An Exploration of The Relationship Between Physical Therapists’ Psychological Characteristics and Feedback Methods

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Providing treatment interventions to clients with chronic pain is a complex task for any professional. Research suggests that clients with chronic pain experience declines in physical, emotional, and psychological quality of life. Client’s that have chronic pain have complex effects from dealing with this condition in their lives. Hashmi and colleagues found that clients with chronic pain (i.e., pain lasting > three months) process pain through the emotional and reward circuitry in the brain. The literature base provides evidence that clients with chronic pain who receive psychologically based interventions along with physical rehabilitation have better outcomes than individuals with chronic pain who receive only physical rehabilitation. Therefore, it is necessary to examine how to train physical therapy providers to effectively incorporate ACT into their treatment sessions. The study involved 33 of the participants completing the online ACT workshop through three different feedback methods (control, peer, and expert) to assess knowledge, psychological flexibility, self-compassion, and fidelity. Results from this small sample did have increased knowledge and fidelity of ACT principles via an online workshop. The peer group had the highest median change score in knowledge compared to expert and control, which was found to be significant. There were no statistically significant differences between feedback groups within the constructs of self-compassion and psychological flexibility. Feedback and fidelity were found to have a significant association with each other.
NORTHERN ILLINOIS UNIVERSITY
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MAY 2023

AN EXPLORATION OF THE RELATIONSHIP BETWEEN PHYSICAL THERAPISTS’
PSYCHOLOGICAL CHARACTERISTICS AND FEEDBACK METHODS

BY

DUSTIN COX
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE
DOCTOR OF PHILOSOPHY

SCHOOL OF INTERDISCIPLINARY HEALTH PROFESSIONS

Doctoral Director:
Daniel Boutin
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CHAPTER 1: INTRODUCTION

Clients with chronic pain routinely seek medical care for their condition, making it one of the most expensive chronic diseases in the United States because chronic pain impacts a wide range of daily activities and life domains (Institute of Medicine Committee on Advancing Pain Research, Care, and Education, 2011). Research suggests that clients with chronic pain experience declines in physical, emotional, and psychological quality of life (QOL; Majlesi, 2019; Nakagawa et al., 2017; Rapti et al., 2019). Kawai and colleagues (2017) demonstrated that clients with chronic pain, especially clients who experience chronic pain at multiple sites or who experience neuropathic pain, have poorer mental health, impaired physical abilities, work-related deficits, and lower overall QOL compared to clients who do not experience chronic pain. Because many aspects of human functioning are affected by pain, practitioners must take a dynamic and multifaceted approach to pain management during patient care.

Medical practitioners experience challenges in providing chronic pain treatment to individuals with chronic pain. One challenge has been the use of prescription opioids as a primary method of treatment for individuals who have chronic pain. Pharmacological approaches have limited efficacy and bring risk (Els et al., 2017). In 2017, there was an average of 58.7 opioid prescriptions per 100 people in the United States, but fewer than 10% of opioid-dependent clients received effective treatment for chronic pain (Centers for Disease Control and Prevention [CDC], 2018; World Health Organization [WHO], 2018). Since the mid-1990s, an opioid crisis
has developed in the United States, and it stems from several compounding factors. In 1995, Dr. James Campbell, a leading physician in pain management, addressed the American Pain Society and urged the profession to consider pain as the fifth vital sign after body temperature, pulse rate, respiration rate, and blood pressure (Morone & Weiner, 2013). When the medical community implemented this recommendation, healthcare practitioners’ focus on the client’s pain level increased (Van Zee, 2009). Purdue Pharma used high-pressure sales tactics and misleading or false data to encourage doctors to prescribe OxyContin. Some studies demonstrated dangerous negative outcomes for OxyContin that were not shared with doctors. Between 1996 and 2001, Purdue Pharma regularly provided all-expenses-paid continuing education seminars to doctors who were identified as high prescribers of opioids (Van Zee, 2009). The continuing education sessions focused on teaching doctors that OxyContin was both safe and effective in the treatment of pain (Van Zee, 2009). These factors helped contribute to the current opioid crisis in the United States (Morone & Weiner, 2013; Van Zee, 2009).

Physical therapy providers traditionally treat individuals with chronic pain using a biomechanical approach. Physical therapy focuses on treating the site of injury and correcting routine biomechanics (O’Sullivan, 2012). Physical therapy providers use a variety of treatment interventions including exercise, stretching, and skilled hands-on techniques called manual therapy to treat chronic pain; however, researchers have found limited empirical support for these treatment interventions. For example, Miyamoto and colleagues (2013) examined whether participation in Pilates improved chronic lower back pain and found minimal improvements in pain level and functional status. Geneen and colleagues (2017) completed a Cochrane review and classified the use of exercise as an intervention for reducing pain and increasing physical
functioning as “low quality.” This classification from the literature base informs practitioners that the outcomes related to the intervention of exercise for chronic pain is not the strongest evidence. Exercise should not be used as a primary treatment intervention for chronic pain but could be used to address other important health-related outcomes in conjunction with evidence-based treatment for pain. Physical therapy should not be used as a pain reduction intervention until evidence is stronger. Unfortunately, the body of research reviewed by Geneen and colleagues (2017) was limited by studies with small sample sizes, and small sample sizes lead to concerns about the impact of low power. These concerns make it difficult to scientifically evaluate exercise as an intervention. A systematic review of physical therapy literature was conducted by Namnaqani and colleagues (2019). They examined manual therapy approaches for chronic lower back pain treatment and found improvements in physical functioning post-treatment, but results were not maintained after one year (Namnaqani et al., 2019). Neither exercise nor manual therapy alone is sufficient for increasing physical function in clients with chronic pain.

Pain is processed through many pathways in the brain (Hashmi et al., 2013). In a groundbreaking study, Hashmi and colleagues (2013) examined how the brain processes acute and chronic pain in neurocircuitry processing. A cohort of clients with acute back pain received four fMRIs over a one-year period. Clients with acute pain showed neurons firing in the typical acute pain sequence of input through the midbrain to the somatosensory cortex for processing. Among clients who transitioned from acute pain (i.e., pain lasting < three months) to chronic pain (i.e., pain lasting > three months), a different pathway was activated from the amygdala, prefrontal cortex, and hippocampus that indicates an activation of the emotional and reward
circuitry (Hashmi et al., 2013). Understanding that chronic pain is processed within the emotional and reward pathways of the brain may provide insight into creating effective strategies for client-centered approaches to chronic pain treatment. Treatment should address physical, emotional, psychological, and QOL aspects of chronic pain (Hamood et al., 2018; Husky et al., 2018; Nakagawa et al., 2017).

Chronic pain treatment requires a variety of approaches. Third-wave therapies developed by psychologists incorporate behavioral, mindfulness, and cognitive strategies. Third-wave therapies have evolved from first- and second-wave therapies that focused on the role of maladaptive patterns that involved emotions and behaviors (Hayes & Hofmann, 2017). Specifically, Acceptance and Commitment Therapy (ACT) focuses more on a person’s relationship with emotion and behavior than on the role of the maladaptive pattern (Hayes & Hofmann, 2017). Third-wave therapies such as ACT have been the focus of pain research during the last decade, and ACT has emerged as a strong, evidence-based treatment intervention for chronic pain (McCracken & Gutierrez-Martinez, 2011; Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016). Researchers have examined how ACT is related to psychological and physical task performance among clients with chronic pain, and results from the studies show that ACT effectively decreases anxiety, depression, and physical task disability in clients with chronic pain (McCracken & Gutierrez-Martinez, 2011; Prochaska & Norcross, 2014). Three systematic reviews have been carried out examining how clients with chronic pain respond to ACT interventions. The most recent systematic review examined 11 randomized controlled trials and found ACT to be superior to wait-list clients and/or standard practice of care (Feliu-Soler et al., 2018). Unfortunately, psychological staff were the professionals that were being studied to
deliver ACT to clients with chronic pain and none of the studies in the systematic review included a physical therapist (Feliu-Soler et al., 2018).

ACT uses a dynamic approach that includes social, verbal, emotional, and behavioral strategies to help clients work through the chronic pain and how it affects QOL (Feliu-Soler et al., 2018). ACT focuses on improving psychological flexibility in clients with chronic pain. Psychological flexibility is developed through six processes including acceptance, cognitive defusion, contact with the present moment, perception of self as context, values formulation, and committed actions (Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016). Clients with chronic pain are encouraged to understand and accept that they can still live a fulfilling life while dealing with chronic pain (Prochaska & Norcross, 2014; Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016). Vowles, Sowden, and Ashworth (2014) examined how well ACT addressed the six processes of developing flexibility, and the research suggests that ACT improves physical function, depression, and anxiety in clients with chronic pain. Physical therapy can incorporate third-wave therapies into their sessions.

There are similar current therapies that have been developed in the field of physical therapy to help treat pain, but they have not been extensively researched. Classification-based cognitive therapy was developed by O’Sullivan and colleagues (2015) and includes education on both body mechanics and the neurological component of pain. Fersum and colleagues (2013) compared classification-based cognitive therapy to traditional manual therapy for low back and exercise for chronic pain and found classification-based cognitive therapy provided significantly improved functional outcomes compared to traditional therapy. O’Sullivan and colleagues (2015) compared classification-based cognitive therapy to manual therapy (e.g., proper
ergonomic movements and activity tolerance training) for clients with chronic lower back pain. They demonstrated that classification-based cognitive therapy had significantly improved functional outcomes compared to traditional therapy. Classification-based cognitive therapy outcomes are positive, but this intervention has very few studies investigating the outcomes of this approach. Classification-based cognitive therapies evidence is also limited on how long the outcomes last for clients who receive this type of treatment intervention.

Acceptance and Commitment Therapy is an evidence-based and flexible intervention for use in healthcare settings. It may be a particularly attractive alternative to traditional psychology-based interventions because outcomes from ACT interventions can be delivered across multiple formats and in a cost effective manner. The ACT intervention is considered cost-effective because the cost to deliver ACT to the patient while evaluating the client’s chronic pain outcomes is cheaper than other forms of chronic pain management (Feliu-Soler et al., 2018). The implementation of ACT has traditionally been in face-to-face sessions. Client outcomes from receiving ACT interventions from an online platform has been explored. The delivery of online ACT has had positive outcomes in several different studies for clients with chronic pain (Herbert et al., 2017; Scott et al., 2018; Simister et al., 2018). Some results from the studies show that face-to-face sessions are sometimes superior to online sessions (Herbert et al., 2017). Though online ACT is not always superior to face-to-face sessions, online ACT is more effective at improving psychological and physical functioning outcomes compared to traditional medical treatment (Simister et al., 2018). Specifically, the early stages of the literature base appear to be promising that ACT can be effectively delivered either face-to-face or in online formats.
One major difference in theoretical principles for ACT compared to traditional Cognitive Behavioral Therapy (CBT) is the way in which clients with chronic pain relate to dealing with chronic pain in their daily lives. According to traditional CBT, the primary goal involves teaching clients with chronic pain to suppress negative thoughts and pain during the course of daily life (Hayes & Hofmann, 2017). In contrast, the primary goal of ACT involves teaching clients to live with chronic pain during the course of daily life while accepting that the chronic pain will always exist (Feliu-Soler, 2018). Additionally, ACT encourages clients to practice psychological flexibility in their daily lives. Psychological flexibility can help clients with chronic pain navigate how to live their lives while experiencing the condition for prolonged periods and have a history of experiencing multiple failed treatments (Feliu-Soler et al., 2018). This contrasts with traditional CBT which encourages clients to avoid having negative thoughts and experiences with chronic pain (Davis et al., 2015). ACT uses a dynamic and flexible approach in therapeutic delivery, which is an essential component of healthcare delivery in the 21st century.

Practitioners who use ACT can address clients’ social, emotional, and physical needs during treatment sessions. McCracken and Gutierrez-Martinez (2011) examined client emotional, social, and physical functioning during the course of ACT delivery in interdisciplinary teams, and ACT delivery was associated with significant improvements in several areas of social and physical functioning (e.g., depression, pain-related anxiety, physical and psychosocial disability). Other researchers have published outcomes related to increased QOL, increased daily functioning, decreased anxiety, and decreased depression when abbreviated ACT treatment sessions have been delivered to clients with chronic pain in
interdisciplinary teams (McCracken & Gutierrez-Martinez, 2011; Veehof, Trompeter, Bohlmeijer, & Schreurs, 2016; Vowles, Sowden, & Ashworth, 2014). Overall, research supports ACT as a strong, evidence-based approach in the treatment of clients with chronic pain.

A consideration that needs to be evaluated is the psychological flexibility of the physical therapist, which can interfere with the effectiveness of ACT being used in the clinic (Luoma & Vilardaga, 2013). Practitioners who were unable to demonstrate psychological flexibility themselves were unable to deliver effective delivery of ACT (Luoma & Vilardaga, 2013). Physical therapists using ACT interventions in their sessions need to develop psychological flexibility to effectively deliver ACT to their clients.

**Purpose of the Study**

Clients with chronic pain have positive outcomes when treated with ACT interventions, and physical therapy providers frequently treat clients with chronic pain. Therefore, it was necessary to examine how to train physical therapy providers to effectively incorporate ACT into their treatment sessions. A group of researchers in London examined an ACT educational intervention when it was incorporated into physiotherapy sessions for chronic lower back pain (Godfrey et al., 2019). The researchers required physical therapists to complete a two-day workshop on ACT principles, which included fidelity check-ups and daily diaries. Therapists who completed the workshop had an 88% adherence to ACT intervention but did have low rate of fidelity at 41% (Godfrey et al., 2019). Additionally, two studies showed that continuing education delivery in a blended format can be effective (Ilic et al., 2015; Nofal et al., 2018). Ilic and colleagues’ (2015) study revealed that the blended learning techniques with preselected readings and quizzes did not lead to better knowledge acquisition, but students’ attitudes toward
the content being presented improved. Results from Nofal and colleagues (2018) indicated that online quizzes helped to reinforce learning when paired with other access to online resources and lectures. The study utilized a blended format to introduce ACT principles to physical therapists for use in treatment interventions. The format incorporated a continuing education workshop which included both seated didactic work and online work.

**Significance of the Problem**

The current estimation is that 11% to 40% of the United States population experiences chronic pain. The United States pays $560 billion per year for the costs associated with chronic pain (Dahlhamer et al., 2018). Husky (2018) notes that approximately 75% to 93% of the cost of back pain is from indirect costs such as decreased productivity, missed days of work, and decreased functional abilities. The data suggests that chronic pain is one of the top health conditions in the United States.

A recent Cochrane review demonstrated that individuals with chronic pain who receive psychologically based interventions along with physical rehabilitation have better outcomes than individuals with chronic pain who receive only physical rehabilitation (Kamper et al., 2015). Several physical therapy researchers have been calling for physical therapy providers to incorporate psychology-based approaches into their chronic pain interventions since 2011 (Driver et al., 2017; Main & George, 2011; O’Sullivan, 2012). Though many physical therapy providers understand the impact of chronic pain and the need to incorporate psychology-based interventions, there remains little evidence as to which psychology-based treatment approaches would be best or how to properly educate physical therapy providers about these approaches.
(Driver et al., 2017; Main & George, 2011). Further investigation allows for a more complete and holistic approach to client-centered treatment for clients with chronic pain.

**Need for the Investigation**

Currently, no peer-reviewed studies of seated, blended, or online workshops introducing ACT principles to the sole audience of physical therapy providers have been completed in the United States. Coronado and colleagues (2020) noted that only one study in their systematic review of randomized controlled trials involved physical therapy providers learning to use ACT. That study was completed by Godfrey et al. (2019) in the United Kingdom and included eight physical therapists. The Association for Contextual and Behavioral Sciences (ACBS), the international professional organization for ACT, does have a special interest group for physiotherapists (ACBS, 2022). Though the special interest group exists, and the professional association recognized physiotherapists as a professional group, a literature review does not result in any peer-reviewed articles including ACT and United States physical therapists. There is one physical therapist who provides online training in ACT principles for other physical therapists in the United States, but he has not published any outcomes in a peer-reviewed journal (Integrative Pain Science Institute, 2022). Research is needed to understand how physical therapists in the United States can be effectively trained in ACT and apply that training to the United States healthcare system.

**Research Questions**

The current investigation focused on how physical therapists’ traits and feedback methods affect the delivery of ACT to clients with chronic pain. According to previous research, individuals delivering ACT must be psychologically flexible to effectively deliver ACT (Luoma...
Currently the study of psychological flexibility has been completed on psychologists using ACT and no published data is known on the psychological flexibility of physical therapists. To investigate this principle the first research question was: Does feedback change the knowledge, psychological flexibility, and self-compassion of physical therapists learning about ACT during an online workshop? This study investigated whether feedback during the didactic session was associated with the greatest fidelity to ACT principles when working with clients with chronic pain. Understanding the effects of the educational delivery method allowed investigators to better plan the educational delivery of ACT to other physical therapy providers. Therefore, the second research question was: Does feedback affect the fidelity of physical therapists providing ACT to clients?

**Limitations**

There are several limitations to the current research investigation. The research design of this study was the first, or at least one of the first, to investigate whether different feedback methods for learning ACT principles impacted the physical therapy providers’ traits related to ACT. Therefore, the design of the ACT workshop and feedback methods were based on research from different topics and directly related to previous ACT research. The online platform that hosted the ACT workshop was not as interactive or visually pleasing as a professional company for continuing education workshops would have provided and therefore might have interfered with participants’ perceptions of the ACT workshop. The research study had an experimental design but lacked population randomization due to limited budget and staffing. These were limitations of the research project; however, the research project does move the literature base forward on understanding the importance of feedback in learning ACT.
Definition of Terms

The following definitions are helpful to understand key concepts in the review of literature.

Cognitive-Based Therapy

Cognitive-based therapy is an approach that combines behavioral therapy with cognitive therapy. The first wave of therapy was developed to understand the relationship between the stimulus and the behavior. Second-wave therapy was developed to understand how the client’s cognitive thoughts affect the stimulus and the behavior. Third-wave therapy was developed to account for the fact that the patient is consciously aware of all their cognitive thoughts and to encourage them to accept their emotions, preferably without acting on them (Hayes, 2016).

Modalities

Modalities are therapeutic tools that physical therapy providers use to reduce client pain. Therapeutic interventions are normally delivered through electrical machines that apply electricity, ultrasound, or medication to help decrease pain during a therapy session (O’Sullivan, Schmitz, & Fulk, 2019).

Manual Therapy

Physical therapy providers use manual therapy when they apply manual force to the patient to help correct improper body mechanics at the target joints (Namnaqani et al., 2019).

Third-Wave Therapies

Third-wave therapies include ACT. The goal is to allow the patient to be aware of their cognitive thoughts. Clients are encouraged to make decisions based on their values and to remain
committed to actions that align with their values. The client is encouraged to be aware of their emotions but always remain constantly present in the moment (Hayes, 2016).

**Conclusion to Introduction**

Treatment approaches to chronic pain in the United States need to change because of the current opioid crisis and the growing number of clients who have chronic pain. Practitioners of physical therapy are beginning to recognize that a more holistic approach is needed because cognitive implications are a major factor in the treatment of chronic pain (Driver et al., 2017; Main & George, 2011; O’Sullivan, 2012). In the past, cognitive-based therapies, such as ACT, have largely focused on effectiveness in treating chronic pain, and these therapies have been effective at posttest measures and follow-up (Feliu-Soler et al., 2018). Currently, there is little evidence available to allow the physical therapy community to effectively train physical therapy providers in ACT principles (Godfrey et al., 2019). Research needs to focus on an effective educational delivery model to train physical therapy providers in ACT principles.
CHAPTEER 2: REVIEW OF THE LITERATURE

To complete an investigation into physical therapy treating chronic pain from a cognitive behavioral approach it is important to understand the history and factors of chronic pain. The history and factors of chronic pain affect how physical therapy providers navigate chronic pain and can help researchers develop future studies to improve the outcomes of clients with chronic pain who use physical therapy.

Types of Chronic Pain

Chronic pain is identified as pain that lasts more than three months and persists outside of normal tissue healing (Treede et al., 2015). Pain is classified into two overarching categories, nociceptive or non-nociceptive pain (Lundy-Ekman, 2018). Nociceptive pain occurs when tissues have been damaged, and nociceptive signals are sent to the central nervous system (CNS) to alert the body of tissue damage (Lundy-Ekman, 2018). The body should begin and complete the healing process within three months (Treede et al., 2015). An individual with nociceptive pain longer than three months may be diagnosed with chronic pain (Treede et al., 2015). The client with chronic pain will be assessed and placed within one of the three categories of non-nociceptive chronic pain based on the clinical presentation.

Non-nociceptive pain occurs when the CNS detects pain in the absence of tissue damage. The three subcategories of this type of pain include neuropathic pain, central sensitivity
syndromes, and pain syndromes (Appendix A; Lundy-Ekman, 2018). Neuropathic pain is caused by damage to the somatosensory system by a lesion or disease. The CNS component of the somatosensory system allows for humans to have a nonconscious awareness of their surroundings by providing continuous information about sharp or dull pain, temperature, crude touch, and proprioception (Lundy-Ekman, 2018). The integration of all somatosensory input allows humans to make accurate and correction interpretations of the environment in which they are interacting (Lundy-Ekman, 2018). Central sensitivity syndromes involve a dysregulation of the CNS. The CNS signals pain from the cerebrum down to the peripheral nervous system (Lundy-Ekman, 2018). Examples of central sensitivity syndromes are fibromyalgia and chronic migraines. Individuals with these illnesses are usually more reactive to all types of sensory input (e.g., light touch and temperature; Lundy-Ekman, 2018). Finally, pain syndromes are unique because they involve the somatosensory system and additional neurologic systems such as the automatic nervous and motor functioning systems (Lundy-Ekman, 2018). Examples of pain syndromes are complex regional pain syndrome and chronic lower back pain (Lundy-Ekman, 2018).

Approximately 20% of the United States population has chronic pain, which leads to $560 billion per year in costs related to healthcare, lost productivity, and disability services (Dahlhamer et al., 2018). Healthcare workers need to examine clients with chronic pain from a holistic view because the client experiences many barriers that are not directly related to the pain. Clients with chronic pain have many barriers related to the functional impairments related to their psychological and physical functioning as a result of dealing with chronic pain (Husky et al., 2018).
Individuals with neuropathic pain may experience symptoms such as paresthesia and dysesthesia. Paresthesia is an abnormal sensation that does not cause pain. For example, a client may experience a tingling sensation in the left arm when no painful stimulation has been introduced to the arm (Lundy-Ekman, 2018). Dysesthesias are unpleasant sensations that can be produced with or without a stimulus and are usually described as a burning sensation (Lundy-Ekman, 2018). There are two subtypes of dysesthesia, categorized as allodynia and hyperalgesia (Lundy-Ekman, 2018). Allodynia occurs when a normal sensation that a typical person would not perceive as painful is perceived as painful, e.g., putting on a sweater and experiencing a painful sensation on the arms from the sensory input of the cotton on the skin (Lundy-Ekman, 2018). Hyperalgesia is a mild, painful stimulus that is felt as tremendous pain by the individual (Lundy-Ekman, 2018). For example, a person may accidentally poke his or her finger with a staple, and the resulting pain feels like an amputation rather than a mild poke. Neuropathic pain changes the way in which an individual perceives his or her world because of changes in the somatosensory system.

People with central sensitivity syndromes have increased sensitivity to sensory input even though there is no dysfunction in the structural nature of the somatosensory system. For example, clients with fibromyalgia pain may have tenderness and stiffness of muscles and joint pain even though no injury occurred (Lundy-Ekman, 2018). Muscle sensitivity among clients with fibromyalgia contributes to both fatigue and challenges in engaging in daily activities (Tschudi-Madsen et al., 2019). Central sensitivity syndromes greatly affect quality of life for the individuals experiencing this type of chronic pain.
Pain syndromes are complex because they involve many systems within the CNS. Individuals with chronic pain often experience psychological and physical challenges such as anxiety, depression, and dysfunction of the core muscles (Cramer, Johnson, & Nilsen, 2018; Kregel et al., 2018; Yamada et al., 2016). Clients with chronic pain who have anxiety and depression have greater disability and lower QOL scores than clients who report pain only (Bair et al., 2008). The dysfunction of core muscles combined with patient concerns about experiencing re-injury may lead to muscle guarding, improper body mechanics, and continued weakening of core muscles (Lundy-Ekman, 2018). Individuals with chronic pain experience problems with many different body systems and the resulting psychological conditions as they try to function with chronic pain.

Managing Chronic Pain

The management of chronic pain is complex because of the impact on overall functioning. Clients with chronic pain may have difficulty sustaining relationships with family and friends and the ability to work (Breivik et al., 2006). Many clients with chronic pain report a desire to end their pain with death (Breivik et al., 2006). Fortunately, a variety of medicinal, psychology-based, and surgical treatment interventions are available to treat chronic pain. In treating chronic pain medicinally, the order of drug potency from least potency to strongest pain potency includes topical analgesics, nonsteroidal anti-inflammatory drugs, weak opioids, strong opioids, and nerve blocks (Hylands-White, Duarte, & Raphael, 2017). Pain relief from medication use has a reported success rate of 30% for clients with chronic pain (Hylands-White, Duarte, & Raphael, 2017). Surgical methods may be recommended if medications are unsuccessful (Hylands-White, Duarte, & Raphael, 2017). The decision to use surgical
Interventions is tailored to the needs of the patient, but the order from least invasive to most invasive includes an intrathecal drug delivery system, nerve section, deep brain stimulator, and spinal cord stimulator (Hylands-White, Duarte, & Raphael, 2017).

Biopsychosocial interventions for chronic pain involve the use of interdisciplinary teams that develop treatment plans to address the patient’s needs from a holistic perspective (Kusnanto, Agustian, & Hilmanto, 2018). The interdisciplinary team approach is difficult to implement because it requires the healthcare team to use effective communication and collaboration proactively and to successfully implement ideas (Brown et al., 2003; Vermeir et al., 2015). Professionals in several disciplines can assist with biopsychosocial approaches, including physical therapists, occupational therapists, specialized nurses, and psychologists. The two main therapeutic strategies used in biopsychosocial approaches can be categorized into either traditional CBT or ACT. The goal of traditional CBT is to have the patient use mental strategies to eliminate any negative thoughts while working on strategies to improve overall social behaviors (Hylands-White, Duarte, & Raphael, 2017). In contrast, the goal of ACT is to directly deal with negative thoughts by exploring them and how they influence daily struggles (Hylands-White, Duarte, & Raphael, 2017). Interdisciplinary teams work well in using the biopsychological approach to provide interventions such as ACT to clients with chronic pain.

Clients with chronic pain participate in a variety of treatment approaches to ameliorate symptoms. Recent research revealed that two thirds of individuals with chronic pain were taking prescription medication (Breivik et al., 2006). Breivik and colleagues (2006) reported that one third of clients with chronic pain were not being treated for their chronic pain and two thirds were using interventions such as massage and physical therapy for the treatment of chronic pain.
Almost half (46%) of the clients that had chronic pain in that same study reported that it was not being managed appropriately (Breivik et al., 2006). Clients dealing with chronic pain need effective intervention strategies to help manage the condition.

**Physical Therapy**

*History*

Physical therapy traces its origins to Germany when Per Henrik Ling, in 1813, started a clinic for gymnasts that focused on the rehabilitation components of massage, manipulation, and exercise (Shaik & Shemjaz, 2014). The term “physiotherapist” first appeared in Physiatriche Schriften in 1851, and the profession continued to grow through World War I and World War II as the need for services increased (Shaik & Shemjaz, 2014). During the 1950s, physical therapy became a recognized profession, and providers could treat newborn babies through older adults. “Physiotherapy” is the term that is still used outside of the United States, and “physical therapy” is the term used within the United States (Shaik & Shemjaz, 2014). In 2016, the clinical doctorate became the requirement for all practitioners within the United States as the entry-level practicing degree for the profession. Physical therapy practitioners are required to graduate from a Commission on Accreditation in Physical Therapy Education program; programs are typically three years in length and require a bachelor’s degree prior to enrolling (APTA, 2020). As reported by the United States Bureau of Labor Statistics (2020), there were 258,200 physical therapists in 2019 practicing in the United States.

**Physical Therapy Treatment for Chronic Pain**

Physical therapy is helpful when treating a variety of chronic pain conditions such as central neuropathic pain, complex region pain, myofascial pain syndrome, fibromyalgia, cancer-
related pain, and disability-related pain (Lundy-Ekman, 2018). Physical therapy providers are encouraged to conduct a thorough examination to determine which type of chronic pain the client is experiencing. Treatment interventions common to the field of physical therapy include patient education, cognitive-behavioral strategies, self-care strategies, exercise, neuromuscular re-education, manual therapy, assistive devices, and modalities (O’Sullivan, Schmitz, & Fulk, 2019). Chronic pain affects the patient in multiple dimensions including, but not limited to, the physical, psychological, and work-related domains. Therefore, clients experiencing chronic pain might benefit from treatment by an interdisciplinary team of healthcare professionals (Bujak et al., 2020).

Traditionally, physical therapists have treated pain from a standpoint of modalities, manual therapy, and flexibility programs with the goal of reducing pain during the session and increasing client performance (O’Sullivan, Schmitz, and Fulk, 2019). Physical therapists use modalities to help decrease client pain prior to treatment, during the treatment session, or post-treatment to increase the likelihood that clients can receive physical therapy interventions for a longer period of time while experiencing less pain (O’Sullivan, Schmitz, and Fulk, 2019). Physical therapy modalities for treating chronic pain consist of electrical stimulation, transcutaneous electrical nerve stimulation (TENS), ultrasound, phonophoresis, iontophoresis, massage, and dry needling. These modalities can help with treating chronic pain but only have short-term effects (Lundy-Ekman, 2018). After the modality has been removed, clients with chronic pain will experience a return of that pain (Ulger, Demirel, Oz, & Tamer, 2017). Therefore, modalities are used as a preparation activity to complete a therapy session with reduced pain exacerbation rather than a long-term solution to treating chronic pain. Manual
therapy interventions in physical therapy are designed to increase movement and flexibility and reduce the overall stress that can be dispersed by improper movement in joints. Increasing the flexibility of joints, along with proper body mechanics, helps increase a chronic pain client’s overall body movement and reduces overall pain (Ulger, Demirel, Oz, & Tamer, 2017). Though manual therapy and exercise do have a positive effect on lowering a client’s chronic pain level, these interventions do not greatly affect the client’s QOL. (Hidalgo et al., 2017; Ulger, Demirel, Oz, & Tamer, 2017). The approaches that are traditionally used in physical therapy (i.e., therapeutic modalities, manual therapy, and exercise) reduce pain levels in clients with chronic pain but are not a holistic approach to addressing QOL in clients with chronic pain.

Strengthening is another physical therapy intervention used to treat chronic pain. After joints have been mobilized through manual therapy, the physical therapy provider encourages clients to increase core and functional strength to allow the client to complete daily tasks effectively and with proper body mechanics, core strength, and overall extremity strengthening (Mueller & Niederer, 2020; Riley, Swanson, & Dyer, 2019; Schulz et al., 2019). Traditionally, clients with chronic pain were treated with support from the biomechanical approach (O’Sullivan, 2015). However, clients with chronic pain have not experienced significant improvement in performing their preferred functional task when treated using this model (O’Sullivan, 2015). Physical therapy interventions provide many positive benefits to the client, such as improving physical performance, endurance, and strength, but it does not fully address the holistic role or QOL of clients with chronic pain.

The International Association for the Study of Pain (IASP) developed a pain curriculum that has been incorporated into physical therapy educational programs in Australia. The IASP
curriculum has four main domains: the multidimensional nature of pain, pain assessment and measurement, management of pain, and clinical conditions (Hush, Nicholas, & Dean, 2018). When the IASP pain education curriculum was embedded in a three-year physical therapy doctoral program, students learned about treating clients with chronic pain using a biopsychosocial approach (Hush, Nicholas, & Dean, 2018). Students who have gone through the IASP curriculum during professional education have increased knowledge and clinical competence in treating chronic pain when compared to students in a traditional physical therapy educational program (Hush, Nicholas, & Dean, 2018). Producing entry-level clinicians who have developed specific knowledge and treatment interventions for clients who have chronic pain is one step that can help the physical therapy profession be more proactive in treating clients with chronic pain.

Cognitive functional therapy is a cognitive strategy that has been explored by the physical therapy community as a treatment approach for clients who have chronic pain. Cognitive functional therapy is a person-centered intervention; it addresses chronic pain through a functional approach of normalizing provocative posture and movements while using a cognitive strategy to reduce fear-avoidant behaviors (O’Sullivan et al., 2015). Cognitive-based therapy interventions have been shown to decrease pain levels and increase functional ability in daily tasks among clients with nonspecific chronic lower back pain (Fersum et al., 2013; Filho, 2016; Godfrey et al., 2019; O’Sullivan et al., 2015). Several cognitive-based approaches are being researched, and the results are being disseminated for pain treatments as demand for multifaceted approaches increases within the profession (Fersum et al., 2013; Filho, 2016; Godfrey et al., 2019; O’Sullivan et al., 2015).
**Treatment Fidelity**

Treatment fidelity is an important aspect of the effectiveness of evidence-based treatments (Hinckley & Douglas, 2013). Measuring treatment fidelity is essential to ensure that evidence-based practices are being properly implemented by clinicians in the field. Many evidence-based programs have significant positive outcomes during the research period but do not have the same outcomes when they are completed in the field by clinicians (Joa et al., 2020; McHugo et al., 2007). The reduction in effectiveness occurs when the programs are not implemented in the field as they were designed in their research (Joa et al., 2020; McHugo et al., 2007). Clinicians have achieved increased treatment fidelity when investigators asked clinicians to complete intervention fidelity follow-up checks to determine how well a program has been implemented after the initial training (Carroll et al., 2007; Taniguchi et al., 2019). Clinicians who were able to complete treatment interventions with increased fidelity had better outcomes in their programs in comparison to control groups who did not have fidelity follow-up measures in place (Carroll et al., 2007; Joa et al., 2020; Taniguchi et al., 2019). Increasing the fidelity of a treatment program allows for evidence-based practice to be carried out effectively in the field.

Evidenced-based practice is an important feature in providing clients with appropriate and sound treatment. The process of using evidenced-based practice involves clinicians using interventions that have been proven effective through clinical research (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006). Using evidenced-based practice is an important component for clinicians in healthcare settings. Incorporating evidenced-based practice in the clinic has been studied to help providers understand the best ways to implement new practices quickly and effectively in the clinic (American Psychological
Association Presidential Task Force on Evidence-Based Practice, 2006). There are three options when adopting new evidenced-based practice: auditing with feedback, performance gap assessments, and practicing the new intervention (Titler, 2008). Auditing with feedback involves a process of using performance indicators to assess how well interventions used by practitioners are addressing the client’s needs (Titler, 2008). Performance gap assessments are used at the beginning of implementing a new evidenced-base strategy to help assess clinicians on their performance and areas for improvement (Titler, 2008). Practicing the new interventions is completed with little to no follow-up from trained staff to see how the clinicians are using the new intervention in the clinic (Titler, 2008). Auditing with feedback and performance gap assessments have been found to be superior to practicing the new intervention (Grimshaw et al., 2006; Ivers et al., 2012). Performance gap assessments work well when the goal is to understand how often a new evidence-based practice is completed in the clinic (Titler, 2008). Audits with feedback are necessary for direct feedback about how the interventions are being applied by the clinician (Titler, 2008), and it has been shown to improve the performance of providers using evidenced-based practice in the clinic (Roos-Blom et al., 2019; Vratsistas-Curto, McCluskey, & Schurr, 2017). Providing clinicians with feedback is an effective way to increase provider performance using evidence-based practice.

Treatment fidelity allows clinicians to understand areas of weakness so that clinicians can provide the highest quality of evidence-based services to their clients (Joa et al., 2020). Carroll and colleagues (2007) identified an effective approach to evaluate programs for fidelity by examining the depth of program policy strategies to facilitate program deployment, quality of delivery, participant responsiveness, and adherence to intervention. Clients who received
interventions with low fidelity experienced poorer outcomes than clients who were in the original research program (Carroll et al., 2007). Deficits in implementation fidelity cause professionals to reassess what barriers are affecting the deployment of the program (Axford et al., 2020; Brown-Choy et al., 2020).

Validity of any measurement tool can be increased by fidelity checks to ensure that the intervention is carried out correctly in the field. Treatment drift can occur during treatment as the providers administer the intervention and make personal modifications, and these changes can negatively impact the intervention (Richards, 2018). Providers need prompt and frequent feedback about performance because the more an improper intervention is practiced, the harder it will become for the provider to correct errors and provide the proper treatment (Daniels & Daniels, 2007). Feedback should be administered in a positive manner, and it should be about specific, objective measures on the performance. This approach allows the providers to make accurate adjustments to the performance of the treatment intervention. To decrease intervention errors, providers should receive frequent feedback from experts and have repeated trainings to maintain a high level of treatment validity (Daniels, 2016; Richards, 2018). Feedback is an important component in helping increase treatment validity.

Leaders and experts in the field can provide feedback in many different formats. Feedback is best delivered in one-on-one sessions and not in group sessions (Daniels, 2016). During one-on-one sessions it is important that feedback is designed to be objective, specific to performance criteria, and directed at provider performance and not client outcomes (Daniels, 2016). Feedback should not be directed at client outcomes because there is a great deal of variability from client to client on outcomes (Daniels, 2016). Additionally, there are limits to an
expert’s time to provide extensive feedback, and these limitations must be considered when
designing feedback plans (Daniels, 2016). Thus, appropriate feedback criteria that have been
operationalized and are measurable, feasible, and directed at the provider must be developed and
used frequently to increase the validity of the treatment program.

Fidelity can be assessed by an individual who has been trained in the program and trained
in assessing fidelity (Carroll et al., 2007; Joa et al., 2020; Taniguchi et al., 2019). The
Acceptance and Commitment Therapy Fidelity Measure has completed preliminary testing to
narrow the measure to 25 items that has had moderate inter-rater reliability (O’Neill et al., 2019).
This peer-rated fidelity tool requires additional expert clinicians in the field and increased budget
to use it. Self-rated fidelity measures are available as well (Margolies et al., 2018). Investigators
have found that programs using self-rated implementation fidelity measures in the field have
produced significant adherence to their program design and clients’ positive outcomes were
found when the program was being researched (Margolies et al., 2018). Self-rated fidelity can be
used to help program managers understand how effectively clinicians are using the program with
actual clients.

Acceptance and Commitment Therapy

Background

ACT was first developed in the early 1980s with the goal of encouraging clients to
acknowledge difficult thoughts and feelings in order to be more present in their lives and make
committed actions toward desired values (Prochaska & Norcross, 2014). This perspective
contrasts with other cognitive-based therapies that focus on removing negative thoughts rather
than learning to live with them (Hayes, 2019). ACT can be delivered by any practitioner as long
as that practitioner has the goal of helping clients live more meaningful and engaging lives by increasing psychological flexibility (Hayes, 2019). All humans encounter a myriad of challenges in everyday life, and having increased psychological flexibility allows an individual to better navigate, process, and interact with the world (Hayes, 2019). ACT posits that struggle, pain, and grief are inevitable and expected experiences of human existence (Hayes, 2019). Theoretically, by increasing psychological flexibility, counterproductive efforts to cope with struggle will be minimized and efforts to increase meaning and value in life will be maximized.

**Principles of Psychological Flexibility**

Psychological flexibility is the foundation upon which ACT was developed. Stephen Hayes, the founder of ACT, summarized psychological flexibility as the ability to think and feel openly, to be present in the situations that you are currently experiencing, to live a life that is focused on making decisions about values that matter most to you and developing habits that allow for one to live openly, present in the moment (regardless of whether the moment is good or bad), and according to your values (Hayes, 2019). Psychological flexibility involves asking individuals to change their relationship with thoughts, emotions, and feelings. Individuals are encouraged to be open to negative thoughts, emotions, and feelings when they occur instead of trying to avoid or deny the painful responses they cause (Zhang et al., 2018). Psychological flexibility has been found to help people change health behaviors through the following key areas of ACT principles: recognizing situational demands; shifting one's mindset or perspective when a situation becomes challenging; balancing the roles that one must complete each day; and being aware, open, and committed to actions that are in alignment with the individual’s values (Kwasnicka et al., 2016). An individual who practices ACT increases psychological flexibility
that contributes to lasting healthy behavior traits. Increased psychological flexibility allows an individual to make decisions that align with his or her core values and adjust behaviors if the context requires it while maintaining alignment with core values (Butryn et al., 2011). This concordance between behavior and values provides support for more maintainable behavior change; behavior change can remain even when emotional challenges are encountered.

Psychological flexibility is a very promising psychological approach to help individuals create a behavior change that allows them to navigate life’s challenges.

**ACT’s Six Core Processes**

ACT has six core processes: self-as-context, defusion, acceptance, attention to present moment, values, and committed action. Psychological flexibility is achieved when clients actively use all six ACT processes (Hayes, 2019). Individuals who engage in the opposite of one of the six core ACT processes are practicing psychological inflexibility and may have a more challenging time when encountering human suffering such as chronic pain (Dindo, Van Liew, & Arch, 2017; Hayes, 2019). Existing literature suggests that clients demonstrate the greatest improvements in psychological flexibility when practitioners address all six ACT processes during sessions (Harris, 2009; Hayes, 2019; Levin et al., 2020; McCracken & Vowles, 2013; Peterson et al., 2019). Each of the core processes is addressed as the patient is ready to cover that topic area or as it arises naturally in the session (Harris, 2009).

**Self-Compassion**

Self-compassion was first studied by Kristin Neff to better measure psychological health. Self-compassion comes from the root word of “compassion” (Neff, 2003). Compassion involves being open to the suffering that is occurring in another’s life and fully recognizing that suffering.
By understanding the suffering, a person is presumably more likely to be kind and take action to help the other individual. Consequently, self-compassion involves a connection with one’s internal emotions and one’s own suffering (Neff, 2003). Individuals who are self-compassionate choose to remain open and aware of their suffering and use kindness toward the self as they heal. Being open and aware in self-compassion involves using the ACT core processes, thereby allowing individuals complete psychological flexibility (Pyszksowska & Rönnlund, 2021). Individuals with self-compassion may recognize that suffering is connected to the larger human experience (Neff, 2003). Self-compassion allows for individuals to recognize their pain and work through adverse situations.

**Acceptance and Commitment Therapy in Practice**

The six core processes can be divided into three pillars of the ACT model: opened, centered, and engaged. The first two pillars of ACT, opened and centered, involve the mindfulness components of the ACT core processes, defusion, acceptance, attention to present moment, and self-as-context. Defusion is a core concept in psychological flexibility. Individuals experiencing challenging circumstances may become fused, or mired, in the circumstances, thoughts, or feelings of the moment. Defusion encourages individuals to look at their thoughts with an impartial curiosity in order to gain perspective on the present situation (Zhang et al., 2018). Acceptance is achieved when an individual is willing to be open and experience natural emotions or situations without trying to control or avoid the situation, even when those emotions are difficult (Bond et al., 2006). Attention to the present moment involves allowing the self to be fully engaged in current experiences, even when those circumstances are challenging. Having attention to the present moment means being cognitively aware of what is occurring now without
worrying about what happened in the past or what the future will bring (Bond et al., 2006). Self-as-context is achieved when an individual can complete self-reflection on a behavior from an accepting position and in the situation in which it happened (Bond et al., 2006). For example, a client who describes him- or herself as an “angry person” can use self-as-context to learn to separate the thought from his or her identity. This separation can be implemented through exercises that encourage the person to describe how others see him or her or how he or she sees him- or herself from a different perspective (e.g., as a young child). Therefore, this step allows an individual to understand that he or she is having these thoughts, but the thought does not define who he or she is at all times. The pillar of engagement encompasses the ACT core processes of values and committed action (Zhang et al., 2018). Values are centered on what an individual holds as most important in life (Zhang et al., 2018). Values can change and grow across the lifespan and are ideals to which one strives rather than goals to be met (Zhang et al., 2018). Therefore, committed actions that move the individual toward those values must be consistently reinforced, often through pairing the action verbally with the value to be achieved. For example, if a client indicates that family connection is an important value, any action that moves the client toward (rather than away from) that value should be discussed as a successful committed action (e.g., attending a grandchild’s school play rather than staying home; Zhang et al., 2018). The core processes help an individual move toward psychological flexibility.

There are certain ACT core processes that are associated with facilitating better outcomes under certain conditions. Plumb and Vilardaga (2010) reported that the ACT process of acceptance helps facilitate reduced symptoms of stress, psychosis, anxiety, and depression. A few studies have shown that the ACT processes of acceptance and values are associated with
higher rates of physical functioning in clients with chronic pain (Bendayan, Esteve, & Blanca, 2012; McCracken & Velleman, 2010). Overall, psychological flexibility is the greatest mediator for helping clients with chronic pain to have enhanced outcomes (Wicksell, Olsson, & Hayes, 2010). Research in chronic pain has continued to reveal insights that psychological flexibility is an important element in increasing physical functioning, reducing anxiety, and reducing depression in clients with chronic pain (Gentili et al., 2019; Kato, 2020; Scott, Hann, & McCracken, 2016; Steiner, Bogusch, & Bigatti, 2013).

An important reminder is that ACT is focused on increasing the client with chronic pain QOL and not reducing the pain score (Hayes, 2019). A clinician using ACT must work through all the ACT processes, and clinicians typically begin ACT treatments by keeping each ACT process separate, focusing on one core processes at a time. As the clinician becomes more familiar with ACT, the clinician is better able to incorporate multiple process into a session and move through the core processes more naturally (Harris, 2019). Understanding how a new clinician uses the ACT processes in sessions can help inform researchers as to the best way to treat chronic pain and train new clinicians.

**Psychological Flexibility in Practice**

Psychological flexibility is important both for clients and practitioners. Researchers have examined how a practitioners’ own psychological flexibility is related to both treatment fidelity and to positive client outcomes (Feliu-Soler et al., 2018). ACT has been shown to improve psychological flexibility in the practitioner over time. Practitioners who work through the ACT process daily are better able to relate the principles and components of ACT to clients (Feliu-Soler et al., 2018). In one study, practitioners with greater psychological flexibility practiced
ACT with greater fidelity than those with lower psychological flexibility scores (Feliu-Soler et al., 2018). The development of psychological flexibility takes considerable effort for most people, which suggests the need for a professional-to-professional support network to help practitioners develop psychological flexibility (Feliu-Soler et al., 2018).

A professional community designed to support practitioners who wish to develop psychological flexibility could be helpful for practitioners. Support from a professional community may be especially important for non-psychological disciplines (Feliu-Soler et al., 2018). Nurses with higher levels of psychological flexibility were found to have better relationships with co-workers and have reduced work exhaustion compared to nurses who had low levels of psychological flexibility (Blanco-Donoso et al., 2019). Healthcare workers’ psychological flexibility was negatively associated with compassion fatigue and positively associated with compassion (Blanco-Donoso et al., 2019). Healthcare workers in these studies benefited from psychological flexibility by experiencing reduced burn-out and increased compassion when treating clients (Garner & Golijani-Moghaddam, 2021; Holmberg et al., 2019).

Psychological flexibility has been shown to be an effective psychological skill for practitioners across multiple disciplines, but it takes time to develop and is not generally taught in disciplines outside of psychology.

**Self-Compassion in Practice**

Self-compassion is the ability to be kind to the self. When one practices self-compassion, one tends to have increased health scores and lower anxiety and depression compared to individuals who do not practice self-compassion (Zessin, Dickhäuser, & Garbade, 2015). Clients with chronic pain often have comorbid conditions of anxiety and depression (Comachio et al.,
Investigators have found that ACT is superior to control group at helping participants develop self-compassion (Moran & Ming, 2020; Yadavaia, Hayes, & Vilardaga, 2014). Consistent with ACT principles, higher levels of psychological flexibility and self-compassion have been found to positively impact individuals’ perceptions of quality of life and satisfaction with life (Pyszkowska & Rönnlund, 2021). It is possible that working on self-compassion may be helpful in creating a more holistic, client-centered approach to pain treatment.

Recent research demonstrated that healthcare workers with increased self-compassion can have better therapeutic rapport and decreased rates of the desire to leave the healthcare field due to work fatigue (Duarte, Pinto-Gouveia, & Cruz, 2016; Savieto et al., 2019). Nurses with high self-compassion were more likely to continue to practice nursing even when environmental conditions were poor (Rizal, Egan, & Mantzios, 2021). A sample of healthcare workers during the COVID-19 pandemic who had low levels of self-compassion had higher reports of anxiety and depression compared to the general population that was used as a comparison group (Kotera et al., 2021). Clinicians who develop ACT skills might increase self-compassion and psychological flexibility and, therefore, their own health and therapeutic relationships with the client while reducing anxiety and depression that come from the demands of professional life.

Acceptance and Commitment Therapy in Physical Therapy

Several cognitive behavioral therapies, such as ACT, have been implemented by physical therapists. ACT is an effective cognitive behavioral approach that incorporates mindfulness in the treatment of chronic pain in inpatient and outpatient settings while improving physical
function and reducing symptoms of depression and anxiety (Feliu-Soler et al., 2018). Clients are encouraged to use the ACT principle of self-reflecting on problems from social, emotional, behavioral, and physiological points of view. Practically, this means that clients are encouraged to notice their thoughts, be curious about their thinking, and make decisions based on personal values (Feliu-Soler et al., 2018). The targeted outcome of ACT is to increase physical functioning of the client with chronic pain rather than focusing on reducing pain levels (Feliu-Soler et al., 2018). ACT helps clients achieve this increased QOL by having clients work through six core processes. There is no one way to explore the six core processes with clients. Clinicians are encouraged to integrate the processes in any way that meets the needs of the client, enabling ACT to be tailored to the client. ACT has been shown to be successful in increasing clients’ functional outcomes and is cost effective when compared to traditional treatments (Feliu-Soler et al., 2018; McCracken & Gutierrez-Martinez, 2011; Veehof et al., 2016). Thus, ACT research and outcomes have been shown to be a promising way to treat clients who have chronic pain.

Investigative research has explored how physical therapists working individually or as part of an interdisciplinary team can use ACT when treating clients with chronic pain (Feliu-Soler et al., 2018; Godfrey et al., 2019; Hughes et al., 2017; McCracken & Gutierrez-Martinez, 2011; Vowles, Sowden, & Ashworth, 2014). These interdisciplinary team studies were conducted in Europe. Brief ACT interventions, lasting between three and eight weeks, can produce increased functional outcomes for clients who have chronic pain (McCracken & Gutierrez-Martinez, 2011). Vowles and colleagues (2014) examined functional abilities of clients with chronic pain who participated in ACT treatment. Outcomes from the study showed that ACT treatments were correlated with helping clients with chronic pain decrease pain intensity
that inhibited functional task completion, emotional distress, and disability. McCracken and colleagues (2013) developed an ACT-based group session for clients with chronic pain by completing a pilot group with interdisciplinary team members and clients with chronic pain. Clients with chronic pain were randomly assigned to a control group of traditional treatment or an intervention group. The intervention group received at least three out of four 4-hour-long training sessions about ACT therapy tailored to clients with chronic pain. Post-treatment and three-month follow-up survey results showed that clients who received ACT interventions reported lower disability scores, fewer depressive symptoms, and higher acceptance of pain compared to the control group. Several investigators (Feliu-Soler et al., 2018; Hughes et al., 2017; McCracken & Gutierrez-Martinez, 2011; Vowles, Sowden, & Ashworth, 2014) have examined the use of ACT with clients with chronic pain as part of an interdisciplinary team. Conclusions from the interdisciplinary investigations indicated that ACT helps clients with chronic pain increase functioning during daily tasks and reduce the burden of dealing with chronic pain.

**Current Limitations in Acceptance and Commitment Therapy as It Relates to Physical Therapy**

Currently, research investigating how physical therapy providers should be trained to learn and implement ACT is very limited. In one recent study, McCracken and Gutierrez-Martinez (2011) completed a study in Europe examining the outcomes of chronic pain when treated by an interdisciplinary team using ACT. The research design in this study did involve psychologists providing ACT interventions and physical therapists focusing on physical functioning of the clients with chronic pain. Clients with chronic pain had reduced depression,
anxiety, and physical disability at the end of the interventions and at three-month follow-up (McCracken and Gutierrez-Martinez, 2011). Though interdisciplinary team management is a great way to effectively treat chronic pain, in the United States group treatment of chronic pain has not been established as a primary way to treat clients with chronic pain (Godfrey et al., 2019). One of the barriers to implementing ACT is the lack of available professionals to provide training (Feliu-Soler et al., 2018). Therefore, an effective way to train non-psychologist professionals in ACT is needed (Feliu-Soler et al., 2018).

In one study in the United Kingdom, a small sample of physical therapists who treated clients with chronic pain attended a brief ACT training to be able to implement the ACT core processes into their treatment inventions (Godfrey et al., 2019). The randomized controlled trial involved one psychologist, eight physical therapists, and 248 participants with nonspecific lower back pain. The psychologist gave a two-day face-to-face session with physical therapists about ACT and had monthly group follow-up with them (Godfrey et al., 2019). Each learner was able to implement ACT with a fidelity score of at least 41% when scored by fidelity raters (Godfrey et al., 2019). The control group received standard care, and the intervention group received ACT along with manual therapy techniques and a personalized exercise program. Both groups received the same number of therapy sessions allocated for nonspecific lower back pain by the universal healthcare system in the United Kingdom. Participants who received ACT during their physical therapy session had better outcomes on their disability and physical health ratings at the post-treatment session and at the three-month follow-up compared to participants in the control group (Godfrey et al., 2019). The published work of Godfrey and colleagues (2019) is the only
currently published article focusing on physical therapy providers learning ACT from a psychologist and then providing ACT to a client with chronic pain (Coronado et al., 2020).

Physical therapy providers have used workshops as an educational delivery method to help practitioners and students develop new clinical skills to increase performance in the clinic. Students in a physical therapy program had a 5.8% to 9.1% increase in knowledge and clinical examination skills after completing a workshop that was facilitated by an interdisciplinary team (González Blum et al., 2020). Additionally, problem-based learning and integrated clinical experiences embedded into physical therapy and medical education have been shown to be effective at increasing clinical reasoning (Gupta et al., 2021; Willis et al., 2018). Physical therapists learning about cognitive behavioral therapies reported that a workshop combined with performance feedback from a psychologist was an important component of increasing performance (Montesinos et al., 2021; Nielsen et al., 2014). There remains a gap in understanding an effective learning approach to train physical therapists in ACT, but research suggests that elements of current educational theories might be useful for developing an educational delivery method.

ACT can be delivered by professionals who do not bill for psychological services (Gaupp et al., 2020; Udell, Ruddy, & Procento, 2018). Furthermore, non-psychological professionals should have a support group for continuous problem-solving in delivering ACT (Gaupp et al., 2020; Udell, Ruddy, & Procento, 2018). Gaupp and colleagues (2020) used an ACT-trained psychologist to complete one two-day workshop with healthcare workers to learn ACT principles to increase healthcare worker’s performance on work-related tasks. Healthcare workers who attended the two-day workshop had a statically significant higher increase in the Health of the
Nation outcome measure compared to the control group, which had a score decrease as measured at post-test and three-month follow-up. In a different study, an ACT-trained psychologist provided a six-session ACT workshop to United States Navy recruits who sustained injuries during boot camp. The goal of the ACT workshop was for Navy recruits to learn to implement ACT principles into their lives to facilitate how they increase their QOL while living with pain (Udell, Ruddy, & Procento, 2018). The Navy recruits were placed into either traditional rehabilitation or a rehabilitation program including ACT (Udell, Ruddy, & Procento, 2018). The program was administered over two weeks and included six therapy sessions. Recruits who received ACT were more likely to complete boot camp and pass a fitness assessment compared to those receiving standard treatment (Udell, Ruddy, & Procento, 2018). These studies show that ACT workshops have a positive outcome for individuals who receive ACT intervention treatment from a psychologist trained in ACT. Currently, only one published research article informs practice that clients with chronic pain had increased physical function and abilities to adjust to work and social demands after being treated by a physical therapist providing ACT interventions during their treatment sessions (Godfrey et al., 2019). Physical therapists in this research study completed ACT core principles 41% of the time during their sessions when fidelity checks were completed (Godfrey et al., 2019). Though the preliminary research shows promising outcomes for ACT-trained psychologists to teach clients about ACT, the outcomes on how to train non-psychology-based healthcare workers on ACT is not well understood.

ACT training sessions that use different forms of feedback can help researchers understand which feedback method helps increase fidelity to training among non-psychology-based practitioners in ACT. Feedback can be used to help learners assess fidelity to treatment
standards and improve quality of work (Boud & Molloy, 2013; Gupta et al., 2021). For feedback to be successful, it should be clear, timely, and nonjudgmental; focus on the positive; encourage the learner to reflect areas of needed improvement; include mutual respect between the reviewer and the practitioner (Gupta et al., 2021). Formal feedback can be given face-to-face or in writing, and the feedback should be delivered at a preselected time (Branch & Paranjape, 2002). Learners report that feedback helps close learning gaps and increase performance on the task being learned, which could help increase the fidelity to treatment (Gupta et al., 2021). Understanding how different types of feedback might affect fidelity can provide knowledge about how to best format ACT trainings for non-psychology-based practitioners.

The existing research is promising for teaching physical therapists how to implement ACT into clinical practice, and there are existing companies that can provide training. Praxis is a United States-based continuing education company offering ACT training in both seated and online formats to professionals. Praxis allows anyone to attend the workshops, but it is geared toward psychology-based professionals such as social workers, counselors, and psychologists (Praxis, 2021). The information provided on the Praxis website also mentions that trainings are useful to medical staff such as physicians and nurses, but it does not heavily promote other allied health professions such as physical therapists (Praxis, 2021). Praxis offers money back guarantee, but training has yet to have peer-reviewed research backing. Because there are very few ACT training workshops designed for physical therapists in the United States that have been formally evaluated for effectiveness through the peer review process, finding an effective method to train physical therapy providers in ACT will take time, but there is enough
information in the research literature to begin taking first steps to building a training program for evaluation.

Theory

Connectivism

Connectivism was originally established by Siemens (2005), and this theory recognizes that learning is facilitated by technology and socialization (Goldie, 2016). The eight guiding principles of connectivism assert that (a) learning and knowledge rest in the diversity of opinion; (b) learning is a process of connecting sources of information; (c) learning can occur through the virtual process; (d) learning is a lifelong process; (e) connections with others help to facilitate continuous learning; (f) the learner must understand concepts across various disciplines and concepts; (g) learning must expose the learners to the most current knowledge; and (h) having the ability to make decisions is an important skill for learning (Siemens, 2005). Learning occurs in the community when it is a component of a learning node. A learning node is a group of individuals who are connected based on their connecting points in a network. A network must contain two or more nodes. The network goal is to share resources and help inform others about developments within the network (Goldie, 2016). As the network shares information, nodes in the system can share the most up-to-date knowledge on current topics. This connection allows for each node to share the most pertinent information throughout the network, which allows the network to remain up to date on current practice standards (Siemens, 2018).

Connectivism also allows for each node to interact with knowledge at its own pace, and each node can spend as much time as needed on each topic. The node can share new knowledge quickly with another node while continuing to discuss the content within the group (Siemens,
2018). This method allows the learners to fully understand the impact of the content. Topics of general knowledge can be discussed quickly while topics that require deeper investigation can be discussed at length. Finally, members of each node are encouraged to share knowledge on a topic to ensure a rich and robust discussion (Siemens, 2018).

Connectivism has been helpful among medically related topics related to the COVID-19 pandemic. Caruso and colleagues (2020) found that when professors created groups within their learning management system platforms, students were able to engage in learning and continued to develop in the medical program after the program rapidly shifted to fully online due to the COVID-19 pandemic. Rad and colleagues (2021) found similar results during the higher educational shift from seated to online learning due to the COVID-19 pandemic. COVID-19 restrictions encouraged students to work in collaborative groups in which students were more easily able to share knowledge and ideas and work toward a common goal. During the rapidly changing educational delivery methods, students were able to perform well and apply material appropriately, and students reported enjoying working in collaborative groups (Rad et al., 2021). Currently, research demonstrates that collaborative learning in an online environment can be a favorable approach to developing robust professionals (Rad et al., 2021).

Most professional fields require that members complete continuing education to maintain licensure. Many members seek these continuing education sessions through online courses or at conferences (Thomas et al., 2006). Continuing education sessions are mainly taught using the Socratic method wherein the instructor will ask the learners questions as a group or deliver knowledge without much interaction between the learners (Thomas et al., 2006). Knowledge is disseminated to the group, and the learner is not offered the chance to process how this new
knowledge applies to professional practice. Learners can discuss the new information after the session with other colleagues, if the situation allows for discussion (Thomas et al., 2006). Cervero and Gaines (2015) revealed that learners reported increased usefulness when continuing education sessions were interactive and spread out over several sessions compared to sessions that delivered in a concise lecture format (Van Hoof & Doyle, 2018). Connectivism is a dynamic way to transform seated, hybrid, or online continuing education courses into an opportunity for learners to engage with the content and foster understanding about how the content can be applied to daily professional practice.

Allowing learners to interact with one another easily and quickly during educational sessions could be beneficial to professional continuing education. Learners would not only have access to the knowledge that is being disseminated but could also share resources related to practice standards, networking, resources, and effective ways to implement new knowledge into their specific field (Downes, 2006). The development of effective collaboration with other learners is critical for healthcare professionals to work successfully together. By focusing on how to collaborate and learn from each other, the group can be more dynamic in its approach, and the focus shifts from knowledge acquisition to application of knowledge (Goldie, 2016). Access to knowledge is a dynamic process of integrating and applying concepts as the group interacts and examines the topic (Goldie, 2016). The theory of connectivism is promising and can help professionals move forward in areas of continuing education learning.

**Relational Frame Theory**

Another theory applicable to continuing education workshops for physical therapists learning about ACT is the relational frame theory. The main idea of the theory is that human
language and cognition are components that work cohesively together to allow humans to interact with one another (Hayes, 2016). The three main properties of relational frame theory are that (a) learning is bidirectional; (b) relations can be compounded, especially if the learner can see that these relations are shared in a similar context; and (c) the relations enable individuals to make decisions when presented with choices (Hayes, 2016). According to relational frame theory, when working with clients, the client creates rules and boundaries that are often arbitrary, and the client is simply imposing the boundary because of long-term habits. The difficulty with the client’s behavior is that the individual will follow these same rules and problematic behaviors unless the clients learn another way to handle their behaviors (Hayes, 2016). For example, a client with social anxiety may frequently cancel social engagements with friends and family and therefore feels lonely and disconnected from friends and family (Harris, 2019). The client wants to have meaningful relationships with friends and family but is unable to do so because cancelling engagements causes the client to miss opportunities to have meaningful interactions. Unfortunately, cancelling social engagements also provides immediate relief from social anxiety; thus, the problematic behavior continues (Harris, 2019). Psychology-based interventions, such as ACT, built from relational frame theory, allow for robust and effective treatment addressing how humans interact with their surroundings (Edwards et al., 2017; Hayes, 2016; Oró et al., 2021). ACT therapists attempt to understand a client’s thought patterns, how different environmental situations produce the client’s behaviors, and if the client’s behaviors align with his or her values (Harris, 2019). Then the ACT therapist can help the client understand how his or her decisions influence whether he or she is living according to his or her values.
**Backward Design Theory**

The backward design model was first proposed by Tyler (1949) when he suggested that course evaluations should be a dynamic process in which educators focus on course learning outcomes and how educational technology helps students achieve that outcome. Wiggins and McTighe (1998) further developed the backward design model by stating that an instructor should know the desired learning outcomes at the course planning stage. Once the instructor identifies the desired goals of the educational technology, the instructor builds a project that will allow the learner to achieve the desired goal. The process of backward design involves three main stages as follows: identifying the desired results from the learner, determining acceptable evidence to use in development of the educational experience, and planning the learning experiences (Wiggins & McTighe, 1998). Several researchers have shown that learners enjoyed the educational session(s) when backward design theory was used to develop an educational program (Crossman, 2017; Jozwik, Lin, & Cuenca-Carlino, 2017; Slavych, 2020). Specifically, learners’ outcome assessments improved after participating in an educational session implementing backward design theory (Crossman, 2017; Jozwik, Lin, & Cuenca-Carlino, 2017; Slavych, 2020).

**Summary of Theory**

The three main theories of connectivism, relational frame theory, and backward design can work well together in the development and implementation of an educational program (Appendix B). Connectivism has continued to gain momentum as technology integration has occurred in educational delivery. The connectivism theoretical framework works well with the relational frame theory of ACT because the theory is framed off the perspective that learners will
make connections between the information they learn in the learning environment and previous knowledge the learner knows (Siemens, 2018). Relational frame theory’s core assertion is that humans do not have to learn about environments and interactions in one specific way because humans are able to make connections about those interactions in various ways (Hayes, 2019). Learning occurs when a learner is able to have meaningful discussions to see how what is being learned can be applied to various contexts with other learners, and the theory of connectivism is based on this concept. To get connectivism and relational frame theory to work well together in a learning environment, backward design theory can be used as the instructional theory driving the learning environment. Backward design theory can make sure that the theories are driving learners toward the desired outcome that the instructor is wanting to produce from the learning experience. These three theories can be used well together to help learners understand how to use ACT.
CHAPTER 3: PROCEDURES OF THE STUDY

Research Questions

Based on the review of the literature regarding physical therapy, ACT delivery, treatment fidelity, and feedback, two research questions were necessary to investigate the identified knowledge gaps. The focus of the investigation was on how the physical therapist’s traits and feedback methods affect ACT delivery with clients with chronic pain. Research informs practice that individuals delivering ACT need to have knowledge, psychological flexibility, and self-compassion to increase the therapeutic use of self in delivering ACT. The first research question was: Does different groupings of feedback change the knowledge, psychological flexibility, and self-compassion of physical therapists learning about ACT during an online workshop? Three hypotheses follow:

1. $H_0$: Physical therapists’ ACT knowledge will not differ across all three feedback groups.

   $H_1$: Physical therapists’ ACT knowledge will increase the most in the expert group compared to the peer and control groups.

2. $H_0$: Physical therapists’ psychological flexibility will not differ across all three feedback groups.

   $H_1$: Physical therapists’ psychological flexibility will increase the most in the expert group compared to the peer and control groups.
3. **H₀:** Physical therapists’ self-compassion will not differ across all three feedback groups.

   **H₁:** Physical therapists’ compassion will increase the most in the expert group compared to the peer and control groups.

   Additionally, the study investigated whether feedback delivery type was related to physical therapy providers’ fidelity in using ACT principles when working with chronic pain clients. Understanding whether the feedback method was related to fidelity of ACT implementation provided the investigator with findings to better plan educational delivery of ACT to future physical therapy providers. The second research question was: Does feedback affect the fidelity of physical therapists providing ACT to clients? One hypothesis follows:

4. **H₀:** Physical therapists’ fidelity scores will not be different across expert, peer, and control groups.

   **H₁:** Physical therapists’ fidelity scores will be highest in the expert group compared to the peer and control groups.

**Study Variables**

There are five constructs that help address the two research questions in this study. The five constructs are knowledge, psychological flexibility, self-compassion, fidelity, and feedback methods.

**Knowledge (Dependent Variable)**

Knowledge is comprehension about ACT principles and is an interval variable and is abbreviated KNO for statistical analyses. Participants answered a 16-item test called the Acceptance and Commitment Therapy Knowledge Questionnaire. Each item was scored as
incorrect (0 points) or correct (1 point). Responses were summed to provide the knowledge, or KNO, score with a range of 0 to 16.

**Psychological Flexibility (Dependent Variable)**

Psychological flexibility is an interval variable and is abbreviated PFLEX for statistical analyses. Participants answered the seven-item Work-Related Acceptance and Commitment Questionnaire. All items are answered on 7-point Likert-type scale from “never true” (0) to “always true” (7). These answers have no consistent difference between each category, though the score is calculated by summing the answers with a possible range from 7 to 49.

**Self-Compassion (Dependent Variable)**

Self-compassion is an ordinal variable and is abbreviated as SCOMP for statistical analyses. Participants completed the 12-item Self-Compassion Short Scale. All items are answered on a 5-point Likert-type scale from “almost never” (1) to “almost always” (5). These answers have no consistent difference between each category, though the score is calculated using the total mean. To find the mean, scores for each question are summed and divided by 12, with questions 1, 4, 8, 9, 11, and 12 reverse coded. The SCOMP score can range from 12 to 60 with three groupings for the self-compassion score.

**Fidelity (Dependent Variable)**

Fidelity was rated by participants using the Self-Rated Fidelity Measure for ACT (SRFACT) and abbreviated as SRFACT for statistical analysis. SRFACT is a nominal variable. Participants assessed fidelity to each of the six ACT components by completing the six-item Self-Rated Fidelity Measure for ACT. All items are answered on a 6-point Likert-type scale. For all items, the answer choices are scored from 0 to 5 and are as follows: “not delivered this
session,” “need training prior to working alone,” “flawed display of competence,” “mixed level of competence,” “full competence level,” “best possible performance.” The interval between scores is not consistent, but the scores are summed for the total SRFACT score, reflecting fidelity across all ACT domains. The score range for the Self-Rated Fidelity Measure for ACT is from 0 to 30, with passing scores being an average of 80% of the domains that were scored on the SRFACT.

**Feedback Groups (Independent Variable)**

Feedback is a nominal variable and was abbreviated as FEEDB for statistical analyses. The variable had three groupings of expert feedback, peer feedback, and control group based on which form of feedback the participant received during the intervention. Participants were placed in a feedback group by the investigator in one randomization assignment prior to the start of the study.

**Goal**

The goal of the research study was to determine whether a feedback method changed the characteristics of the learners and also affected the ACT fidelity scores of physical therapy providers. Also, physical therapy providers can be members of an interdisciplinary team. When an interdisciplinary team is practicing ACT, the client can receive constant feedback about improving psychological flexibility through the cognitive behavioral approach (Feliu-Soler et al., 2018). One of the areas that required further investigation is understanding how different feedback methods affected the learning of non-psychology-based professionals such as physical therapy providers. Further understanding into how feedback methods affect the learning and
deployment of ACT to a client can help researchers better understand ways to develop educational workshops for non-psychology-based professionals.

**Operational Hypotheses**

There are four operational hypotheses in this research design. There are three hypotheses for Research Question 1 and one hypothesis for Research Question 2.

**Research Question 1**

To test the first hypothesis posited that knowledge differs by feedback methods during the ACT online workshop, Hypothesis 1 stated that participants in the expert feedback group will have the highest change in ACT knowledge compared to the peer feedback and control groups. A one-way ANOVA was used to analyze whether there is a difference in ACT knowledge scores from pre-test to posttest between the three groups (i.e., expert feedback, peer feedback, and control).

To test Hypothesis 2, that physical therapists’ psychological flexibility will increase the most in the expert group compared to the peer and control group, a one-way ANOVA was used to determine whether a difference in change scores from pre-test to post-test between groups. The data were considered to have an independent variable that was measured on a nominal scale and a dependent variable that was measured on an interval scale.

To test Hypothesis 3 stating that physical therapists’ self-compassion will increase the most in the expert group compared to the peer and control group, a one-way ANOVA was required because there are three groups looking at a change score from an interval range. The results provided findings into how feedback methods affected the physical therapy providers’ self-compassion.
Research Question 2

The goal of Research Question 2 is to understand whether type of feedback during educational delivery was associated with physical therapy providers’ fidelity to ACT when treating clients with chronic pain. To understand how feedback affects fidelity, Hypothesis 4 states that participants in the expert feedback group will have the highest fidelity at posttest compared to either the peer feedback or control groups; a chi-square test of homogeneity was used because the independent variable has three categories, and the dependent measure is a nominal category. A chi-square test of homogeneity was used to examine whether SRFACT scores differ by type of feedback during educational delivery (i.e., expert feedback, peer feedback, or control group).

Research Design

The research design for this study was an experimental design with one control group and two intervention groups. The goal of the research study was to track changes in knowledge, psychological flexibility, self-compassion, and fidelity over the time of the research study (Fortune et al., 2019; Rew et al., 2018). Baseline variables (i.e., knowledge, psychological flexibility, and self-compassion) were measured to examine whether there are differences between groups or between group members at baseline. The ACT training sessions with physical therapy providers was done over a four-week period of time, and measurements were collected at the beginning and the end for change scores. Results provided findings to the investigator about how feedback affects the outcomes of ACT training sessions (e.g., knowledge, psychological flexibility, and self-compassion).
Population and Sampling

Physical therapy provider inclusion criteria included all the following parameters. Participants were at least 18 years old, of any race and any gender, and currently practicing and licensed in physical therapy in the United States. Physical therapy providers included physical therapists who work in any setting. Physical therapists who participated should have had, but were not required to have, several clients who are currently experiencing chronic pain; this requirement allowed physical therapy providers to incorporate what they learn about ACT interventions in their treatment sessions with clients who have chronic pain.

The Institutional Review Board (IRB) at Northern Illinois University (NIU) reviewed the research protocol before implementation to ensure responsible research. This study underwent an expedited review process because it involved minimal risk to physical therapy providers (i.e., the participants), and physical therapy providers are not a protected population. The physical therapy providers’ information was protected by being in password-protected files with passwords held only by the investigator, and data were de-identified to keep their personal information confidential. Physical therapy providers also received a complete description of what participation in the study entailed and provided informed consent to proceed. Participants were able to withdraw from the study at any time.

The research study used the nonprobabilistic sampling method of convenience sampling. Though convenience sampling does not fully represent the target population of physical therapy providers in the United States, this limitation was mitigated by random assignment of participants to the three different feedback groups. Physical therapy providers were recruited through professional network connections (i.e., physical therapy listervs, Facebook groups, and
other professional networks). Participants were invited to participate via email, social media posts, and word of mouth. Physical therapy providers were offered 10 Continuing Education Units (CEUs) as an incentive for completing the workshop and agreeing to complete the study. CEUs for physical therapists were provided through the state of Arkansas. If a physical therapy provider chose not to complete the workshop or exited early, he or she did not receive CEUs. Enrollment in the research study was completed for any physical therapy provider wanting to enroll in the workshop. Physical therapy providers who were interested in participation contacted the investigator via email. Once the total list of participants was comprised, each physical therapy provider was randomly assigned into one of the three following groups: (1) control, (2) peer feedback, or (3) expert feedback.

To determine how many participants were needed for the study, a power analysis was completed using alpha level, effect size, and power levels. Guidelines for interpreting effect sizes are as follows: small (0.10), moderate (0.30), and large (0.50). Additionally, in research, statistical power ≥0.80 should be obtained to correctly reject the null hypothesis (Cohen, 1988). Using the traditional method of sample size calculations, G*power was used to determine how many participants would be needed to achieve an effect size of 0.50 for a moderate effect size, $\alpha = .05$, with three groups, and four measurements based on a One-way ANOVA. Results from G*power when testing all the hypothesis parameters indicated that Hypotheses 1-3 would require the most participants to reach a power of ≥ .80 or 57 participants (Faul et al., 2007). We attempted to enroll 30 participants or more into each group to allow for attrition and optimize statistical analysis of the research project.
Data Collection Procedures

To determine whether an educational delivery method facilitates improved outcomes on any of the variables of interest, this research project compared three varying types of feedback groups as participants completed an ACT workshop. An overview of the procedure is described in Appendix C. This research study utilized a randomized assignment of participants into one of the educational delivery method groups or the control group. The control group received no educational delivery about ACT, but they completed a pre-test prior to starting their Week 1 of no interventions and a post-test after four calendar weeks. After completion of the workshop, researchers offered the control group the opportunity to complete the expert feedback group ACT workshop to prevent attrition and allowed them the benefit of being in the study. The second group of participants received the ACT workshop and engaged in peer feedback sessions about ACT fidelity. The group received fidelity feedback from their peers and were allowed to start additional group conversations if they wished to discuss the material further than what had been established within the framework of the ACT workshop. The third group of participants received expert feedback from an ACT psychologist about ACT fidelity.

Physical therapy providers completed four assessments during the ACT workshop. To measure fidelity, the SRFACT (Appendix D) was assessed at the end of the workshop to determine whether any groups were affected by different feedback methods. To assess knowledge of ACT principles, the ACT Knowledge Questionnaire (Appendix E) was utilized at the beginning of the workshop and at the end of the workshop to determine what change score occurred. Additionally, to measure psychological flexibility, participants completed the WAAQ (Appendix F) at the beginning of the workshop and at the end of the workshop to determine
change scores. Finally, the Self-Compassion Short Scale (Appendix G) was assessed for self-compassion at the start of the workshop and at the end of the workshop to determine change score. These assessments were the measures were used to assess physical therapy providers’ change that occurred while participating in the research study.

Fidelity checks at post-intervention were completed during the research study. The control group, peer feedback group, and expert feedback group completed the SRFACT at post-intervention. The peer feedback participants submitted their SRFACT to their group members to receive feedback on their fidelity. The expert feedback group submitted their SRFACT measures to the ACT psychologist. The expert feedback was given directly to participants in written communication to help them facilitate ACT in sessions with their clients. The SRFACT scores were compared across groups to examine whether fidelity scores differed by feedback method.

**Intervention**

The peer feedback group was offered a manner to share their SRFACT with each other to provide feedback related to fidelity. Each participant must share their SRFACT with their peer feedback group members at the two-week and four-week time points. Participants could have offered additional comments, questions, or concerns on their group members’ SRFACT scores if they wished. The ACT psychologist acted as the moderator to remove any inappropriate conversations or comments, but the ACT psychologist did not participate in the conversations that occurred in the peer feedback group.

The expert feedback group submitted via assignment two SRFACT forms to the ACT psychologist for review at the end of Week 2 and beginning of Week 4 during the ACT training workshop. The participants received written feedback from the ACT psychologist about how
their fidelity in delivering ACT could be improved. Participants submitted their work at the prescribed times to the ACT psychologist. Participants could have initiated conversations with the ACT psychologist to ask general questions at any time. The announcements feature was used to allow participants in the expert feedback group to know of any additional feedback or comments the ACT psychologist had for the expert group; in this way, all participants in this group had access to expert knowledge.

Using a connectivism approach to learning allowed researchers to see what changes in learning and fidelity occurred during the ACT workshop. An analysis of the three group differences allowed the investigator to determine whether expert feedback was superior to peer feedback or no intervention at all. Knowledge from this study informed researchers about the benefits and limitations of using connectivism and different forms of feedback during an ACT workshop.

**Measures**

The four assessments utilized for this research study were the ACT Knowledge Questionnaire, the Work-Related Acceptance and Action Questionnaire, the Self-Compassion Short Scale, and the Self-Rated Fidelity Measure for ACT. Each of these assessments provided information to determine whether a change score occurred for physical therapy providers during the ACT workshop. The ACT Knowledge Questionnaire was used to assess knowledge gained throughout the workshop. The ACT Knowledge Questionnaire has 16 questions that assess knowledge of ACT principles. Each question is worth the same number of points. The KNO score is determined by the sum of the correct responses out of 16. There is no minimum threshold established for this questionnaire to establish competence (Richards et al., 2011).
Knowledge gained from the research study was one way to assess how the educational workshop affected physical therapy providers learning about ACT.

The Work-Related Acceptance and Action Questionnaire (WAAQ) was to determine the psychological flexibility of individuals. Psychological flexibility is a hallmark of implementing ACT. The WAAQ uses a Likert-type 7-point scale to ask seven questions related to work. The scale ranges from 1 (“never true”) to 7 (“always true”; Bond, 2012). The score for the WAAQ is taken as a summative score after the individual answered each question. The validity of the WAAQ (r = -.30-.31) indicates a low correlation. The WAAQ helped determine the psychological flexibility scores for physical therapy providers in the research study.

The Self-Compassion Short Scale assesses a participant’s self-compassion. The Self-Compassion Short Scale uses a Likert-type 5-point scale with twelve questions related to self-compassion. Prior to summing the scores and calculating the mean, six questions are reverse scored. Scores ranging from 1.00 to 2.49 indicate low self-compassion, scores from 2.50 to 3.50 indicate moderate self-compassion, and scores from 3.51 to 5.00 indicate high self-compassion (Neff et al., 2019). The Self-Compassion Short Scale has good score reliability (Cronbach’s alpha ≥ 0.86) and validity (r ≥ 0.97; Raes et al., 2011). Self-compassion scores helped determine whether the ACT workshop affects the physical therapy SRFACT.

The SRFACT was modified from the Early Start Denver model. The accepted fidelity pass rate for the Early Start Denver model was established at 85% by the study investigators (Rogers, Dawson, & Vismara, 2012). Accepted fidelity is participants scoring at least 4 or 5 in at least 13 of the 15 categories to receive an 80% passing fidelity score. To pass, physical therapy providers had to score at least 80% on the SRFACT each time the measure was completed after
scored ACT intervention sessions. Having an 80% implementation rate ensured construct validity for the ACT approach.

The SRFACT uses a 6-point Likert-type scale to measure the self-assessed fidelity of an individual performing ACT with a patient. The SRFACT was been pilot tested in a small sample during the summer of 2020 and was shown to be stable over time ($r_T = .373, p<.002$) with low to moderate reliability (Cox & Quigg, 2021). The SRFACT is designed to allow practitioners to share scores with other ACT practitioners to facilitate discussions about the practitioner’s performance while providing ACT in treatment sessions. The peer support that occurred during this process can be completed through an online platform to allow for greater flexibility and ease of access to other ACT practitioners. In the peer feedback intervention group, the SRFACT score was shared with other participants to allow discussions to occur. In the expert feedback intervention group, the SRFACT score facilitated feedback from the ACT psychologist.

**Threats to Validity**

Several instructional design components have been implemented in the research design to ensure validity. The study design involves knowledge assessment quizzes, fidelity checks, and two psychology-based measures to assess whether any changes occur related to knowledge of ACT and fidelity to ACT training during the workshop. Pre/post-tests of the Acceptance and Commitment Knowledge Questionnaire were evaluated to determine whether participation in the training workshop increased physical therapy providers’ ACT knowledge. Physical therapists who took the knowledge, psychological flexibility, and self-compassion tests should be not familiar with these tests. Therefore, participants who took the ACT knowledge test should not be influenced by outside factors or previous knowledge. The knowledge change score should come
from the ACT training sessions. Participants’ scores on these tests should not be greatly affected by taking the exams twice. Psychological flexibility and self-compassion could be affected by repeated testing due to increased self-awareness of these traits. The control group was one way to assess for this limitation in the study. There remain some internal validity limitations with repeated measures used in this study.

Self-compassion and psychological flexibility constructs were measured by tools that could derive reliable and valid scores. Several studies have shown that the Self-Compassion Short Scale is a good assessment of self-compassion when compared to the full-length scale, the Self-Compassion Scale (Babenko, O. and Guo, 2019; Bratt & Fagerstrom, 2020; Raes et al., 2011). Multiple studies have shown that the Work-Related Acceptance and Action Questionnaire has high reliability and validity for assessing psychological flexibility, especially when compared to the Acceptance and Action Questionnaire – Revised (Bond et al., 2012). The self-compassion and psychological flexibility scores indicated how effective the ACT workshop is for physical therapy providers.

Fidelity assessments were completed to facilitate appropriate ACT interventions by the physical therapy providers. This study used the SRFACT and because the measure has only completed initial pilot testing, the measure lacks full testing of validity. The SRFACT used the same level of pass rate of 80% as Early Start Denver model. The passing fidelity score was completed by each participant having at least a score of 4 or above on each of the scored ACT domains. The average score across domains must reach at least 80% between two sessions for the same client or two different clients (Rogers & Dawson, 2010). Using the same levels of fidelity allowed for the same parameters of validity on the fidelity measures.
Internal validity in this research study was enhanced through the following parameters. The goal was to create three equal groups (one control and two experimental) with at least 30 participants in each. An attrition rate of 33 participants was estimated, which indicated that the study required 57 participants in total to have enough power. The goal was to include at least 30 participants per group for a total of at least 90 participants; this approach was used to allow for any attrition to occur while maintaining statistical power (Faul et al., 2007). The sampling method contributed to selection bias because physical therapy providers were recruited via professional list serves, Facebook groups, and from the investigator’s professional connections.

External validity in this study was controlled through the following parameters. Ecological external validity was reduced because the sample was not a randomized sample of the population. Population external validity can be completed for United States physical therapists because the participants are from this nation. The workshop was created so that any physical therapist in the United States could experience the same educational programming whether they were in this research study or took the workshop at different time. The inclusion criteria for this research study was developed to be inclusive to as many physical therapy providers as possible to allow the results to apply to the practicing professional body of physical therapy providers in the United States. These parameters helped the external validity of the research study.

Data Analysis

To test Hypotheses 1-3 a one-way analysis of variance (ANOVA) was planned to be conducted. An ANOVA determines where there is a difference between the means of three or more independent groups. There are three assumptions of the ANOVA: a) the dependent variable is normally distributed in each group; b) there is homogeneity of the variances; and c)
observations are independent (Field, 2018). For Hypotheses 1-3 the independent variable is FEEDB (i.e., control, peer feedback, and expert feedback groups), and the dependent variables are KNO, PLEX, and SCOMP. The groups were expected to be normally distributed. Group sizes ran a risk of not being equal due to convenience sampling, and each observation was expected to be independent of all others. The model equation for an ANOVA is $\mu_1 = \mu_2 = \mu_3$. The results of the ANOVA could have indicated whether there is a difference between the outcome measures based on level of FEEDB. If the results from the ANOVA reached statistical significance, a post hoc test, Tukey’s honest significant difference test, would have been conducted to determine which groups differed from each other (Field, 2018).

Thirty-three participants enrolled in the study, indicating the need to use a nonparametric test instead of an ANOVA. The Kruskal-Wallis nonparametric test was used because it compares the means of three or more independent groups. There are four assumptions for the Kruskal-Wallis test: a) the dependent variable is on an ordinal or continuous scale; b) there is one independent variable that consist of 2 or more categories; c) each observation is independent; and d) distributions of each group have the same shape (Field, 2018). For Hypotheses 1-3, the independent variable is FEEDB (i.e., control, peer feedback, and expert feedback groups), and the dependent variables are KNO, PLEX, and SCOMP. The model equation for the Kruskal-Wallis is $H = \left( \frac{12}{N(N+1)} \sum_{j=1}^{k} \frac{R_j^2}{n_j} \right) - 3(N + 1)$. The results of the Kruskal-Wallis indicate whether there is a difference between the medians outcome measures based on level of FEEDB. If the results from the Kruskal-Wallis reached statistical significance, a Dunn-Bonferroni approach would be conducted to determine which groups differed from each other (Field, 2018).
A chi-square test of independence was conducted to test the hypothesis for Research Question 2. The chi-square test of homogeneity determines whether there is a difference between the size of the expected proportion compared to the actual proportion when comparing two variables with two or more groups each. The analysis makes the following four assumptions: a) a dichotomous dependent variable, b) three or more categories that are independent of each other on the independent variable, c) independent observations, and d) random assignment to independent groups from a single sample (Field, 2018). For Research Question 2 each group was tested at the end of each training session; each dependent variable uses a nominal scale to pass or fail fidelity. The sample was a convenience sample, and the samples ran a risk of not being normally distributed. The formula for this analysis is \( \chi^2 = \sum [(O_{r,c} - E_{r,c})]^2 / E_{r,c} \). If a significant difference was found, a multiple Cramer’s V test was completed post hoc to determine which group(s) were significantly associated (Field, 2018).
CHAPTER 4: RESULTS

Participants

Through convenience, snowball sampling 53 participants from 11 different states were enrolled in the study (Table 1). Participants were randomly assigned to three feedback groups (control, peer, and expert). The attrition rate was 38% with 33 of the participants completing the online ACT workshop of participants who did not finish the study, 17 of them asked to be enrolled in the ACT workshop but never started the course and 3 started the course but did not finish. Fourteen participants completed the control group, 11 participants completed the peer group, and 8 participants completed the expert group.

Table 1

<table>
<thead>
<tr>
<th>State</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>1</td>
</tr>
<tr>
<td>Arizona</td>
<td>4</td>
</tr>
<tr>
<td>Colorado</td>
<td>1</td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
</tr>
<tr>
<td>Illinois</td>
<td>2</td>
</tr>
<tr>
<td>Kansas</td>
<td>1</td>
</tr>
<tr>
<td>Missouri</td>
<td>14</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2</td>
</tr>
<tr>
<td>New York</td>
<td>2</td>
</tr>
<tr>
<td>Texas</td>
<td>3</td>
</tr>
<tr>
<td>Washington</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

Participants in the study were seasoned clinicians according to the number of years practiced (Table 2). The majority of participants reported working as a physical therapist for 11
or more years (51.5%), and more than a quarter (27.3%) reported working as a physical therapist for 6 to 10 years. The remaining participants (21.3%) reported working for 5 or fewer years as a physical therapist (Table 2).

<table>
<thead>
<tr>
<th>Years</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>2</td>
<td>6.1</td>
</tr>
<tr>
<td>3-5</td>
<td>5</td>
<td>15.2</td>
</tr>
<tr>
<td>6-10</td>
<td>9</td>
<td>27.3</td>
</tr>
<tr>
<td>11 or more years</td>
<td>17</td>
<td>51.5</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100</td>
</tr>
</tbody>
</table>

Participants in the research study worked with several clients with chronic pain per week on average. Ten participants (30.3%) reported treating 1-5 clients with chronic pain per week (Table 3). Approximately one quarter of participants reported seeing 6 to 10 clients with chronic pain per week, and 18.2% of participants reported treating 11 to 15 clients with chronic pain per week (Table 3).

<table>
<thead>
<tr>
<th>Clients with Chronic pain</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
<td>15.2</td>
</tr>
<tr>
<td>1-5</td>
<td>10</td>
<td>30.3</td>
</tr>
<tr>
<td>6-10</td>
<td>8</td>
<td>24.2</td>
</tr>
<tr>
<td>11-15</td>
<td>6</td>
<td>18.2</td>
</tr>
<tr>
<td>16 or greater</td>
<td>4</td>
<td>12.1</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100</td>
</tr>
</tbody>
</table>

**Data Cleaning and Preparation**

Participants data was only included if the participant completed all of the assignments within the workshop. The constructs for knowledge (KNO), self-compassion (SCOMP), psychological flexibility (PLEX), and fidelity (SRFACT) were all included in different assignments at the required timelines prescribed by the study. Participants were encouraged to
select all items that were true for them on the measures for SCOMP and PLEX. Two participants selected two Likert options on one of the SCOMP questions. One of the two Likert items was randomly selected as the participant’s marked response on the SCOMP for these coding errors. Data were converted from Canvas into a Qualtrics survey and downloaded into an Excel worksheet. In Excel, the change scores for knowledge, self-compassion, and psychological flexibility were calculated. Next, all data were uploaded to SPSS for analysis.

**Descriptive of Continuous Variables**

Descriptive statistics were run to explore the KNO, PLEX, and SCOMP variables for the 33 participants in the ACT workshop. Data were analyzed using SPSS version 26.

**Table 4**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median</th>
<th>Standard deviations</th>
<th>Low end</th>
<th>High end</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNO</td>
<td>1.00</td>
<td>4.31</td>
<td>-5.00</td>
<td>13.00</td>
</tr>
<tr>
<td>PLEX</td>
<td>1.00</td>
<td>4.16</td>
<td>-11.00</td>
<td>10.00</td>
</tr>
<tr>
<td>SCOMP</td>
<td>-0.83</td>
<td>0.36</td>
<td>-0.92</td>
<td>0.75</td>
</tr>
</tbody>
</table>

The data in Table 4 is the change scores from pre-test to post-test for KNO, PLEX, and SCOMP. A median of 1.00 was found for the KNO variable, a median of 1.00 was found for variable PLEX, and a median of -0.83 was found for variable SCOMP.

**Hypothesis 1**

Hypothesis 1 stated that participants in the expert feedback group would have the highest change in ACT knowledge compared to the peer feedback and control groups. The four assumptions were met for the Kruskal-Wallis because the dependent variable is continuous, the independent variable had three categories (control, peer, and expert), each observation was independent, and distribution of each was the same shape. These assumptions being met allowed for the statistical analysis to be conducted by the researcher.
The Kruskal-Wallis demonstrated that there was a statistically significant difference in the median KNO scores between the three groups, $H = 12.09, p = 0.002$, with a median KNO score of 0.00 in the control group, 5.00 in the peer group, and 3.00 in the expert group. The effect size was .34, which is a large effect size. A Dunn-Bonferroni approach was used to determine whether any differences were found between control and expert group, control and peer group, and expert and peer group. A pairwise post hoc Dunn-Bonferroni test was statistically significant for control and peer groups ($p = 0.002$). The pairwise post hoc Dunn-Bonferroni was not statistically significant for control and expert ($p = 0.229$) or expert and peer ($p = 0.593$). Physical therapists who received peer feedback during the workshop had the greatest increase in ACT knowledge compared to physical therapists who did not participate in training or physical therapists who received expert feedback.

**Hypothesis 2**

Hypothesis 2 stated that physical therapists’ psychological flexibility would increase the most in the expert group compared to the peer and control groups. The four assumptions were met for the Kruskal-Wallis because the dependent variable is continuous, the independent variable had three categories (control, peer, and expert), each observation was independent, and distribution of each was the same shape. These assumptions being met allowed for the statistical analysis to be conducted by the researcher.

A Kruskal-Wallis test was performed to determine whether there was a difference in PLEX between the three feedback groups (i.e., expert feedback, peer feedback, and control). The Kruskal-Wallis showed that there was no statistically significant difference in the median PLEX scores between the three groups, $H = 1.01, p = 0.603$, with a median PLEX score of 0.50 in the control group, 0.00 in the peer group, and 1.50 in the expert group. The results from the study
were not statistically significant and therefore failed to reject the null hypothesis because psychological flexibility did not change for physical therapists who did not participate in training and for physical therapists who received peer or expert feedback.

**Hypothesis 3**

Hypothesis 3 stated that physical therapists’ self-compassion would increase the most in the expert group compared to the peer and control groups. The four assumptions were met for the Kruskal-Wallis because the dependent variable is continuous, the independent variable had three categories (control, peer, and expert), each observation was independent, and distribution of each was the same shape. These assumptions being met allowed for the statistical analysis to be conducted by the researcher.

A Kruskal-Wallis test was performed to determine whether there was a significant difference between SCOMP between the three feedback groups (i.e., expert feedback, peer feedback, and control). The Kruskal-Wallis showed that there was no statistically significant difference in the median SCOMP scores between the three groups, $H = 1.08$, $p = 0.584$, with a median self-compassion score of 0.00 in the control group, -1.67 in the peer group, and -0.04 in the expert group. Results from the statistical analysis did not find a statistically significant difference and therefore failed to reject the null hypothesis because self-compassion did not change for physical therapists who did not participate in training and for physical therapist who received peer or expert feedback.

**Hypothesis 4**

Hypothesis 4 stated that participants in the expert feedback group will have the highest fidelity at post-test compared to either the peer feedback or control groups. A chi-square test of homogeneity has four assumptions that were met because the dependent variable was a
dichotomous variable, there were three categories that were independent of each other (control, peer, and expert), each observation was independent, and each participant was randomly assigned to each independent group (control, peer, and expert) from a single sample. These assumptions were met and allowed for the investigator to complete a chi-square test of homogeneity on the data set.

The chi-square test of homogeneity was used to determine whether there was an association between groups. Results from the Pearson chi-square test showed a statistically significant result, where \( \chi^2(2) = 6.65, p = 0.036 \). The post hoc test of Cramer’s V revealed a correlation of 0.45, showing a moderate effect size between FEEDB and SRFACT (Field, 2018). The moderate effect size indicates that the association between FEEDB and SRFACT in this data set is quite strong. The results from this statistical analysis inform us that fidelity is associated by different forms of feedback.
CHAPTER 5: DISCUSSION

Purpose of the Study

The purpose of the study was to examine how to train physical therapy providers to effectively incorporate ACT into their treatment sessions. Despite a small sample size, a majority of physical therapy providers in this study reported practicing physical therapy for over a decade and reported treating clients with chronic pain as a normal part of their caseload. The data yielded some information about how these physical therapy providers performed in an online ACT workshop with different feedback methods.

Each hypothesis helped guide this research study and the results did provide findings that have implications for physical therapy providers, educators, and future research. Results from Hypothesis 1 indicated that physical therapy providers in this small sample increased their knowledge via an online workshop. No statistically significant difference in psychological flexibility was detected in this study (Hypothesis 2). However, self-compassion scores did decrease in both peer and expert groups, but not to a statistically significantly difference (Hypothesis 3). Hypothesis 4 did find that fidelity and feedback were statistically significantly associated. These findings and their interpretations do provide insights into next steps for each discipline that benefits from this research study.
Interpretation of Hypothesis 1

Physical therapy providers’ knowledge scores were statistically significantly different between groups such that knowledge scores were higher in the peer group compared to the control group. No statistically significant differences between control and expert groups or peer and expert groups were detected. Physical therapists when educated about chronic pain in a pain education curriculum were found to have increased knowledge on the dynamic aspects of pain compared to students in a traditional physical therapy curriculum (Hush, Nicholas, & Dean, 2018). These findings indicated that physical therapy providers learned about the complexity of treating clients with chronic pain.

Researchers have examined the effectiveness of educational workshops and found that learners who attend workshops increase their knowledge scores from baseline to post-test (González Blum et al., 2020). Students in a physical therapy program had a 5.8% to 9.1% increase in knowledge and clinical examination skills when completing a workshop that was facilitated by an interdisciplinary team (González Blum et al., 2020). The findings in the current study are slightly different compared to the González Blum et al. (2020) study because the peer group had the largest increase in knowledge compared to the expert or control feedback groups. The findings for the peer and expert groups in this study about an ACT online workshop are similar when compared to the González Blum and colleagues (2020) study for their participants having an increase in knowledge scores after having taken a workshop. Only the peer group in this study about an ACT online workshop was found to be significantly different when compared to the control group. The expert group had 8 participants while the peer group had 11 participants; therefore, further investigation is necessary to determine whether the findings are
robust. Importantly, the study demonstrates that the workshop was an effective mode of education delivery because knowledge increased, regardless of the feedback method. This information is important when considering future studies.

**Interpretation of Hypothesis 2**

Physical therapists’ psychological flexibility did not statistically significantly differ between groups in this study. Psychological flexibility is a key feature of ACT and occurs when the six core processes work together (Hayes, 2019). To practice psychological flexibility an individual must change their relationship with thoughts, emotions, and feelings (Zhang et al., 2018). Psychological flexibility helps individuals change their health behaviors by adapting dynamically to daily demands (Kwasnicka et al., 2016). Developing psychological flexibility takes time and consistent practice. It is possible that the brief nature of the intervention in the current study (i.e., four weeks) might not be enough time to detect changes in psychological flexibility among busy physical therapy providers (Hayes, 2019; Moran & Ming, 2020; Yadavaia, Hayes, & Vilardaga, 2014).

Psychological flexibility has been found to be one of the greatest mediators for helping clients with chronic pain achieve enhanced outcomes in their QOL (Wicksell, Olsson, & Hayes, 2010). Practitioners who use ACT themselves have increased psychological flexibility and the clients with whom they use ACT experience better outcomes with practitioners who are practicing ACT in their own lives (Feliu-Soler et al., 2018). ACT support systems for practitioners using ACT with their clients with chronic pain may be important for non-psychology based disciplines such as physical therapy (Feliu-Soler et al., 2018). Creating and testing support systems within the online ACT workshop was one consideration for creating the
peer group and the expert group. The goal was for the peer group to create discussion boards to help each other with problem solving as they navigated the course, while the expert group could consult with the expert psychologist. Therefore, it is important to continue to examine ways to educate and provide support for physical therapy providers who are learning and implementing ACT interventions with their chronic pain clients.

**Interpretation of Hypothesis 3**

One of the connections between ACT and self-compassion is the importance of being open and aware of one’s own suffering and to use kindness toward oneself as one heals (Neff, 2003). The connection between ACT and self-compassion is one reason why these variables were taken into consideration for the research study. Statistically significant group differences in self-compassion scores were not detected among physical therapy providers. It is also noted that the Dunning-Kruger effect might have occurred for therapists as they took their self-compassion post-test (Duignan, 2022). Psychological flexibility scores did not decrease but self-compassion scores did decrease between all participants in the study. Self-compassion is best developed when an individual is practicing ACT in their own lives (Moran & Ming, 2020; Yadavaia, Hayes, & Vilardaga, 2014). Self-compassion is not a principle in physical therapy education and physical therapists might have had inflated pre-test scores due to this lack of knowledge. As physical therapy providers learned about self-compassion and ACT, their scores may have reflected this increased application in their lives resulting in lower post-test scores in both peer and expert groups.

Individuals with higher self-compassion scores have been found to have increased health, mental health, QOL, and life satisfaction scores (Pyszkowska & Rönnlund, 2021; Zessin,
Dickhäuser, & Garbade, 2015). While the inverse is also true, healthcare workers with low levels of self-compassion had higher scores of decreased mental health especially in anxiety and depression (Kotera et al., 2021). These increased benefits to one’s life are important no matter the professional trade or demands on life. Healthcare workers with increased self-compassion have been found to have decreased desire to leave their work and increased therapeutic rapport with their clients (Duarte, Pinto-Gouveia, & Cruz, 2016; Savieto et al., 2019). The multitude of benefits for healthcare workers developing self-compassion was one of the major considerations in including an assessment of self-compassion in this research study. Future investigation into the development of self-compassion in the healthcare workers is needed as continued work with ACT in healthcare is carried out.

**Interpretation of Hypothesis 4**

A strong association was found between fidelity and different forms of feedback. Examining the fidelity of practitioners implementing an intervention in the field is considered an important aspect assessing evidence-based treatments (Hinckley & Douglas, 2013). Many evidenced-based treatments have decreased effectiveness in the field compared to their original research outcomes due to decreased fidelity of treatments by providers in the field (HcHugo et al., 2007; Joa et al., 2020). Ensuring intervention effectiveness in clinic settings is crucial in making sure the intervention is delivered to the highest quality to the clients. The importance of using efficient, cost-effective fidelity assessments in the field is one reason that this variable was included in this research study. Clinicians who use fidelity checks during intervention implementation delivered their interventions at a higher fidelity than clinicians who did not have fidelity checks (Carroll et al; 2007; Joa et al., 2020; Taniguchi et al., 2019). The way in which
practitioners receive their fidelity is also an important factor. Feedback is best delivered in one-on-one sessions compared to group feedback (Daniels, 2016) and therefore that was a reason that one-on-one sessions (expert group) and group feedback (peer group) were created in this study. Fidelity is an important quality check in treatments being carried out in the clinic by practitioners.

Godfrey and colleagues (2019) found that fidelity was impacted when physical therapists were trained by one psychologist. The physical therapists in the study received a two-day face to face session with the psychologist, followed by monthly group supervision from the psychologist. Physical therapists in the study implemented ACT with a fidelity score of at least 41% when scored by fidelity raters (Godfrey et al., 2019). Additionally, there was a strong association between fidelity and different forms of feedback in the current study, where fidelity was associated with the type of feedback (peer vs expert), which is in line with the findings of Godfrey and colleagues (2019). In the Godfrey and colleagues’ study (2019) fidelity was affected by the supports that were provided to physical therapists learning about ACT. Since a chi-square test was used, and the sample was very small, further investigation is needed to understand which forms of feedback most influence the fidelity of physical therapy providers.

Key Findings

The results of the study provide a base of knowledge for physical therapists and the ACT community. Currently, Godfrey and colleagues’ (2019) research is the only currently published article focusing on physical therapists who learn ACT from a psychologist and then provide ACT to clients with chronic pain. That study was conducted in the United Kingdom (Coronado et al., 2020), and the current study demonstrates that a similar approach is promising among
practitioners in the United States. Findings from the workshop indicate that physical therapists are interested in learning more about psychology-based treatments geared toward clients with chronic pain. Further investigation into how different forms of feedback affect physical therapy providers’ fidelity in the clinic needs to be investigated since a strong correlation was found in this small sample size. The small sample size does not have high statistical power and can lead to error in reporting the outcomes. A larger sample size of physical therapy providers with enough statistical power is needed to help bring out further information on how fidelity could be affected by feedback. Further investigation is needed to understand how to help physical therapy providers understand and implement self-compassion and psychological flexibility while learning about the ACT process in their own lives and when using ACT with their clients. This research study is a small but important step in helping researchers understand more about how to train physical therapists about ACT.

**Implications for Practitioners**

Physical therapy providers may learn about ACT from attending workshops on ACT (Godfrey, 2019). This current study was the first to compare how peer vs expert feedback relates to outcomes of knowledge, psychological flexibility, self-compassion, and fidelity when physical therapy providers learned about ACT and implemented ACT while working with clients with chronic pain. The results of this study contribute to evidence of using online, interactive platforms with physical therapy providers interested in understanding and implementing ACT in the United States. These findings should be interpreted with caution, however; the design of the ACT online workshop would benefit from a focus group of physical therapy providers. Workshop content and delivery should be examined by a focus group of physical therapy
providers to better understand strengths and weaknesses of the current ACT online workshop material and delivery. Also, understanding what supports practicing physical therapy providers prefer to use (e.g., access to expert feedback, peer support, etc.) should be explored. Insights from physical therapy providers about the best ACT metaphors for each of the ACT core processes would be beneficial to provide a better educational method to learn and implement psychological flexibility into their own lives. These improvements can allow for a better assessment on how the online ACT workshop facilitates any development of the variables in the study of knowledge, psychological flexibility, self-compassion, and fidelity.

**Implications for Educators**

Carrying out an online workshop for ACT is a viable option for training physical therapists. Physical therapists who completed the workshop did so within four weeks and did not report any complaints to the investigator. It is important to receive approval from all necessary bodies that approve CEUs prior to beginning the study. Gaining national approval for the CEU may have increased recruitment and decreased attrition in the study. Another recruitment design to decrease attrition would be to start all the participants in a control wait group immediately upon their request to join the study and then randomly assign each participant into the peer or expert group. Finally, prior to implementing larger workshops, the association between self-compassion and psychological flexibility found in this study needs to be investigated to make sure enough content and assignments are provided to allow for skill development to occur within four weeks.

Future research could focus on increasing participant recruitment to allow for a more robust data set to be collected on the constructs of knowledge, psychological flexibility, self-
compassion, and fidelity. A larger, more robust data set would allow for statistical power to be achieved when running the statistical analysis on the data and therefore provide more reliable conclusions about how online education helps physical therapists understand ACT. Once data are collected, a comparison of an online workshop to a face-to-face workshop for physical therapy providers would help researchers understand whether one educational delivery method is superior to another. The literature based on this topic is still very novel and has much room to grow in helping physical therapists understand the best ways to learn about ACT and then implement ACT in the clinic.

**Strengths and Limitations**

This study had several strengths. Participants were recruited from all over the United States and included all training levels, genders, and races, which increases generalizability. Weekly modules were designed to provide participants flexibility to complete the module within a one-week time frame while also carrying out their normal life and work duties. Participants were informed that flexibility was built into the workshop in case any participant needed extra time. Overall, participants completed each weekly module on time, and only two participants took an extra week to complete the Week 3 module. A strength would be that participants provided qualitative reflections that provided insights into their experiences with each weekly learning module (e.g., reflective assignments) that helped the physical therapy providers work on their ACT skills. The flexible use of technology was enhanced by using a learning management system that allowed for participants to complete each weekly module’s videos, information, and assignments from their smartphone, tablet, laptop, or computer. Participants were also able to complete these assignments anywhere they had internet or mobile data access. This flexibility
created opportunities for participants to complete sessions at any time and place that was most conducive to their exiting commitments at work and at home.

The study’s overall completion rate of 33 participants is a major limitation of the study. The sample did not have enough power to conduct a parametric statistical test for Research Question 1 and the three hypotheses that are tied to that question. Furthermore, some participants were confused as to whether or not their participation would earn CEUs because there was confusion about whether their state would accept the CEUs that were approved by the state of Arkansas. This confusion may have contributed to the attrition rate (38%) and led to a small sample size (33 participants). Therefore, the small sample size is a limitation of the study since the study needed 53 participants to have enough power to adequately conduct the statistical test proposed in the research design. Another limitation to this study was in the research design. It is noted that placing all participants in a control wait group for four weeks and then dividing them into either the peer group or expert group may have yielded a higher number of participants in each group. This design method may have helped reduce attrition.

The use of standardized assessments in this study enhanced the validity of the study design. The SRFACT was assessed by the Early Start Denver model of a passing score being 80% average across the domains that were scored (Rogers & Dawson, 2010). The study also used the Self-Compassion Short Scale (Babenko, O. and Guo, 2019; Bratt & Fagerstrom, 2020; Raes et al., 2011) and Work-Related Acceptance and Action Questionnaire (Bond et al., 2012) which are valid and reliable measures. The control group was designed and implemented into the study to help assess whether any factors affected the repeated-measures design of the study. In the control group, KNO and SCOMP had 0.00 scores while the PFLEX had a 0.50 increase.
There was consideration if the Dunning-Kruger effect occurred to SCOMP since scores
decreased -1.67 in the peer group and -0.04 in the expert group (Duignan, 2022). The participant
sample is small, and a greater sample is needed to determine whether the Dunning-Kruger effect
does take place or not when taking the Short Self-Compassion test twice with physical therapists
(Duignan, 2022).

Power estimates revealed that a minimum of 57 participants were needed to adequately
test the hypothesis of interest. The current study included 53 participants and had an attrition rate
of 38.74%, leaving 33 participants available for data analysis. The high attrition rate is a concern
in this sample because it contributed to the low sample size. Future research could examine
whether specific elements in this study contributed to attrition. There was a four-week time
frame in recruiting which may have led to the higher attrition rate. The use of convenience
snowball sampling may have led to selection bias and affected the internal validity of the study;
however, random assignment to groups enhanced internal validity.

The external validity of the study was maintained through several different parameters.
Ecological validity remained reduced since the sample was not a randomized sample of United
States physical therapists. Participants did take the workshop during the same period of time and
was as inclusive as possible to allow for the results to apply to the practicing body of physical
therapists in the United States given the small sample being produced. The results of the study,
both significant and not significant, provide evidence to the physical therapy and ACT
communities about the usefulness of an online workshop about using ACT in practice. Finally,
conclusions are tentative until the study can be completed using a larger sample size.
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APPENDIX A

PAIN FIGURE
<table>
<thead>
<tr>
<th>Types of Pain</th>
<th>Acute Pain / Nociceptive</th>
<th>Chronic Pain / Non-nociceptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtypes of Pain</td>
<td>Nociceptive Pain</td>
<td>Neuropathic Pain</td>
</tr>
<tr>
<td>Conditions associated with subtypes of pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Small fiber neuropathy a. Diabetic neuropathy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Postherpetic pain b. Guillain-Barre</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Lundy-Ekman, 2018)
APPENDIX B

THEORETICAL CONCEPT MAP
APPENDIX C

OVERVIEW SHOWING DATA COLLECTION PERIODS IN THE STUDY
<table>
<thead>
<tr>
<th>Time</th>
<th>Control</th>
<th>Vs</th>
<th>Peer Feedback</th>
<th>vs</th>
<th>Expert Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-intervention</strong></td>
<td><strong>Knowledge:</strong> ACT Knowledge questionnaire</td>
<td></td>
<td><strong>Knowledge:</strong> ACT Knowledge questionnaire</td>
<td></td>
<td><strong>Knowledge:</strong> ACT Knowledge questionnaire</td>
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<tr>
<td></td>
<td><strong>Psychological flexibility:</strong> Work related acceptance and action questionnaire (WAAQ)</td>
<td></td>
<td><strong>Psychological flexibility:</strong> WAAQ</td>
<td></td>
<td><strong>Psychological flexibility:</strong> WAAQ</td>
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<tr>
<td></td>
<td><strong>Self-compassion:</strong> self-compassion scale</td>
<td></td>
<td><strong>Self-compassion:</strong> self-compassion scale</td>
<td></td>
<td><strong>Self-compassion:</strong> self-compassion scale</td>
</tr>
<tr>
<td><strong>Post-intervention</strong></td>
<td><strong>Fidelity:</strong> SRFACT</td>
<td></td>
<td><strong>Fidelity:</strong> SRFACT</td>
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<td><strong>Fidelity:</strong> SRFACT</td>
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<td></td>
<td><strong>Knowledge:</strong> ACT Knowledge questionnaire</td>
<td></td>
<td><strong>Knowledge:</strong> ACT Knowledge questionnaire</td>
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<td></td>
<td><strong>Self-compassion:</strong> self-compassion scale</td>
<td></td>
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<td></td>
<td><strong>Self-compassion:</strong> self-compassion scale</td>
</tr>
</tbody>
</table>
APPENDIX D

ACT FIDELITY CHECKLIST
Now please self-identify one client that you have treated twice in the last 10 days. Please mark how you self-assess how you completed each of the Acceptance and Commitment Therapy domains that you covered. Only mark the Acceptance and Commitment Therapy domains that you covered in each session.

**Scoring Chart:**

<table>
<thead>
<tr>
<th>ACT Component</th>
<th>Session 1</th>
<th>Session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Diffusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self as Context</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Committed Action</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Scale of measure:**

<table>
<thead>
<tr>
<th>Score</th>
<th>Category Title</th>
<th>Full Category Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Best possible performance</td>
<td>Delivery this component professionally</td>
</tr>
<tr>
<td>4</td>
<td>Fully Competence Level</td>
<td>Represents a component example component delivery, without mistakes</td>
</tr>
<tr>
<td>3</td>
<td>Mixed Level of Competence</td>
<td>Delivery with some strength and some weakness</td>
</tr>
<tr>
<td>2</td>
<td>Flawed Display of Competence</td>
<td>More weakness than strengthens on delivery</td>
</tr>
<tr>
<td>1</td>
<td>Need training prior to working alone</td>
<td>No delivery component used during observation.</td>
</tr>
<tr>
<td>0</td>
<td>Not delivered during this session</td>
<td>Not delivered during this session</td>
</tr>
</tbody>
</table>
APPENDIX E

ACCEPTANCE AND COMMITMENT KNOWLEDGE QUESTIONNAIRE
Directions: This questionnaire consists of 16 items regarding Acceptance and Commitment Therapy. Please read each question carefully and mark the letter of the best response.

1. Suppose a client states, “I’ve learned that the thoughts I have are not me. I want to talk to others who have a trauma history so that they can know that they are not defined by their trauma history.” In this example, what concept has the client most likely internalized?
   a. willingness
   b. self-as-context
   c. defusion
   d. values as goals

2. Which of the following is not an ACT-consistent statement about committed action?
   a. Engage in valued life activities even when psychological barriers arise.
   b. The process is more important than the outcome of our actions.
   c. Failure is not a possible outcome of truly committed action.
   d. Behaving confidently is not the same as feeling confident.

3. When discussing willingness a client responds, “I’ll talk to my wife about how much pain I am in as long as I don’t get overwhelmed.” The client is having difficulty grasping
   a. the all or nothing nature of willingness
   b. the difference between willing and wanting
   c. the need to be open to experience at all times
   d. the link between willingness and values

4. If a therapist uses the phrase “As it is, not as it says it is,” she is referring to
   a. the process of defusion
   b. the concept of conceptualized self
   c. the process of contact with the present moment
   d. the concept of self-as-context

5. From an ACT perspective, what is problematic with this therapist statement?: “When your girlfriend told you she was leaving it made you feel sad.”
   a. Linking emotions to external events could result in more avoidance.
   b. The therapist is reinforcing the content of the story.
   c. The therapist identified reasons as causes for emotions.
   d. The therapist is referring to emotions as real phenomena.

6. A client tells a story about her life that includes drinking alcohol every day, three failed marriages, moving every 12 months, overeating, and repetitious self-injury. What process is most likely to functionally connect these issues?
   a. escape maintained behavior
   b. experiential avoidance
   c. relational frames of comparison and time
   d. excessive cognitive fusion
7. Discriminating a difference between evaluation and description is one component of
   a. defusion.
   b. self-as-context.
   c. willingness.
   d. values.

8. Which of the following best illustrates a client’s confusion with goals as values?
   a. A man wants to be a good employee.
   b. An adolescent wants to be more educated.
   c. A woman wants to be emotionally available for several people in her life.
   d. A woman wants to be married.

9. According to the ACT book, when a therapist says the phrase “If you are not willing to
   have it, you’ve got it” he is illustrating the concept of
   a. defusion.
   b. control as the problem.
   c. acceptance.
   d. values.

10. Which of the following is not an ACT-consistent explanation of “psychopathology”?
    a. emotional avoidance.
    b. ineffective thinking and behavior patterns.
    c. cognitive fusion.
    d. lack of committed action.

11. Ongoing self awareness is the same as
    a. self-as-content.
    b. the conceptualized self.
    c. the evaluated self.
    d. self-as-process.

12. Which of the following is not a statement about contact with the present moment?
    a. Thoughts and feelings often present themselves as about the past or future, but
       they are experienced now.
    b. Cultivating awareness of thoughts and emotions as they occur allows us to notice
       when they get in the way of valued action.
    c. You are not your thoughts, memories, or roles.
    d. Life is not something to be lived when you have solved your problems, life is
       going on now.

13. Values are
    a. non verbal qualities of action
    b. verbally construed global desired life consequences
    c. a decision, not a choice
d. the sum of the goals achieved while on a life path

14. Willingness, as defined by the ACT book, refers to
   a. a person’s motivation to try something new or different in their life.
   b. a feeling or belief that is helpful for tolerating discomfort.
   c. noticing thoughts as verbal constructions.
   d. giving up the struggle with emotional discomfort and disturbing thoughts.

15. The purpose of creative hopelessness is:
   a. To create a coherent story about why the client’s life is painful.
   b. To help a client recognize that his or her life, as it is being lived now, is hopeless.
   c. To show that the strategies that the client has used to manage internal experiences
      are unworkable.
   d. To illustrate to the client that they need to find new ways to fix their problems.

16. The belief “anxiety is bad” is an example of
   a. a dysfunctional thought.
   b. unwillingness.
   c. cognitive fusion.
   d. deliteralization.
APPENDIX F

WORK-RELATED ACCEPTANCE AND COMMITMENT QUESTIONNAIRE
(WAAQ) Please rate the truth of each statement (for the agreed time period) in the column on the right, using the following scale:

<table>
<thead>
<tr>
<th>Never true</th>
<th>Very seldom true</th>
<th>Seldom true</th>
<th>Sometime true</th>
<th>Frequently true</th>
<th>Almost always true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1. I am able to work effectively in spite of any personal worries that I have
2. I can admit to my mistakes at work and still be successful
3. I can still work very effectively, even if I am nervous about something
4. Worries do not get in my way of my success
5. I can perform as required no matter how I feel
6. I can work effectively, even when I doubt myself
7. My thoughts and feeling do not get in the way of my work
APPENDIX G

SELF-COMPASSION SHORT SCALE
Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

<table>
<thead>
<tr>
<th>Almost never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Almost always</th>
</tr>
</thead>
</table>

1. When I fail at something important to me I become consumed by feelings of inadequacy.
2. I try to be understanding and patient towards those aspects of my personality I don’t like.
3. When something painful happens I try to take a balanced view of the situation.
4. When I’m feeling down, I tend to feel like most other people are probably happier than I am.
5. I try to see my failings as part of the human condition.
6. When I’m going through a very hard time, I give myself the caring and tenderness I need.
7. When something upsets me I try to keep my emotions in balance.
8. When I fail at something that’s important to me, I tend to feel alone in my failure.
9. When I’m feeling down I tend to obsess and fixate on everything that’s wrong.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I’m disapproving and judgmental about my own flaws and inadequacies.
12. I’m intolerant and impatient towards those aspects of my personality I don’t like.