey, 2002).

A Quick Exercise

It's a warm summer day and you have worked hard and played hard all day long. You're feeling good about yourself and about life. You head home and decide to take a shower before heading off to bed. As you are drying yourself off after your shower, you hear a pop in your back and you try to stand…it's painful. The fear about this pain begins to affect other areas of your life; you feel anxious and worried. The process has begun – it's time for you to give away something in your life. **Scratch off one thing off your list.**

For the next several months you worry and then you find yourself in the doctor's waiting room. You feel nervous – your senses are heightened. You notice everything in the room. You tell yourself that you're making a big deal about nothing. Your heart is beating faster now as the doctor takes a history and you try to second-guess why he is asking all of those questions. He starts you on a medication that has the potential to cause addiction. After the exam, you get into your car and drive the few miles home. It's time to take the medication he prescribed…which makes you feel tired and drowsy. Your family is helpful – too helpful as a matter of fact. You think a lot about "What if this pain does not go away?" Time is dragging on slowly. **Scratch off two things off your list.**

It's been six months and you have yet another monthly appointment to meet with the prescribing doctor again to refill your medications. You notice the pain is still there but you are able to function with the medications he has prescribed. The doctor is cautious about continuing to prescribe the opioid medication and tells you "you'll need to start physical therapy." Fear strikes you deeper this time and you worry about whether the doctor is going to stop prescribing the opioid medication. **Scratch off one thing off your list.**

As you go to psychotherapy appointment, your heart begins to beat faster and your legs feel like rubber. The therapist sits in a chair next to you and the words you have dreaded to hear are finally spoken: "You pain is chronic and is something you will need to continue managing." You can't remember all that the therapist says in the next few minutes, but the words "exercise," "nonopioid medications," and "surgery" stand out. **Scratch off one thing off your list.**

You decide to have the surgery the neurosurgeon offered you after a year in pain. The surgery goes well (or so the doctor said) and he prescribes a mixture of opioid medications and physical therapy as a proper course of action. You have a leave of absence from your work responsibilities and the doctor won't be more specific about recovery time. Money is a problem, but it's a stress you hardly have time to think about what with appointments, medications and adjusting to having good days and bad days. Things are different now, and it's hard to realize that so much of your life has changed in just a few short weeks. Your life seems to be slipping away. **Scratch off two things off your list.**

Several months pass and you know somehow, deep inside, that you're not getting any better – one clue was that the surgeon discharged you from their clinic today and will not continue prescribing the opioid medications. You are confined to bed most of the time; the yard outside is full of weeds and the early signs of winter are coming on. Your family and friends come around less often. **Scratch off one thing off your list.**

Sometimes you awake at night wondering if you are dead or still alive after all. Life has lost much of its meaning. Life seems to be spinning out of your control. **Scratch off one thing off your list.**

Learning coping skills to manage the pain can help rebuild self-esteem and relationships. Acceptance & Commitment Therapy (ACT) can help patients find a way to live a fuller life despite their pain. ACT is one of the more actively researched approaches amongst the third wave of developing psychotherapies (Hayes, Strosahl, & Wilson, 1999). It is a style of therapy with a lot of flexibility, and the therapeutic process is more experiential than didactic. What sets it apart from other psychotherapies is that it is a form of clinical behavior analysis that uses acceptance and mindfulness strategies mixed with commitment and behavior-change strategies to increase psychological flexibility. Cognitive-Behavioral Therapy (CBT) can help with restructuring negative thoughts and unhealthy behaviors to become more adaptive. CBT for pain is based upon the cognitive-behavioral model, which is grounded on the notion that pain is a complex experience that is influenced by its underlying pathophysiology and the individual's cognitions, affect, and behavior (Turk, Meichenbaum, & Genest, 1983). CBT is a structured, time-limited, present-focused approach to psychotherapy that helps patients engage in an active coping process aimed at changing maladaptive thoughts and behaviors that can serve to maintain and exacerbate the experience of chronic pain. Past research has shown that grief therapy has been effective in reducing pain and depression, usage of psychotropic medications, and visits to psychological health care providers (Reed, 1999). Frontline practitioners may also want to consider complementary and integrative health (CIH) approaches. Various CIH therapies may help ease a patient's transition through grief (Hart, 2012). Movement programs, such as yoga and massage, can help ease stress and promote relaxation. Recreational activities, such as art and music, can help a patient transform feelings and emotions related to their losses (Hart, 2009; Hart, 2010).

Grief is a multifaceted response to loss that may occur when someone suffers from chronic pain. Past research has shown that individuals who suffer from chronic pain experience physical, cognitive, behavioral, social, and philosophical losses. The role for frontline practitioners is to then address their patients' grief at each of these dimensions by acknowledging the losses, assessing their needs, and connecting them with resources.

Fear-Avoidance & Pain Catastrophizing

Psychosocial factors have become increasingly recognized as important moderators and determinants of the pain experience (Quartana, Campbell, & Edwards, 2009). Several variables tap into a negative pain schema, including pain anxiety, pain helplessness, and fear of pain. These variables share significant variance with broader negative affect constructs, such as depression and anxiety (Hirsch, George, Riley, & Robinson, 2005). Fear is the emotional reaction to a specific, identifiable, and immediate threat, such as an injury (Rachman, 1998). Fear may protect an individual from imminent danger as it prompts the defensive behavior that is associated with the fight-or-flight response (Cannon, 1929). Fear can lead to the avoidance of activities that people with chronic pain associate with the occurrence or exacerbation of pain. Confrontation and avoidance are the two extreme responses to this fear, of which the former leads to the reduction of fear over time. Whereas avoidance can be adaptive in the acute phase, the use of continued avoidance during the chronic phase can lead to distress, disability, increased absenteeism, and health care utilization.

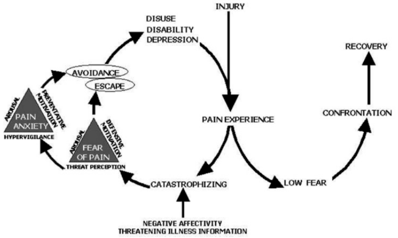
What is the Fear-Avoidance Model?

The fear-avoidance model describes how individuals develop chronic, musculoskeletal pain because of avoidant behavior based on fear (Lethem, Slade, Troup, & Bentley, 1983). The fear-avoidance model states that negative appraisals about pain and its consequences, including catastrophic thoughts, can result in feelings of pain-related fear, avoidance of daily activities, and hypervigilance or over-monitoring of bodily sensations (see below) (Leeuw et al., 2007).

A Closer Look

What is the Fear Avoidance Model?

The fear-avoidance model describes how individuals develop chronic, musculoskeletal pain as a result of avoidant behavior based on fear.



As a result of this misinterpretation, the individual repeatedly avoids pain-inducing activity and will likely overestimate any future pain from such activity. In turn, the avoidance response ultimately results in physical deconditioning, depression, disability from work, inability to participate in recreation, and incapacity for family activities (Vlaeyen & Linton, 2000). This perpetuates the pain experience as opposed to moving towards recovery. Once avoidant behavior is no longer reinforced, the individual exits the positive feedback loop (Pincus, Smeets, Simmonds, & Sullivan, 2010). In contrast, if an individual continues their independence without negatively thinking about pain, then this response style will lead them to accept that they have pain which ultimately moves towards a faster recovery.

There is clear evidence that fear-avoidance is closely related to increased pain, physical disability, and long-term sick leave in chronic pain patients (Gatchel et al., 2007). However, even after two decades of cross-examination, there is still considerable debate about the model among researchers (Rose, Klenerman, Atchison, & Slade, 1992). A question remains-- if fear drives disability, then could severe disabling pain make one fearful? It is the classic chicken and egg problem to determine the direction of causation between fear and disability due to pain. In addition, the fear-avoidance model may be simplistic for every situation involving fear, discomfort, and chronic pain (Nicholas, Linton, Watson, & Main, 2011). However, the model is generally acknowledged for diagnosing and understanding how humans positively and negatively react to fear (Crombez et al., 2012).

A Word About Catastrophic Thinking

Negative appraisals about pain can lead to catastrophic thinking, which, as a result, contribute to feelings of pain-related fear. Past research has focused on an array of coping responses, among them ignoring sensations, diverting attention, and catastrophic thinking. Of these, the greatest attention has been directed at catastrophic thinking (Malmstrom & Tait, 2010). Catastrophic thinking is defined as "an exaggerated negative mental set brought to bear during actual or anticipated pain experiences (Sullivan et al., 2001)." It has been further defined using a three-factor construct that has been replicated in several studies (Osman et al, 1997; Van Damme, Crombez, & Eccleston, 2002). The three-factor construct (Quartana, Campbell, & Edwards, 2009) includes:

- **Rumination**–A relative inability to inhibit pain-related thoughts in anticipation of, during, or following a painful encounter. (e.g. "I can't stop thinking about how much it hurts.")

- **Magnification**–The tendency to magnify the threat value of the pain stimulus. (e.g. "I'm afraid that something serious might happen.")
- **Helplessness**–To feel helpless in the context of pain. (e.g. "There is nothing I can do to reduce the intensity of the pain.")

Current conceptualizations of catastrophic thinking most often describe it in terms of appraisal or a set of maladaptive beliefs (Gatchel, 2017). Maladaptive thinking falls into four broad categories, with many individual variations within each (Tagg, 1996). Those four categories are:

- **Overgeneralization**–Taking isolated cases and using them to make wide generalizations. (e.g., thinking that if one treatment for pain does not help, then none of the treatment options will help.)
- **Mental filter**–Focusing almost exclusively on certain, usually negative or upsetting, aspects of an event while ignoring other positive aspects. One of the specific subtypes is catastrophic thinking. (e.g., Focusing on how rude a doctor has been and ignoring how well you felt after treatment or the kindness of all the other staff.)
- **Jumping to conclusions**–Drawing conclusions (usually negative) from little (if any) evidence. Two specific subtypes are mind-reading and fortune-telling. (e.g., Believing that the doctor thinks you are lying because he/she is asking you more questions or expecting the doctor will not listen to you, so you don't speak much about your illness.)
- **Emotional reasoning**–Making decisions and arguments based on intuitions or personal feelings rather than an objective rationale and evidence. (e.g., Feeling like your doctor