

**The Impact of Religious Music on Chronic Pain Perception**

**by**

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**Dedication**

This document and all of the tears, frustration, anger, shots of espresso, Starbucks green tea lattes, mugs of cold coffee, lox on a bagel, and emotions are dedicated to my grandmother, Alice Alter. Everyone knew her as Alice Alter or mean Ms. Alter. I knew her as Bubbie, a play on the traditional Polish terminology for Grandmother. You see, she was a teacher within the City School District of the City of New York. She pushed her children and her grandchildren to their very limits because she knew that what they were capable of was more than what they thought they were capable of. She pushed me to go forth and prove those who told me that I couldn't do something that I could. Bubbie told all of her offspring, those related by blood and those who married into the family to "come home victorious or come home on their shield." Well Bubbie, I think that I did and I hope that you're proud of me.

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## **Abstract**

One of the most debilitating conditions that currently exists is chronic pain. With the multitude of pain-related consequences that can be experienced, the biopsychosocial perspective examines the chronic pain experience using a multifactorial approach that examines all aspects of life impacted by the chronic pain experience (Gatchel et al., 2007). In examining aspects that have impacted the chronic pain experience, religion has been found to be a factor. Previous research has shown that religious practitioners experience a high likelihood of turning towards religion in an effort to seek an understanding regarding what is happening to them (Pargament & Raiya, 2007). With music being a common pain intervention, being able to choose what music to listen to has been found to be related to positive outcomes (Mitchell et al., 2007). For religious individuals, religious music has been found to be a coping mechanism in response to stressful situations (Safara & Samanesadatsadidpoor, 2014). The exact mechanism for the relationship is unknown, however, when both music and religion are important, the effect of music as a coping mechanism may be amplified (Hilliard, 2005). The main goal of this study is to examine how religious and non-religious music impacts the chronic pain experience. In addition, religion and the chronic pain experience will be examined. Participants were recruited through Amazon's Mechanical Turk (MTurk) in order to gather an adult sample of individuals with pain. Statistical analyses found that individuals who scored high on measures of religiousness also reported listening to music that reminded them of their religion. It was also found that there is a strong cognitive associative context in which music is used for pain management. Implications from this research include



providing resources for religious individuals experiencing chronic pain, best practices for studying religion in a psychological context, and tailoring non-pharmacological pain interventions.

## **Chapter One**

### **Introduction**

One of the most debilitating chronic conditions that currently exists is chronic pain. There are a wide range of options available for the management of chronic pain, including biological (pharmacological) interventions and psychotherapeutic options, but one treatment alone might not be sufficient for patients with pain and oftentimes a multidisciplinary approach shows the most effectiveness (Gatchel et al., 2014). While the types of treatments that are included within multidisciplinary treatment programs can vary, music therapy is common (Bernatzky et al., 2012). Although there is no consensus in the literature regarding the “gold standard” for the type of music used, certain characteristics of the music, pain management experience, and individual traits have been found to impact the effectiveness of music on pain perception. Religiousness, in particular, seems to be an individual trait that has been consistently associated with pain management (Dedeli & Kaptan, 2013) and listening to religious music has been found to increase an individual’s spiritual well-being (Hilliard, 2005). Therefore, this study sought to explore the relationship between an individual’s religiousness, coping through music, and the perception of the chronic pain experience

### **Pain**

Pain is defined as the unpleasant sensory and emotional experiences associated with actual or potential tissue damage (Ashburn & Staats, 1999). Associated tissue damage may be due to progressive disease processes, inflammatory processes, or injury. The most common differentiation between pain conditions is between acute and chronic pain. Acute pain can be

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understood as a consequence of surgery, illness, and injury (Kerns et al., 2011) and is seen as an expected consequence of tissue damage (Ashburn & Staats, 1999). Acute pain is any type of pain that completely resolves in three months or less (World Health Organization, 2019b), typically with no long-term side effects and individuals are able to return to activities they were engaging in before experiencing the acute pain (Ashburn & Staats, 1999). Although acute pain is typically perceived as distressing and uncomfortable to many individuals, the possibility for transition from acute to chronic pain is more alarming. This transition may result from persistent tissue damage failing to resolve, leading to the pain becoming debilitating and the symptoms persisting (Casey et al., 2008). It is unknown why some instances of acute pain transition into chronic pain, however, there are a variety of factors that can influence the transition including the intensity of acute pain and associated psychological factors (Casey et al., 2008).

The transition from acute to chronic pain can lead to several issues, including long-term disability and constant intervention for pain management (Casey et al., 2008). Chronic pain, as compared to acute pain, tends to be associated with higher costs and physical/mental health comorbidities. According to ICD-11 [International Classification of Diseases], “Chronic pain is pain that persists or recurs for longer than 3 months,” (World Health Organization, 2019a). There are a variety of syndromes that can result in chronic pain, including fibromyalgia and phantom limb pain (Ashburn & Staats, 1999) as well as conditions such as spinal degeneration, osteoarthritis, or other disc diseases. Within healthcare systems, chronic pain has been found to be a significant problem that puts a strain on resources (Henschke et al., 2015) and impacts the quality of life for those who experience it (Gatchel et al., 2014). Overall, chronic pain is prevalent within the United States (Dahlhamer et al., 2018) and has a large impact on the healthcare system, requiring a multidisciplinary approach towards understanding the chronic

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pain experience and how to best provide those who experience chronic pain with resources that are evidence based to help them to cope.

### ***Chronic Pain***

Given the public health impact of chronic pain it is critical to have a sound understanding of the mechanisms that drive the pain experience. Chronic pain is a multifactorial condition, with biological, psychological, and sociological factors influencing its perception. Chronic pain tends to be characterized by a universal inability to participate in activities of daily living without assistance (Ashburn & Staats, 1999). This inability to participate without restrictions has been found to impact multiple aspects of life, leading to overall decreased life satisfaction. In order to properly treat chronic pain, which is oftentimes either over or under treated (Ashburn & Staats, 1999), evaluation of the impact of chronic pain on an individual's life must be examined at multiple levels. In order to fully understand the overall impairment associated with chronic pain, it has been found that the biological, psychological, and physiological perspectives illustrate how all-encompassing the chronic pain experience can be (Gatchel et al., 2007).

### **The Biopsychosocial Perspective of Pain**

With the multitude of potential pain related consequences that can be experienced at the biological, psychological, and sociological levels, researchers have used the biopsychosocial perspective to understand what factors seem to modulate the chronic pain experience (Gatchel et al., 2007). Biological impairment associated with chronic pain includes nociceptor activation to stimuli, leading to the perception of pain (Melzack & Wall, 1965). The psychological impairment associated with chronic pain is also known to be associated with increased psychological comorbidities (Gatchel et al., 2014; Gatchel et al., 2007) and/or psychological characteristics or behaviors that modulate the pain experience. Sociological impairment can also

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occur due to chronic pain, resulting in possible economic impact (Phillips, 2006) and relationship strain/stress (Leonard et al., 2006).

### ***Biological Factors Associated with Pain***

Using a biological perspective, pain is the result of a stimulus impacting a particular area to such a degree that the threshold of normal tolerance is exceeded, resulting in varying levels of discomfort (Woolf & Ma, 2007). In order for a stimulus to be discriminated as noxious, several steps must be followed. First, a particular stimulus must be exposed to any type of free nerve ending and the sensation has to be registered as pain. This leads to the free nerve endings being categorized as a nociceptor (Woolf & Ma, 2007). The nociceptors then transport the signals to the central nervous system via fast nerve fibers or slow nerve fibers, dependent on what type of pain is being experienced. Typically, acute pain is more likely to be transported by fast nerve fibers and chronic pain is likely to be transported by slow nerve fibers. After the slow and fast nerve fibers transport their information to the thalamus and somatosensory cortex via the spinal cord and substantia gelatinosa, the pain is interpreted in regard to intensity and location. There are several neurochemicals that are associated with pain. The release of enkephalins, a type of opiate, is influenced by the activation of slow nerve fibers and further influences the release of other neurotransmitters associated with pain. The Gate Control Theory, as outlined by Melzack and Wall (1965), also illustrates a physiological pain pathway through demonstrating that there are structures within the central nervous system that can mediate the perception of pain via influencing the flow of nerve fibers. As the gate is slightly opened, frequently through psychological or sociological means, only a few of the nerve fibers would be able to transmit pain signals to the brain for perception, thus buffering or exacerbating the pain experience based on the situation.

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### *Sociological Factors Related to Pain*

In regard to the sociological aspects of pain, outside perception of chronic pain can impact the behaviors of an individual with chronic pain through symptom exacerbation. As noted by Leonard, Chatkoff, and Maier (2018), relationship satisfaction can be a link towards reported symptom exacerbation. This illustrates those who are within a relationship and are experiencing poor relationship satisfaction while also experiencing chronic pain may exacerbate their symptoms in order to garner support, consistent with a behavioral model of pain (Fordyce et al., 1973; Leonard et al., 2018).

When applied to the behavioral model of pain, those with chronic pain alter their behaviors when interacting with others as to order to elicit support in response to their outward presentation of chronic pain, which illustrates to individuals who do not know the individual that the pain they are experiencing is unbearable (Leonard et al., 2006). As a result, the behaviors can lead to positive reinforcement, with the individual who is experiencing chronic pain behaving in a certain way in order to garner specific behaviors from others (Fordyce et al., 1973)

Also noted by Kerns, Turk, and Rudy (1985), there are several different types of spousal responses to pain, including punishing responses. Punishing responses have consistently been shown to be associated with negative pain and psychological outcomes. This type of response includes individuals who are experiencing chronic pain reporting feelings of being “punished” or having their feelings invalidated by their partners (McCraken, 2005). In response to these punishing behaviors, individuals do not report lower levels of pain acceptance, both internally and externally (McCraken, 2005). Instead of the individual with chronic behavior having their behaviors reinforced through positive reinforcement, their behaviors were reinforced through

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positive punishment because they reduce the likelihood of the engagement in a specific behavior with the addition of their partner's response.

### *Psychological Factors Associated with Pain*

There are a wide variety of psychological factors that are associated with pain. Many of these factors revolve around psychopathological disorders and their underlying consequences. In order to understand the psychological factors associated with the chronic pain experience, it is necessary to understand that there are multiple psychological disorders that have been found to be influenced by pain, including anxiety and depression. The role that psychological distress plays within the chronic pain experience is complex as several studies have found a reciprocal association between distress and pain (Husted et al., 2012). Although Husted et al. (2012), does not focus on clinically significant disorders of depression and anxiety, Gatchel et al. (2007), provides a more detailed review of the literature of this area. In addition to the link between distress and pain, is how this impacts the individual and it has been noted that the level of psychological impairment experienced has been found to be related to the level of pain experienced (Sterling et al., 2005)

Anxiety has been found to be common in those with chronic pain due to the unexpected symptoms that are associated with chronic pain in regard to exact symptoms and severity (Gatchel et al., 2007). This leads to individuals feeling as if they have no control in the situation, leading to them avoiding certain behaviors to avoid experiencing pain because it is the only element they can control (Kerns et al., 2011). This association between behavior engagement and experiencing pain becomes cyclical and the avoidance reinforces the fear. The avoidance appears to be related to anxiety due to catastrophizing of any behavior that may lead to pain and the perception of being able to control when pain occurs (Buenaver et al., 2007; Kerns et al., 2011).

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Clinically significant depression has also been found to be a common psychological diagnosis in individuals with chronic pain due to the increased levels of disability that individuals with chronic pain experience (Gatchel et al., 2007). There exists a significant relationship between experiencing chronic pain and clinically significant depression due to the robust relationship that exists, suggesting that individuals who experience chronic pain are at an increased likelihood of experiencing depression (Banks & Kerns, 1996; Gatchel et al., 2007). The exact mechanism behind this bidirectional relationship is unknown, however, Samwel et al. (2007), have noted that individuals who report experiencing chronic pain also report experiencing depressogenic cognitions that are the result of learned-helplessness. This is a result of an inability to engage in activities in daily living without experiencing chronic pain and acknowledging the debilitating impact of chronic pain (Samwel et al., 2007).

One psychological aspect of chronic pain that has been found to impact relationships is pain catastrophizing which consists of individuals exaggerating their symptoms in order to garner social support from others (Buenaver et al., 2007). Pain catastrophizing is typically negatively, leading to others responding negatively, which tends to be perceived as punishment and a failure to provide social support, which leads to increased depressive symptoms (Buenaver et al., 2007). This supports previous research that has illustrated that individuals expect to receive solicitous responses when catastrophizing their pain, rather than punishing responses (Boothby et al., 2004; Buenaver et al., 2007; Leonard et al., 2013).

**Pain and Coping.** Several of the psychological factors involved in the biopsychosocial perspective revolve around the perception of control surrounding pain. For individuals who suffer from chronic pain, the experience of pain and associated impairment has been found to be mediated by the appraisals and associated coping strategies used (López-Martínez et al., 2008;



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Ramirez-Maestre et al., 2008). As such, the transactional model of stress can be used to explain the process by noting that the appraisal of each situation is further mediated by the available coping mechanisms and how the application of the coping mechanisms influence consequent appraisals (Lazarus & Folkman, 1984). The transactional model of stress appraisal (Lazarus & Folkman, 1984), states that the cognitive appraisal of stressors is influenced by the situation and available coping mechanisms, with the perception of a situation influencing how resources are able to be allocated (Jamieson, Nock, & Mendes, 2012). In regard to chronic pain, when an individual is in a situation triggering pain, they adapt to the situation through utilizing a coping strategy that has been found to relieve the associated sensation of pain. This would involve a primary appraisal of the situation in order to determine which coping strategy to engage in and a secondary appraisal in order to reassess the situation and determine if the situation has been resolved or requires additional attention. As there exists less control in relation to pain experienced, the ability for coping mechanisms to mediate the appraisal of pain lessens. Researchers have found that individuals who report experiencing chronic pain tend to engage in a wide variety of both traditional and nontraditional coping strategies in order to seek relief from the discomfort including the use of analgesic medications, physical therapy techniques, seeking social support, seeking care from a multi-disciplinary team, engagement in psychotherapy, and using religion/faith to address chronic pain (Ashburn & Staats, 1999).

### **The Usage of Religion as a Coping Mechanism**

Research has found that individuals who practice religion have a higher likelihood of turning towards religion in order to cope with stress, oftentimes in an effort to seek meaning regarding what is happening to them (Pargament & Raiya, 2007). This may be due to the assumption that there is a spiritual explanation as to why something is happening (Pargament, et

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al., 2005). As a result, individuals have been found to turn towards religion during times of stress in order to understand why they are being challenged, with religion serving as a source of meaning both globally and situationally (Park & Folkman, 1997). A full review of the literature regarding the prevalence of religious coping mechanisms in response to situations that are perceived as stressful can be found in Harrison et al., (2001) and Abu-Raiya and Pargament (2015).

Previous research regarding coping mechanisms used by individuals who are hospitalized has found religious coping mechanisms to be prevalent (Harrison et al., 2001). Harrison and colleagues (2001) have found that there are two assumptions associated with religious coping. The first assumption suggests that all humans encounter situations that triggering a dynamic process of coping that works for whatever situation they are engaged in (Harrison et al., 2001). The second assumption suggests that within coping individuals choose which coping mechanism to use based on what has previously worked (Harrison et al., 2001). As such, when individuals encounter situations that are perceived as overwhelming, they use coping mechanisms that they know will help the situation be perceived as less overwhelming. When applied to individuals who view religion as important, they are more likely to use religious coping mechanisms when confronted with situations that are perceived as overwhelming.

Applying Lazarus and Folkman's (1984) transactional model of stress to chronic pain, chronic pain may be seen as a stressful situation that requires a primary and secondary appraisal to assess the resources available. After the primary appraisal assessing the situation as stressful, individuals who identify as religious may have a secondary appraisal of the situation as having sufficient resources and may be able to cope with the stressor due to religion being seen as a way to buffer the perceived stress (Dezutter et al., 2010). Previous research by Phelps et al., (2009)

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also supports this explanation because research has found that individuals who are faced with stressful situations rely upon religion in order to cope with their situation.

The use of religion as a coping mechanism has been seen previously by Pargament et al. (1988) due to the reasoning that the struggles that an individual faces are nothing more than what G-d perceives them as being capable of handling. For many individuals, the analysis and recitation of religious literature serves as a way to understand who they are and what is expected of them. This has been found within the Abrahamic religions, which consists of Islam (Darabina et al., 2017), Christianity (Hamilton et al., 2013b), and Judaism (Abu-Raiya & Pargament, 2015). Individuals who identify as religious tend to turn towards religion as a coping mechanism when they experience stress (Pargament & Raiya, 2007). This has led to the proposal that the initial biopsychosocial model requires the addition of a spiritual element due to the influence that an individual's spirituality has on their overall wellbeing (Sulmasy, 2002; Dedeli & Kaptan, 2013).

The reason as to why individuals use religion as a coping mechanism varies for each individual. Previous research has found that religious coping mechanisms include: attempts to understand the world and what an individual's role is (Park & Folkman, 1997), religion's usage as a common bond between individuals, and the creation of a religious social support network (Krause et al., 2001; Park, 2007). In regard to how religion is used to understand the world and provide meaning, Park and Folkman (1997) noted that religion is used by some individuals in order to provide meaning as a method of explanation in a manner that is significant to the individual. This also serves as additional support for the usage of religion as a coping strategy due to how it shapes individual's perceptions of the world and how they perceive stressful situations with an external locus of control (Park & Folkman, 1997; Lazarus & Folkman, 1984).

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In addition to intra-individual benefits of religion, there is a foundation for social support networks due to shared beliefs that individuals of the same religion have. The use of religion as a basis for a social support network has been illustrated by Krause et al. (2001), with religious social support networks being sources for emotional and spiritual support. Active participation in religious activities is a way in which religion is used as a form of social support, specifically through prayer in group settings (Dedeli & Kaptan, 2013). For example, within Judaism, certain prayers require a quorum of ten Jewish adults (Encyclopedia Britannica, 2018), thus forcing the creation of a religious support network. One of the prayers that requires a quorum is called the Mourner's Kaddish, a prayer that those who are observing the death of an important figure in their lives recite in order to both honor the memory of their loved ones but also to acknowledge that G-d is there for them as they go through this struggle (Blumenthal, 2001). Blumenthal (2001) noted that an unexpected consequence of the recitation of the Kaddish is that mourners are not allowed to wallow within their grief. Rather, they have to engage within the community in order to recite the Kaddish. In doing so, they are engaging with the social support that exists within their community and others are made aware of the assistance they may need.

In regard to emotional support, Krause et al. (2001) noted that this source is primarily interpersonally based and revolves around feelings of support during times of stress or emotional upheaval. Spiritual support consists primarily of assistance in deepening religious views and assistance in practicing certain elements of religion (Krause et al., 2001). Applying this to the transactional model of stress, having access to this social support network serves as a coping resource during the secondary appraisal of the situation that allows individuals to engage in emotion-focused coping that has religious undertones and appraise the situation as being addressed in response to the resources used (Lazarus & Folkman, 1984).

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### *Religious Coping and Pain*

Religious coping strategies have been found to have a positive impact on adverse health outcomes. Park (2007) proposed that individuals who use religion as a meaning system towards understanding why certain elements occur the way they do, tend to engage in behaviors that lead to better health outcomes. Level of self-reported religiosity/spirituality is associated with better immune function, positively balanced cholesterol levels, and better cardiovascular health (Seeman et al., 2003). For a full review of the literature regarding the relationship between religiosity/spirituality and health outcomes, see Seeman et al. (2003).

Religion has been used as a coping mechanism for pain in a variety of situations across a variety of religious traditions (Abu-Raiya & Pargament, 2015; Dedeli & Kaptan, 2013). This is due to the importance that religion has for many individuals and how religion can impact an individual's way of life, specifically their way of understanding how the world works (Park, 2007; Wachholtz et al., 2007). Dedeli and Kaptan (2013) noted that both spiritual and religious variables, that are dependent on personal beliefs and experiences, may impact the chronic pain experience both positively and negatively. This was further illustrated by Park (2007), who noted that individuals who believe that God is responsible for their health outcomes have an increased likelihood of turning towards religious-oriented coping mechanisms than those who are not.

This is further supported by the notion that individuals who reported experiencing chronic pain had an increased likelihood of using religious oriented coping strategies, such as prayer and attending religious services, if they identified as religious (Dedeli & Kaptan, 2013). Previous research by Harrison et al. (2005), noted that within a population of African-American individuals who experienced sickle cell disease, attending church services was related to lower scores on measures examining pain. Although there was a significant relationship, it is important

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to note that within the African-American community, attending church has been consistently used as a way to cope with stressors and may be illustrating a demographic specific coping mechanism. A review of the literature regarding pain and religious coping by Koenig (2001) noted that within qualitative research regarding religious coping mechanisms and chronic pain, engaging in frequent prayer was related to greater pain intensity. This suggests the usage of prayer as a coping mechanism in response to immediate pain in order to distract from the pain occurring. It is important to note that using religious coping mechanisms do not impact the severity of pain experienced, rather they impact the level of pain tolerated (Wachholtz et al., 2007). An individual may report experiencing the same amount of pain as another individual; however, they are able to tolerate it to a different degree as a result of the coping strategies they use. This is also a result of the subjective nature of both religion and pain.

### **The Use of Music as a Coping Mechanism**

Music has been found to be a non-pharmacological intervention to help alleviate chronic pain throughout history, as far back as the 2nd millennium BCE (Bernatzky et al., 2012). Using music as a non-pharmacological coping mechanism to chronic pain has been found to work through impacting the cardiopulmonary system, limbic system, and endocrine systems (Bernatzky et al., 2012). The exact mechanism that music triggers is unknown, but is theorized to be related to processes that occur within the limbic system in regards to memory and emotion (Bernatzky et al., 2012), the release of natural endorphins within the endocrine system, and the lack of activation of the Hypothalamic-Pituitary-Adrenal [HPA] axis in relation to the lower levels of adrenocorticotrophic hormone released leading to the decreased likelihood of the activation of the sympathetic nervous system (Bashiri et al., 2018). Thus, the fight or flight

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response of the body in relation to stressful situations tends to have a lower probability of occurring in response to pain when an individual is exposed to music (Bashiri et al., 2018).

Mitchell et al. (2012), have found that music can serve a distraction, capable of maintaining a hold on an individual's attention while experiencing pain. When compared to other types of distractions, including humor and engaging in solving mathematical problems, listening to preferred music has been found to distract the listener from the pain and allow the individual to feel more control in regard to the situation (Mitchell et al., 2012). Richard-Lalonde et al. (2020), also noted that music serves as a distraction for ambient sounds, specifically noting that music was able to distract individuals from the sounds associated with being in a hospital and decrease anxiety. This has been found to cause individuals to begin to feel more comfortable (Richard-Lalonde et al., 2020) and reduce inflammation associated with chronic pain (Khan et al., 2018). As a result, the sympathetic nervous system begins to release its control and the parasympathetic nervous system allows the body to relax with decreases in the number of inflammatory cytokines (Khan et al., 2018).

Mitchell et al. (2012), also found that giving individuals the choice in regard to what music to listen to impacts the amount of time an individual was able to tolerate the painful stimuli to a higher degree than humor or solving mathematical equations in a cold-pressor task. This suggests that when individuals are allowed to choose which type of music they want to listen to, they may feel control over a situation that feels uncontrollable. Allowing individuals to choose what genre of music they wish to listen to prior to surgery has been found to lead to better outcomes than not giving any choices (Bernatzky et al., 2012). This may be a result of being able to exert more control over a situation where there are inherently fewer aspects that can

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be controlled, leading to experiencing less anxiety and a higher perception of control which can decrease the aversiveness of the pain experienced (Mitchell et al., 2007).

MacDonald et al. (2003), proposed that participants chose a particular music selection due to the emotions associated with that music, including comfort and safety. They further illustrated this point by noting that the associations between the music and the emotions experienced are influenced by factors outside of the music (MacDonald et al., 2003). Even though there is research that suggests that certain types of music are better for relaxation than others (Richard-Lalonde et al., 2020), the emotional associations of music selected plays an important role.

As a result of the experimental nature of these studies, it is important to note that even though there is not a “gold-standard” in regard to the best type of music to listen to there is research that illustrates that music is a non-pharmacological pain intervention that does work. There are several factors that impact its effectiveness, including what type of music and if the individual had a choice in what to listen to. Allowing individuals to choose the music they want to listen to when engaging in music therapy further illustrates the relationship between the perception of control and the perception of pain (Jamieson et al., 2012). The usage of music as a non-analgesic form of pain relief has been found to lead to better post-operative outcomes than the usage of other analgesic modalities (Bernatzky et al., 2012). A full review of the literature regarding the usage of music as an alternative form of pain relief can be seen in Bernatzky et al. (2012).

### ***Religious Music and Pain***

As noted within Hilliard’s (2005) review of the usage of music within palliative care, listening to spiritual music was found to increase an individual’s reported spiritual well-being, as



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assessed by the Spiritual Well-Being scale (Paloutzian & Ellison, 1982), due to the relationship between religion and the unknown after death. Within Wlodarczyk (2007) study, as noted within Hilliard's (2005) review of the usage of music within palliative, participants reported higher scores within the Spiritual Well-Being scale after being exposed to a variety of music therapies. Wlodarczyk (2007) also found that the majority of the participants requested spiritual music, suggesting that listening to spiritual music increases an individual's spiritual well-being by providing a source of comfort during a time of stress. It is important to note that use of religious music as a coping mechanism is not universal and has been found to be specific to certain religions and certain types of religious music (Safara & Samanesadatsadidpoor, 2014). Hughes and Lowis (2002) found that the rhythm of specific hymns plays a role in how religious/spiritual the hymn is perceived. Particular rhythms were found to elicit certain responses associated with specific emotions. Religious music has also been found to be a coping mechanism in response to stressful situations, including health related stressors (Hamilton et al., 2013a). The exact mechanism for the relationship between religious music and pain management is unknown, however, Hamilton et al. (2013a) proposed that within cultures where both music and religion are important, the effect of music as a means of coping may be amplified. Hamilton and colleagues' (2013a) sample was predominantly African-American, a community with a history of using both religion and music as coping mechanisms.

Maulina and colleagues (2017) examined the impact of different types of music on physiological responses to a dental extraction procedure. Muslim individuals who listened to religious Islamic music had lower physiological markers that corresponded to stress and anxiety than those who did not. The authors noted that these results may be associated with the familiarity to Islamic music and how it elicited feelings not associated with anxiety, but with

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safety and comfort. This is a common theme within the types of music chosen for music therapy (MacDonald et al., 2003). Richard-Lalonde et al. (2020), also noted that culturally diverse music can be used for in a pain management context, however, the type of music used has to be something that the individual prefers and has an emotional relation to in order for it to be effective.

### **Summary and Study Aims**

Chronic pain is an unpleasant experience that individuals have in response to actual or threatened tissue damage. The entire chronic pain experience can be examined through a variety of perspectives; however, it has been found that the best way to examine the overall impact that chronic pain can have on individuals is through the biopsychosocial perspective. Psychological factors that have been highlighted within this model suggest that individuals have to engage in some form of coping with the pain experience. Both religion and music have been found to be useful in helping individuals cope with stressful situations, such as health stressors like pain. Previous research has shown the usefulness of religion/spirituality and music as coping mechanisms, both separately and combined.

The purpose of this study is to address the gap in the literature regarding the usage of music as a coping mechanism for those who identify as religious across the dimensions of feelings of affiliation and belonging, religious engagement, and religious beliefs and across different religious denominations. Previous literature has illustrated that many individuals use music as a non-pharmacological coping mechanism for chronic pain. This has been seen in a variety of contexts, including in a hospital setting and when engaging in medical procedures. It also has been found that individuals who identify as religious tend to turn towards their religion in times of stress, including health-related stressors, especially in Abrahamic religions. As such,

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it may be that individuals who identify as religious and are exposed to music that reminds them of their religion are more likely to perceive pain as less painful than individuals who do not identify as religious. This has been primarily seen in Christianity and Islam, with limited literature around Judaism, Sikhism, Hinduism, and Buddhism. The limited literature may be a result of a lack of research, or the literature may be available only in foreign databases that are unable to be accessed.

### *Hypotheses*

Based on the current literature, the following hypotheses can be made:

1. Individuals who report listening to music for pain relief will have comparatively lower levels of reported pain severity and negative pain outcomes (i.e., interference, limitations and emotions) than those who do not listen to music.
2. Those who are religious (as assessed by affiliation, beliefs and engagement) will be more likely to listen to music for pain management and also have less negative pain outcomes (i.e., interference, limitations and emotions).
  - a. Differences between religious denominations will be explored
3. Individuals who report listening to music that reminds them of their religion will report higher religious engagement, beliefs, and affiliation than those who do not report listening to music that reminds them of their religion.
4. Religiousness may moderate the association between listening to music for pain management and perception of pain severity and negative pain outcomes (i.e., interference, limitations, and emotions).

## Chapter Two

### Methods

#### Participants

Due to the COVID-19 pandemic, all data collection occurred online. With this study being conducted entirely online, Amazon's Mechanical Turk [MTurk], was chosen due to previous success in research regarding the social sciences (Litman et al., 2016). Within MTurk, participants are recruited through an online labor market where individuals' "workers" post short tasks for others to complete in exchange for monetary compensation. Due to the population being examined having a specific characteristic, Cloud Research was used in order to ensure that all participants met the characteristics for participating. As noted by Litman et al. (2016), Cloud Research uses the MTurk interface, as well as other tools to provide requesters with an environment where they can control who accesses their Human Intelligence Task [HIT]. As such, Cloud Research provides a streamlined programming and user interface for researchers to engage in online research as the prominence of online data collection increases.

In order to maintain high quality data and restrict the eligibility of certain participants due to institutional regulations and data requirements, specific worker requirements and data quality exclusion factors were enabled. These factors were blocking duplicate IP [Internet Protocol] addresses, blocking suspicious geocodes, only allowing participants from the United States by verifying worker country location, and blocking low quality participants. In addition, due to the data protection regulations that exist, all participants whose IP addresses were outside of the United States had to be excluded. These factors were chosen in order to ensure Institutional

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Review Board [IRB] approval with this study including an online survey; the restrictions placed on participant eligibility were consistent with the institutional requirements for online research. In order to be allowed to participate in the survey participants also had to have a HIT approval rate of 90% or greater, have completed a minimum of 1,000 HIT's, and reported experiencing chronic pain. These factors were chosen in order to ensure that participants understood how MTurk worked and were aware of associated expectations. The factor of experiencing chronic pain was also chosen due to the target population being those who experienced chronic pain and to reduce the possibility of false positive chronic pain diagnoses due to the limited funds available for research compensation.

There were a total of 201 individuals that filled out the pre-screen questionnaire. Due to an error with the dynamic code for the pre-screen questionnaire, 10 individuals were unable to be invited to participate in the main study due to their Amazon Identifier not being recorded, leading to the researchers not being able to offer them the opportunity to participate. On the pre-screen, 13 participants did not report experiencing chronic pain. Nine participants failed to return to Cloud Research to submit their dynamic code to be invited to participate in the main survey. Five did not consent to participate. One participant failed the attention check question on the pre-screen. In total, this led to 163 participants being deemed eligible to participate in the main study and they were sent an initiation to participate. Of the 163, 147 participants completed the main survey. The data from six participants was excluded due to not appropriately responding to the attention check questions. The data from three additional participants was excluded due to not fully completing the survey, leaving the total study sample at 138 participants.

As can be seen in Table 1, the majority of the participants were between the ages of 41 and 50 (89.3%, n=39). Approximately 70% of the participants reported identifying as female

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(n=97) and 28.3% reported identifying as male (n=39). The majority of the participants also identified as being white (82.6%, n=114) and as belonging to the Christian faith (66.7%, n=92). The most common pain condition diagnosed for participants was fibromyalgia (n=29). A further breakdown of the chronic pain conditions reported can be seen in Table 2.

### **Measures/Instrumentation**

Of the 186 participants who completed the pre-screening questionnaire, it was expected that between 30% to 70% of all participants will report experiencing chronic pain, based on chronic musculoskeletal pain prevalence rates in the United States (Gatchel et al., 2014; Phillips, 2006) and the ability for MTurk to successfully flag participants who do not meet the study's qualifications for participating (Chandler, Sisso & Shapiro, 2020; Chandler & Shapiro, 2016). A power analysis through G\*Power (Faul et al., 2007) suggested that a sample of 130 participants would be adequate to assess the hypotheses for this paper. It should be noted that data continues to be collected for further analysis. As such, the first 149 participants who successfully completed the pre-screening questionnaire were given access to the second survey through MTurk's ability to restrict access to certain participants by only granting access to participants who have specific worker identification codes. This was done in order to ensure a lower possibility of false positives.

### ***Demographics (Appendix A)***

Eligible participants completed a demographics questionnaire that asked them to self-report their: year of birth, gender identity, ethnicity, if they have been diagnosed with a chronic pain condition, what chronic pain conditions they had been diagnosed with, how long they had been experiencing their self-reported chronic pain condition (in years and months), if they

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identify as a member of an organized religion and to which organized religion they identify as belonging to.

With the prescreening questionnaire determining if participants had one of the eight listed musculoskeletal chronic pain conditions, participants were asked to further elaborate upon their diagnosis. All participants, who responded to being diagnosed with a chronic pain condition according to the ICD-11 diagnostic criteria, were asked additional chronic pain related questions. These questions were used to assess the diagnosis and how long they have been experiencing the chronic pain condition (in months and years). This also served as an attention check question to further ensure that participants were experiencing chronic pain.

### ***Music Listening Behavior Questionnaire (Appendix B)***

The Music Listening Behavior Questionnaire (Mitchell et al., 2008) was used to examine the importance of music to individuals along multiple aspects. This questionnaire consists of two parts: the first part addresses the relationship that individuals have with music and the second part addresses general musical engagement. Within this study, the responses that participants gave for reasons for listening to music, moods associated with listening to music, frequency of listening to music, importance of music, and music in a cognitive associative context were examined. For the questions assessing reasons for listening to music and mood associations with music, the means and standard deviations were reported due to these questions having a variable response. The frequency of listening to music had two questions. There were two questions assessing the importance of music, where participants answered in regards to personal importance and when compared to others. Assessing music in a cognitive associative context had nine options that the participants could choose from.

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For the current study, the measure was given in its original form and several elements of the Music Listening Behavior Questionnaire were duplicated and modified for pain specific related listening behaviors. If participants responded to the statement “For pain management” under the question “Why do you listen to music?” with an answer between one and ten, they were asked to answer specific questions related to the usage of music as a method of pain management. They were also asked about their frequency of listening to music for pain management, when they began to listen to music for pain management, and if the music they listen to for pain management reminds them of anything. Participants who did not answer with an answer between one and ten to the “For pain management” under the question “Why do you listen to music” were directed to the next section.

### *The Bodily and Emotional Perception of Pain (Appendix C)*

The Bodily and Emotional Perception of Pain (BEEP; Preti et al., 2019) is a 25-item measure used to assess the impact of pain on daily life and consists of two parts. The first part consists of 23 questions along three dimensions: emotional reaction to pain, limitations to daily life caused by pain in the past month, and interference with personal and social functioning in the past month. The second part consists of two questions, asking about how pain has been in the past 24 hours and how severe it is currently. In regard to internal consistency, the first part of the BEEP was found to have high internal consistency (Cronbach’s  $\alpha=0.92$ ; Preti et al., 2019). The first dimension, Emotional Reaction to Pain, consists of 15 items and was found to have high internal consistency (Preti et al., 2019). The second dimension, Limitations Caused by Pain in Daily Life in the Past Month, consists of four items and was found to have acceptable internal consistency (Cronbach’s  $\alpha=0.67$ ; Preti et al., 2019). The third dimension, Interference with Personal and Social Functioning in the Past Month, consists of four items and was found to have



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high internal consistency (Cronbach's  $\alpha=0.758$ ; Preti et al., 2019). In the current study the reliability for the Emotional Reaction to Pain was (Cronbach's  $\alpha=.933$ ). The reliability for the Limitations Caused by Pain in Daily Life in the Past Month subscale was (Cronbach's  $\alpha=.788$ ). The reliability for the Interferences with Personal and Social Functioning in the Past Month was (Cronbach's  $\alpha=.863$ ).

The three dimensions of the first part of the BEEP comprise the pain outcomes variable, with higher scores indicating more severe pain outcomes than lower scores. The second part of the BEEP was also used to establish pain severity in the past 24 hours and in the moment when the survey was completed. In this study, the BEEP was used to assess pain severity in both the moment and in the past 24 hours along with the three dimensions of emotional response to chronic pain, limitations caused by chronic pain in the past month, and interference with personal and social functioning caused by chronic pain in the past month. Each score was used individually due to the differences in each dimension in regard to the chronic pain experience and its impact on each individual's functional disability in relation to their chronic pain experience.

### ***Religiousness***

Two measures were used in the current study to examine religiousness along the dimensions of affiliation and belonging, engagement in religious behaviors, and religious beliefs.

***The Multi-Religion Identity Measure (Appendix D)*** (MRIM; Abu-Rayya et al., 2009) was used to examine the religious identity of the participants. This measure was chosen due to its lack of specific religious verbiage. The complete Multi-Religion Identity Measure (Abu-Rayya et al., 2009) is a 15-item assessment of religious identity with three subscales: Religious

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Affirmation and Belonging, Religious Identity Achievement, and Religious Faith and Practices. Among college students, the MRIM is found to have high internal consistency, both overall and for each of the subscales (Abu-Rayya et al., 2009). In order to maintain brevity within the survey and avoid participant fatigue, one subscale was chosen because it addresses personal religiosity and the importance of religion to an individual. Within the MRIM, the Religious Affirmation and Belonging subscale was chosen, with high internal consistency (Cronbach's  $\alpha=0.85$ ) and consists of 5 items that have been found to have high internal consistencies in other studies when used as a measurement of religion (e.g., Abu-Rayya & White, 2010). The MRIM was also found to significantly correlate with other measures of religiosity, with correlations ranging between 0.62 and 0.94 (Abu-Rayya et al., 2009). For the current study, the Cronbach's Alpha on the Religious Affirmation and Belonging subscale was ( $\alpha=0.762$ ).

*The Religiosity Inventory (Appendix E*; Pennycook et al., 2012) was used to assess the religiousness of participants and consists of nine items under which both religious engagement and religious beliefs are assessed along a Likert scale. The Religious Engagement subscale consists of three items assessing importance of religion, religious service attendance frequency, and prayer frequency. This subscale had high internal consistency (Cronbach's  $\alpha=0.84$ ). The Religious Beliefs subscale consists of six items assessing conventionally held religious beliefs. This subscale had high internal consistency (Pennycook et al., 2012). Higher scores on each subscale indicated higher engagement and stronger agreement with commonly held religious beliefs. This measure has shown solid psychometric properties in past research assessing religion (Pennycook et al., 2012). In the current study, the Religious Engagement subscale had a Cronbach's Alpha of .902 and the Religious Beliefs subscale was found to have a Cronbach's Alpha of .803. Scoring for the Religiosity Inventory (Pennycook et al., 2012) involved creating a

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percentage of maximum possible score for each item and then creating a composite score for each subscale.

### *Pre-Screening Questionnaire (Appendix F)*

Participants were first required to confirm they were eighteen years or older. Failure to respond required participants to exit out of the survey and they were denied compensation. Participants were required to answer the question: “I consent to participate in this study.” Failure to respond required participants to exit the study. If the participants responded to both questions, they were then directed to self-report if they have been diagnosed with any chronic pain condition and which, of eight, listed chronic musculoskeletal pain condition(s) they had been diagnosed with. These pain conditions were myofascial, sciatica, any neuropathic associated conditions, endometriosis, lower back pain, cancer-related pain, fibromyalgia, or pelvic pain. These conditions were chosen due to their prevalence within the United States (Gatchel et al., 2007; Kerns et al., 2011), impact on quality of life (Philips, 2006), and gender-related specificity (Mathias et al., 1996). After answering these questions, participants were then directed to the debriefing document and were given access to resources if they felt as if they needed additional services. In order for participants to be compensated, they received a dynamic completion code at the conclusion of the survey that was associated with their data provided. All participants were compensated \$0.25 for their participation.

### **Procedure**

After obtaining approval from the University of Michigan’s IRB for Health Sciences and Behavioral Sciences, the study was made available on MTurk for workers who met eligibility criteria to complete.

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In order to be eligible to participate, MTurk workers had to currently reside within the United States, have a HIT approval rate of 80% or greater, have completed a minimum of 1,000 HIT's, and report experiencing chronic pain. For the first 49 days of data collection, the initial eligibility criteria remained. However, due to slow data collection and the need to obtain a larger sample size in order to determine if there was a plausible effect size, the initial eligibility criteria were expanded to include those who had a HIT approval rate of 90% or greater and had completed a minimum of 500 HIT's. After 72 days of the study being available for participants to complete, the eligibility criteria were lowered due to stagnated data collection to include participants who had a HIT approval rate of 80% and had completed a minimum of 500 HIT's.

If participants met the eligibility criteria, they were provided with a link to a Qualtrics survey within the MTurk platform. Once participants opened the link, they were directed to an informed consent form, illustrating: what the study was examining and its purpose, what participants would be asked to do, the estimated time of survey completion based off of Qualtrics algorithm, the overall benefits of the research, possible risks and discomforts, compensation, the voluntary nature of the study, confidentiality of the survey results, potential future uses for the data collected, and the contact information for whom to direct questions/concerns to.

Eligible participants identified in the pre-screening questionnaire were given the opportunity to complete the second questionnaire via the MTurk ability to restrict access to certain participants by only granting access to participants who have specific worker identification codes. Eligible participants were then provided with a link to a Qualtrics survey within the MTurk platform. Once participants open the link, they were immediately directed to an informed consent form, illustrating: what the study was examining and its purpose, what participants would be asked to do, the estimated time of survey completion based off of

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Qualtrics algorithm, the overall benefits of the research, possible risks and discomforts, compensation, the voluntary nature of the study, confidentiality of the survey results, potential future uses for the data collected, and the contact information for whom to direct questions/concerns to.

After reviewing the informed consent form for the main study, participants were first required to confirm they were eighteen years or older. Failure to respond required participants to exit out the survey and they were denied compensation. Participants also were required to answer the question: “I consent to participate in this study.” Failure to respond required participants to exit out the survey. The participants who responded “I consent to participate in this study” were allowed to continue participating with the survey for the main study. Following the study measures, participants were directed to a final section consisting of the debriefing document and had resources for the participant to access if felt as if they needed additional services. After reaching this part of the survey, participants were given access to a link that sent them to the landing page of the survey on MTurk. In order for participants to be compensated, they received a dynamic completion code associated with their data provided. There were several attention check questions within the survey in order to ensure that participants did not speed through the questions. If the participants' responses illustrated they had not been paying attention to the questionnaire through the usage of attention check questions, they were denied compensation. Participants who submitted quality data were given \$2.00 as compensation for participating

The process was piloted with seven individuals in order to ensure that when the survey was made officially live, there were no issues with the dynamic code or any of the skip logic. The prescreen questionnaire ran for eight days and due to an issue with the dynamic code, only seven participants out of the 13 who completed the survey were compensated. This issue was

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corrected and the worker ID's were noted in order to ensure that their data was excluded from analysis. The main study measures questionnaire ran for twenty days and ran into no known issues. Six participants submitted quality data for further analysis that was added to the main data set and one participant's data was excluded due to failure to answer an attention check question.

## Chapter Three

### Results

Data analysis occurred through using IBM SPSS 27. Prior to any data analysis, the data was checked for normalcy. It was found that there was negative skewness within all of the variables. Standardized scores were used to screen for univariate outliers. These outliers were winsorized in data analysis. Multivariate outliers were tested through a mahalanobis distance analysis, which showed that there were three outliers. Analysis with and without these outliers were conducted and results showed similar patterns. In order to preserve sample size, the outliers were included. It should also be noted that a p value of .01 was used for statistical significance in the current study to guard against Type I error given the number of statistical analysis conducted.

#### Music Listening Behavior Questionnaire

Examination of the music listening behavior questionnaire found the following outcomes in regard to why participants listen to music, their reported frequency of listening to music, and the importance of listening to music along different dimensions. When asked about why they listened to music, participants agreed with the statement “to enjoy music” ( $M=9.92$ ,  $SD=1.68$ ) stronger than any of the other statements, as can be seen in Table 3. Participants responded that music got them into a relaxed ( $M=9.25$ ,  $SD=2.08$ ) and uplifted ( $M=8.94$ ,  $SD=2.19$ ) mood to a higher degree than any other mood, as reported in Table 4. The majority of the sample (54%,  $n = 67$ ) reported listening to music for enjoyment “all of the time” and been doing that for some time with 91.1% ( $n = 113$ ) reporting that they had started doing this over a year ago, as can be seen in Table 5. Further examination of the music listening behavior questionnaire showed that many of

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the participants (48.4%, n = 61) found music to be “very important” to them and a “little more” important to them when compared to the average person, as can be seen in Table 6. When asked about music in a cognitive associative context, as can be seen in Table 7, the majority of the participants responded that they listen to music in order to remind them about a “time in their life” (55.6%, n = 69), with only 8.7% (n = 11) responding that the music reminded them of their religion. When examining the frequency of the usage of music for pain management, as can be seen in Table 8, 36.3% (n = 45) reported that they listen to music for pain relief only “sometimes” and began doing so “more than a year ago” (57.3%, n = 71). Individuals who reported using music for pain management in a cognitive associative context, as can be seen in Table 9, responded that the music reminded them about a “time in their life” (31.5%, n = 39) with only 12.1% (n = 15) responding that the music reminded them of their religion.

### **Hypothesis 1**

In order to test the first hypothesis, that participants who listened to music for pain management would have less negative pain outcomes (i.e., severity, interference, limitations and emotional responses), correlations between level of agreement to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire and pain outcomes were examined. The results, as seen in Table 10, illustrated that there was a moderate relationship between listening to music for pain management and severity of pain in the past 24 hours and between listening to music for pain management and severity of pain in the current moment.

Further comparisons were then made between groups who responded to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire by comparing those who were in the top third to the bottom



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third of the responses. This was done in order to examine the extremes of those responded to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire.

Several significant results were found after running independent samples t-tests. The means and standard deviations can be seen in Table 11. Independent samples t-test showed that those in the top third of those who reported listening to music for pain management reported more severe pain in the past 24 hours than those in the bottom third of those who reported listening to music for pain management. Results also showed that those in the top third of those who reported listening to music for pain management reported more severe pain in the moment than those in the bottom third of those who reported listening to music for pain management. Finally, the independent samples t-test also showed that those in the top third of those who reported listening to music for pain management reported more limitations to daily life caused by pain in the past month than those in the bottom third of those who reported listening to music for pain management.

### **Hypothesis 2**

For hypothesis 2, which focused on the link between religion along three dimensions (i.e., feelings of belonging, engagement in religious behaviors, and religious beliefs) and pain outcomes, bivariate correlations were conducted. The results, as seen in Table 10, illustrated that there were significant positive correlations. Specifically, there was a weak relationship between engagement in religious behaviors and pain severity in the moment, a strong relationship belief in religious beliefs and engagement in religious behaviors, a strong relationship between belief in religious beliefs and feelings of religious affiliation and belonging, and a strong relationship between engagement in religious behaviors and feelings of religious affiliation and belonging.

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The link between religion along three dimensions (i.e., feelings of belonging, engagement in religious behaviors, and religious beliefs) and level of agreement to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire was also initially examined via correlation. The results, as seen in Table 10, illustrated that there were significant positive correlations between variables examining the different dimensions of religion. In regard to the link between religion and listening to music for pain management, there was a weak relationship between engagement in religious behaviors and listening to music for pain management.

Comparisons were then made between groups who responded to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire by comparing those who were in the top third to the bottom third of the responses. This was done in order to examine the extremes of those responded to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire.

Several significant results were found after running independent samples t-tests. The means and standard deviations can be seen in Table 11. Those in the top third of those who reported listening to music for pain management reported higher feelings of religious affiliation and belonging than in the bottom third of those who reported listening to music for pain management. It was also found that those in the top third of those who reported listening to music for pain management reported engaging in more religious activities than those in the bottom third of those who reported listening to music for pain management

### **Hypothesis 2a**

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Hypothesis 2a specifically focused on the differences across religious denominations. There were very few individuals who reported identifying as a member of a faith that was not Christianity (n=46), so the analysis was ran comparing those who identified as a member of the Christian faith (n=92) to those who did not identify as member of the Christian faith.

Comparisons were made between those who identified as belonging to the Christian faith and those who did not report belonging to the Christian faith along the three separate dimensions of religion. Several significant results were found after running independent samples t-tests. The means and standard deviations can be seen in Table 12. Those who identified as belonging to the Christian faith reported higher feelings of religious affiliation and belonging than those who did not identify as belonging to the Christian faith,  $t(136)=4.71, p<.001$ . Those who identified as belonging to the Christian faith reported stronger beliefs than those who did not identify as belonging to the Christian faith,  $t(64.35)=8.14, p<.001$ . Those who identified as belonging to the Christian faith reported engaging in more religious behaviors than those who did not identify as belonging to the Christian,  $t(136)=9.52, p<.001$ . There were no differences in regards to negative pain outcomes across religious denominations.

### **Hypothesis 3**

Of the 138 participants in the sample, only 12 reported that they listened to music that reminded them of their religion when asked if the music they listen to reminds them of anything within the Music Listening Behavior Questionnaire. When participants were asked if the music they listen to for pain management reminded them of their religion, 17 participants responded in the affirmative. It should be noted that of the 124 participants who reported listening to music for pain management, nine participants reported listening to music that reminds them of their religion both in general and for pain management. The majority of the participants who reported

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listening to music that reminds them of their religion for pain management also reported listening to music that reminds them of a particular time in their life.

Nonetheless, comparisons were made between those who reported listening to music in a general context that reminded them of their religion and those who did not report listening to music that reminded them of their religion along three separate dimensions of religion. This was done through an independent samples t-test. Several significant results were found, and the means and standard deviations can be seen in Table 14. Those who reported listening to music that reminded them of their religion reported higher feelings of religious affiliation and belonging than those who did not. Those who reported listening to music that reminded them of their religion reported having stronger religious beliefs than those who did not. Those who reported listening to music that reminded them of their religion also reported engaging in more religious behaviors than those who did not.

Comparisons were also made between those who reported listening to music that reminded them of their religion for pain management and those who did not report listening to music that reminded them of their religion for pain management along three separate dimensions of religion. This was done through an independent samples t-test and several significant results were found. The means and standard deviations can be seen in Table 14. Those who reported listening to music that reminded them of their religion for pain management reported higher feelings of religious affiliation and belonging than those who did not. Those who reported listening to music that reminded them of their religion for pain management reported having stronger religious beliefs than those who did not. Those who reported listening to music that reminded them of their religion for pain management reported engaging in more religious behaviors than those who did not.

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A paired samples t-test was conducted to compare those who listened to music that reminded them of their religion both in general and for pain management. There was not a significant difference in the number of individuals who listen to music that reminds them of their religion in general ( $M=1.89$ ,  $SD=.34$ ) and those who listen to music that reminds them of their religion for pain management ( $M=1.86$ ,  $SD=.35$ ),  $t(123)=.773$ ,  $p=.441$ .

### **Hypothesis 4**

Multiple hierarchical regressions were conducted for all three pain outcomes and both temporal associations of pain severity to explore the potential moderating effect of listening to music for pain management and religiosity. The first step for the regression included the main effects for listening to music for pain management and one of the dimensions of religion (beliefs, engagement in religious behaviors, and feelings of affirmation and belonging). The second step of the regressions included the two-way interaction terms. In total 15 regressions were conducted. No significant models emerged. There were no significant interaction effects when the second step of each model was the interaction between strongly agreeing to the statement “for pain management” under the question “Why do you listen to music?” within the Music Listening Behavior Questionnaire and each of the dimensions of religion.

## **Chapter Four**

### **Discussion**

The purpose of this study was to address the gap in the literature regarding the usage of music as a coping mechanism for those who identify as religious across multiple dimensions and religious denominations. This study also examined pain outcomes in relation to both music usage and religiousness. Previous review of the literature illustrated that many individuals use music as a non-pharmacological coping mechanism for chronic pain. It also has been found that individuals who identify as religious tend to turn towards religion in times of stress. Based on the literature, it was suggested that individuals who identify as religious and are exposed to music that reminds them of their religion are more likely to perceive pain as less painful than those who do not.

### **Hypothesis 1**

Consistent with other studies, a majority of the sample listened to music for pain management (Mitchell et al., 2007). The first hypothesis, which predicted a relationship between music, pain severity, and negative pain outcomes (i.e., severity, interference, limitations and emotional responses), was partially supported by the data. There was a relationship between listening music and pain severity in both the moment and in the past 24 hours, but not a link between music and all three negative pain outcomes being examined except for limitations to daily life caused by chronic pain in the past month. This can illustrate the notion that music is used as an immediate coping mechanism for pain that is being experienced in the moment, but not for interference or emotional reactions associated with pain. The immediate usage of music

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as a coping mechanism is supported by the literature, with Richard-Lalonde et al. (2020), noting that music can be used as a way to distract individuals from the current situation and MacDonald et al. (2003), providing insight into the importance of the emotional context of the music being listened to in regard to its impact as a non-pharmacological pain intervention. When examining the link between those who highly agreed that they listened to music for pain management and limitations caused by chronic pain in the past month, there was a statistically significant outcome, illustrating that there was a link between those who strongly agreed that they listened to music for pain management and reporting less severe pain both in the moment and within the past 24 hours of taking the survey. This data further supports the notion that music is used to distract individuals from their perception of the chronic pain they experience. The research engaged in by Mitchell et al. (2008) also supports the notion that the cognitive associative context of music is important when used for pain management.

Previous research focused on the use of music for pain management has suggested that listening to music is a coping mechanism that many individuals with chronic pain engage in for multiple reasons (Mitchell et al., 2012). There are multiple reasons as to why individuals use music for pain management, with research suggesting that listening to music activates certain regions of the brain associated with memory and emotion (Bernatzky et al., 2012). This is illustrated within this study, with over 50% of participants responding that they listen to music in order to remind them of a time in their life. It is unknown if the “time in their life” referred to is a time when the individual was not experiencing chronic pain, however, when asked if the music the participants listened to for pain management reminded them of anything, over 30% responded that it reminded them of a particular time in their life. MacDonald et al. (2003), did

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find that many individuals who use music as a form of pain relief and for pain management chose music selections that have an emotional context.

### **Hypothesis 2**

The second hypothesis, examining the relationship between three separate dimensions of religion and pain outcomes, found no statistically significant relationships. There were inter-scale relationships between the dimensions of religion, as found by both Pennycook et al. (2012), and Abu-Rayya et al. (2009). However, in relation to pain outcomes, the only statistically significant relationship was at the .05 level and was between engagement in religious behaviors and pain severity in the moment. The directionality of the relationship, although weak, does suggest that those who experience chronic pain do engage in religious behaviors. Religious individuals report engaging in a wide number of religious coping strategies, including the recitation of religious literature (Darabine et al., 2017) in order to address stressful situations such as experiencing chronic pain. This engagement can be as intensive or relaxed as an individual wants (Pennycook et al., 2012); it all depends on what an individual feels as appropriate in regards to their personal religious beliefs (Salter et al., 2001). It is unknown which precipitates the engagement in religious behaviors: the chronic pain or previous engagement in religious behaviors. Longitudinal studies could examine if the onset of a pain condition strengthens the religious beliefs of individuals.

Religion has been found to be a coping mechanism for stressful situations (Pargament and Raiya, 2007) in order to explain what is happening (Park & Folkman, 1997). Furthermore, engagement in religious behaviors, which includes attending religious services, may illustrate the importance of a strong social support network when coping with chronic pain (Dedeli & Kaptan, 2013). Instead of being able to “wallow in the pain”, those who engage in religious behaviors are



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utilizing the social support that exists within religious communities (Krause et al., 2001) and are able to assess the situation as more tolerable due to the available social support (Lazarus & Folkman, 1984).

Previous research has also found that religious individuals are likely to turn towards music when encountering stressful situations. Hamilton et al. (2013a), found that African American individuals are more likely to turn towards religious music as a coping mechanism due to its historical context. Many individuals would sing songs that had religious undertones prior to the establishment of the Thirteenth Amendment in order to bring forth a sense of comfort and prayer towards G-d (Hamilton et al., 2013a), particularly during times of stress. The literature does suggest that the music that these individuals listen to is religious (Hilliard, 2005), however, the results from this study suggest that the music that the individuals listen to remind them of a time in their life, further illustrating the importance of the context of the music (MacDonald et al., 2003; Richard-Lalonde et al., 2020; Mitchell et al., 2007). It is unknown what genre of music the individuals report listening to within this study.

### **Hypothesis 2a**

Hypothesis 2a examined differences across religious denominations and due to the majority of respondents identifying as a member of the Christian faith, comparisons were made between those who identified as a member of the Christian faith and those who did not.

There were statistically significant results in regard to the separate dimensions of religion, however, it must be noted that this was not a representative sample of all religious denominations. Due to the lack of representation from all religions within this sample, it cannot be accurately concluded that those who identify as belonging to the Christian faith are more religious when compared to those who do not identify as members of the Christian faith.

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There were no significant results in regard to the relationship between religion and negative pain outcomes, illustrating that chronic pain impacts all individuals regardless of what religion they identify as belonging to. Chronic pain has been found to impact a large number of individuals (Gatchel et al., 2007) from a variety of backgrounds (Casey et al., 2008).

Previous research has illustrated the difficulties that exist within measuring dimensions of religion (Slater et al., 2001) across different religions due to the differences that exist in expression of religion. This is primarily argued as a result of the bias that exists in relation to both general and specific religious denominations due to the intricacies regarding beliefs that exist (Slater et al., 2001). For example, Christianity has many denominations and the majority of those who identify as Christian share the universally held belief regarding Jesus as the son of God. One specific denomination of Christianity is Jehovah's Witnesses and those who identify as being Jehovah's witnesses refuse blood transfusions due to the interpretation of specific scripture verses (Gohel et al., 2005). No other denomination of Christianity refuses blood donations on the same principle (Gohel et al., 2005). Abu-Raiya and Pargament (2015) note that there are many common universal variables in religion, however, there are religion-specific differences that must be paid attention to. For example, when asking about a life after death, Greeley and Hout (1999) found that when comparing those who identified as belonging to the Christian faith to those who identified as belonging to the Jewish faith, those who identified as belonging to the Christian faith reported believing in a life after death to a higher degree due to the emphasis placed on a life everlasting. With both religions believing in a life after death, the difference exists in regards to the prominence of the belief (Greeley & Hout, 1999).

The method in which religiousness was examined in this study involved assessing multiple dimensions, including how much an individual identified with their religion (Abu-

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Rayya et al., 2009), frequency of engagement in prayer and religious behaviors (Pennycook et al., 2012), and commonly held religious beliefs (Pennycook et al., 2012). The measures were chosen due to their lack of specific religious wording and their psychometrics illustrating few differences across religious groups.

### **Hypothesis 3**

Hypothesis three, which looked at the relationship between listening to music that reminds individuals of their religion both in general and for pain management and their scores on the three dimensions of religion being examined found several significant results. It is interesting to note that when comparing those who report listening to music that reminds them of their religion in general to those who listen to music that reminds them of their religion for pain management, there was not a significant result. This may be due to the sample size, however, it may also illustrate that the music used in a cognitive associative context for pain management does not strongly remind individuals of their religion, but rather of a time when they were not experiencing pain--which individuals may not directly associate with religious music.

This is supported by Darabinia et al. (2017), who found that within Muslim communities, recitation of the Quran has been found to be a coping behavior that has positive mental health outcomes in regard to reduced anxiety and depression. The exact mechanism underlying this association is unknown, however, it has been theorized that the themes within the Quran provide adaptable strategies for individuals to use in response to situations that they may perceive as being unable to cope with (Darabinia et al., 2017). The Quran has been known to remind individuals of all that G-d is able to do and can possibly allow individuals to feel as if they have transcended the material world (Darabina et al., 2017).

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In research undertaken regarding songs listened to by Christian African-American individuals, it was found that the songs fit into one of five categories: songs of Thanksgiving and Praise, songs that are instructive, songs that evoke Memory of Forefathers, songs that are a form of Communication (prayers) with G-d, and songs that reflect Life after Death (Hamilton et al., 2013a; Hamilton et al., 2017) These categories were found to be universal across Christian African-American individuals (Hamilton et al., 2017). It is unknown if these same categories are found within non African-American individuals who identify as Christian due to the cultural connotations associated with religious music within the African-American community. The research undertaken by Good et al. (2000) supports this finding within the African American community but not within a Caucasian community, however, it is unknown what the religious music selections are and if they were biased towards one community or another.

### **Hypothesis 4**

The fourth hypothesis examined the possible association between listening to music for pain management, the perception of pain severity, and negative pain outcomes with an individual's religiousness moderating the relationship. There was little support found after running statistical analyses and this was surprising given the robust association between religion and music (Hamilton et al., 2013a, Hamilton et al., 2013b; Safara & Samanesadatsadidpoor, 2014), especially in certain religions including Christianity (Hughes & Lowis, 2002).

Religiousness was predicted to be a mediating variable based of previous literature suggesting that when experiencing pain, individuals turn towards religion and the chronic pain perception is different than those who do not turn towards religion (Seemen et al., 2003). However, the lack of the relationship suggests that religiousness is not a mediating variable. It may be that religiousness is a mediated moderated variable, however, there was not enough data

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to support this theory. There may be a possible association along another dimension of religion that was not studied or combination of dimensions of religion, however, it is unknown due to the way religion was measured within this study.

In response to these results, there are several alternative explanations, including the sample demographics. As previously noted, African-American individuals who identify as Christian have a higher likelihood of turning towards music that has religious undertones than those who are White and identify as Christian (Good et al., 2000). Within this sample, even though the majority of the participants identified as Christian (66.7%, n=92), there was a higher percentage of White individuals (82.6%, n=114) than African-American individuals (12.3%, n=17). It is also important to note that there was a small percentage of individuals who reported that they listened to music that reminded them of their religion for pain management (12.3%, n=15), when compared to music in other cognitive associative contexts used for pain management. Music that reminds individuals of their religion may be used and religion may have a moderating effect, however, the way in which religiousness was assessed may not have adequately measured the possible moderating effect of religiousness.

An additional reason as to the lack of significant results may be that patients who are experiencing chronic pain engage with any kind of music for pain management due to the distracting nature of music (Mitchell et al., 2012). These individuals may be unaware of the impact that music with religious tones has due to the lack of awareness in regard to the impact of spiritual interventions for pain management (Sulmasy, 2002). This also provides support for the biopsychosocial-spiritual model, with previous research illustrating the relationship between spiritual, mental, and physical well-being for individuals who report that religion is important to them and identify as highly religious (Sulmasy, 2002; Dedeli & Kaptan, 2013).

### **Strengths and Limitations**

Within this study, the primary strength of this study was the recruitment of the participants. The use of MTurk allowed for a wide variety of participants to access the survey and report their chronic pain experience. MTurk was also used under the presumption that due to the debilitating nature of chronic pain, there would be a high number of individuals who reported experiencing chronic pain. This would also hopefully provide a highly representative sample across both chronic pain conditions and religious orientations due to the heterogeneous breakdown of the demographics of those who use MTurk for supplemental income (Chandler & Shapiro, 2016).

In regards to limitations of this study, there were several. These limitations revolved primarily around conducting this study completely online. First, recruitment was difficult due to the want to maintain high data quality while also obtaining a high sample size. Only including participants who reported experiencing chronic pain through the usage of a qualifier limited the sample size at the beginning of the study. With the combination of the high HIT approval rate and number of minimum completed HIT's, obtaining participants was difficult. Lowering the HIT approval rate and number of minimum completed HIT's required did increase the rate of participation, however, it did take longer than expected to achieve a smaller than predicted sample. There were no issues with data quality after lowering the requirements to participate.

An additional limitation associated with participant recruitment was the homogeneity of participants. The majority of the participants were white and identified as belonging to the Christian faith. In regard to the hypotheses, religious and ethnic heterogeneity was hoped for in order to examine differences across religions. This is because different religions and different ethnicities use music in different ways: for example, African-American Christians tend to report

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a higher usage of religious music due to its cultural significance (Hamilton et al., 2013a) and those who identify as Muslim relying upon muezzin to chant the call to prayer in order to remind them that it is time to engage in one of the five times for daily prayer (Riskedahl, 2020). The lack of diversity within the sample, particularly across religious denominations, illustrates issues in statistical significance when comparing differences across demographic variables and religious denominations. This may have been addressed through directed recruitment of individuals from religious denominations other than Christianity and lowering the requirements for participating within the study.

The cross-sectional nature of the data also proved to be a limitation towards assessing the hypotheses. The majority of the research regarding pain and coping mechanisms is cross-sectional to assess immediate relief when inducing pain (Mitchell et al., 2008), however, within studies examining the causal relationship between variables, longitudinal studies are used (Wlodarczyk, 2007). This allows for the changes over time to be assessed and multiple conclusions to be made in regards, which is important when assessing changes over time in regard to coping with chronic pain. It would have been better to engage in longitudinal research to assess the usage of music as a coping mechanism by examining the prevalence and genre of music used when experiencing chronic pain.

A major limitation within the study was the number of analyses that were ran. As the number of analyses ran increases, the possibility for Type I error also rises. There may have been a likelihood of having false positive results due to the multiple analyses, leading to there being issues with the way in which the analyses were ran. It would have been better to run multivariate analyses in places of the multiple univariate analyses that were ran. It also would have been

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better to control for alternative variables, however, the small sample size hindered the ability to run such analyses and find statistically significant results.

Another limitation was the speed that the participants took while completing the questionnaire. This was seen within the MRIM and the items that were reverse scored. The Cronbach's Alpha from when the scale was developed was much higher than the one for this study. It was theorized that due to the participants speeding through the questionnaire, the questions were not read thoroughly in some instances and participants did not accurately respond to the questions that were written in the negative.

The final limitation that had the largest impact on the study was measurement and quantification of both religion and pain. Each individual's chronic pain experience is different (Gatchel et al., 2007) and even though chronic pain can be measured along a continuum, there are very few standards that quantify what pain is and what pain is not due to the differences in cognitive appraisal of the situation (Ramirez-Maestre et al., 2008). Currently, the ICD-11 does operationalize chronic pain in general as any pain that lasts for three months or longer (World Health Organization, 2019a), with additional specific diagnoses existing as necessary. Religion is also difficult to measure due to the individual nature of what religion means to each individual (Slater et al., 2001). This brings forth the necessity to examine religion on a variety of dimensions while addressing the multifactorial elements of religion. Many individuals would argue that an individual's relationship and belief in G-d is hugely important whereas others may argue that questioning the presence and omnipotence of G-d is more important (Slater et al., 2001). This also is an important factor to address when considering polytheistic religions and their expectations towards deities along with religions that do not have a deity. This study attempted to address the multiple elements associated with religion and religious music by



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addressing religious engagement, beliefs, and feelings of affirmation and belonging after reviewing the literature.

### **Implications**

Within this study, there were several significant results that can have implications for both research and clinical practice. First, there were statistically significant relationships between those who listened to music for pain relief to a high degree and pain outcomes. This illustrates that music is used to a high degree for pain management for some individuals because they are looking for a way in which to cope with the pain they are experiencing. With the overprescribing of opioids, many providers are looking for evidence-based, non-pharmacological pain interventions treatments that work for individuals (Murthy, 2016). In this instance, music may be used in addition to pharmacological interventions and be able to be continued after the pharmacological intervention has been used (Lee, 2016) for further pain management. Music is commonly thought of as a distracting stimuli (Mitchell et al., 2012) and the usage of music for pain management, has not been used to its full potential due to the mixed results in regards to effectiveness (Bernatzky et al., 2012). Typically, pharmacological interventions are engaged in for primary and immediate relief due to their known effectiveness, leading to non-pharmacological interventions not being used until there is a significant issue associated with pharmacological intervention (Thomas et al., 2015). This can have implications in both research and clinical practice as a non-pharmacological intervention for pain management that is backed by previous research and becomes more common due to its accessibility (Hilliard, 2005).

An additional implication of this research is the further support for the impact that religion has on an individual's well-being. Although the statistical analyses from this study suggested as religiousness increases negative pain outcomes also increase, there may be an

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alternative explanation. With previous research showing that when in a stressful situation, individuals who identify as religious tend to engage in religious coping strategies (Pargament & Raiya, 2007), the high levels of religiousness may be a result of the pain and religion serving as a coping mechanism. Furthermore, individuals may be turning towards religion as a way to cope with the pain (Park, 2007). As a clinical implication, this can include the usage of spiritual care as a part of the interdisciplinary care team that an individual with chronic pain uses for pain management (Gatchel et al., 2014). Not all individuals may benefit from the inclusion of spiritual care, specifically those who do not view religion as important to them (Kaplar et al., 2004), necessitating the personalization of interdisciplinary care teams for each individual's situation.

An additional implication from this study involves the examination of religion within a psychological context. There has been continual research regarding the best practices for studying religion (Slater et al., 2001) due to some of the difficulties that exist as a result of the intrinsic differences between religions. Even though there are universally held common beliefs, their importance may be different across religions (Greeley & Hout, 1999). As such, the importance of ambiguity in addressing commonly held beliefs is important while addressing the intrinsic differences that exist. It is also important to choose a measure that has proven psychometrics within the religious group(s) being examined. Within this study, it was predicted that the majority of the participants would respond to identifying as a member of an Abrahamic religion or unaffiliated, based on research out of the 2014 Religious Landscape Study conducted by the Pew Research Center (Pew Research Center, 2015). Thus, the measures chosen to examine religiousness within this study were chosen due to their psychometrics across the Abrahamic religions and their overall ambiguity regarding commonly held religious beliefs. This

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has been seen in previous research regarding the study of religion in a psychological context (Abu-Raiya & Pargament, 2015).

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# IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

## Tables

**Table 1**  
**Descriptive Statistics (n=138)**

	N	%
<b>Age</b>		
20-30	16	11.6%
31-40	33	23.9%
41-50	39	28.3%
51-60	29	21%
61-70	17	12.3%
71-80	4	2.9%
<b>Gender</b>		
Female	97	70.3%
Male	39	28.3%
Transgender	1	0.7%
Gender Nonconforming	1	0.7%
<b>Ethnicity</b>		
White	114	82.6%
Asian	2	1.4%
African American/Black	17	12.3%
Latinx	4	2.9%
Middle East North African	1	0.7%
<b>Religious Orientation</b>		

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

Christianity	92	66.7%
Islam	2	1.4%
Judaism	2	1.4%
Hinduism	1	0.7%
Buddhism	5	3.6%
None of the Above	36	26.1%

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# IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 2**

Frequency of Self-Reported Chronic Pain Conditions

	N	%
Fibromyalgia	29	15.1%
Sciatica	14	7.29%
Degenerative Disk Disease	12	6.25%
Nerve Pain	4	2.08%
Cervical Dystonia	2	1.04%
Osteoarthritis	6	3.13%
Rheumatoid Arthritis	9	4.69%
Migraines	4	2.08%
Arthritis	11	5.73%
Spinal Arthritis	1	0.52%
Endometriosis	2	1.04%
Multiple Sclerosis	2	1.04%
Spinal Stenosis	5	2.6%
Herniated Disks	5	2.6%
Carpal Tunnel	2	1.04%
Impeded Disks	1	0.52%
Bulging Disks	3	1.56%
Drop Foot	1	0.52%
Pinched Nerve	2	1.04%
Peripheral Neuropathy	2	1.04%
Chemotherapy-Induced Peripheral Neuropathy	1	0.52%
Sacroiliitis	1	0.52%
Wagner's Disease	1	0.52%
Crohn's Disease	1	0.52%
Keinbock's Disease	1	0.52%
Connective Tissue Disease	1	0.52%
Systemic Lupus	1	0.52%
Chronic Spinal Pain	1	0.52%
Dystrophy of the Right Foot	1	0.52%
Diabetic Neuropathy	1	0.52%
Neuropathy	3	1.56%
Polyneuropathy	1	0.52%
Pain Conditions Associated w IV Cancer	1	0.52%
Facial Tumor Pain	1	0.52%
Nerve Damage	3	1.56%
Oromandibular dystonia	1	0.52%
Lower Back Pain	12	6.25%
Back Pain	16	8.33%
Upper Back Pain	1	0.52%
Radiation Associated Pain	1	0.52%
Neck Pain	1	0.52%
Lax Ankle Ligaments	1	0.52%

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

Left Foot Pain	1	0.52%
Radiculopathy	1	0.52%
Pulled Muscles	1	0.52%
Chronic Pancreatitis	1	0.52%
Ehlers Danlos	2	1.04%
Adult Onset Stills Disease	1	0.52%
Post Mastectomy Nerve Damage	1	0.52%
Bursitis	1	0.52%
Peripheral Artery Disease	1	0.52%
Joint Weakening	1	0.52%
Fused Spine	1	0.52%
Bone Spurs	1	0.52%
Shoulder Pain	1	0.52%
Shingles	1	0.52%
Hip Pain	1	0.52%
Chronic Stomach Pain	1	0.52%
Chronic Musculoskeletal Pain	1	0.52%
Axial Spondylosis	1	0.52%
Hemangioma Tumors	1	0.52%
Interstitial Cystitis	1	0.52%
Slipped Disk	1	0.52%
Spinal Issues	1	0.52%

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## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 3**

Music Listening Behavior Questionnaire: Reasons for Listening to Music

	Mean	S.D.
To Enjoy Music	9.91	1.66
Be Creative	7.20	3.15
Relieve Boredom	7.33	2.86
Help when Lonely	7.72	3.07
Help through difficult times	8.59	2.71
Relieve stress	9.14	2.21
Express feelings/emotions	8.49	2.72
Get into a particular mood	8.93	2.31
Remain in a particular mood	8.32	2.52
Get out of a bad mood	8.68	2.32
Perform activities that would be boring	8.81	2.29
Set the mood when with others	7.78	3.06
Feel more relaxed	9.13	1.94
Pain Management	7.06	3.38

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 4**

Music Listening Behavior Questionnaire: Degree to Which Music is Associated with a Particular Mood

	Mean	S.D.
Relaxed	8.94	2.21
Uplifted	9.25	2.06
Motivated	9.04	2.24
Cheerful	8.87	2.26
Sad	4.09	2.89
Thoughtful	7.28	2.90
Nostalgic	8.63	2.60
Other	5.43	3.53



IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 5**

Music Listening Behavior Questionnaire: Frequency

	N	%
<b>Listen to Music for Enjoyment</b>		
All the time	75	54.3%
Sometimes	47	34.1%
Occasionally	15	10.9%
Rarely	1	0.7%
<b>Began to Listen to Music for Enjoyment</b>		
More than a year ago	126	91.3%
In the last year	5	3.6%
In the last month	2	1.4%
Recently	4	2.9%
No Response	1	0.7%

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 6**

**Music Listening Behavior Questionnaire: Importance of Music**

	N	%
<b>Personal Importance of Music</b>		
Not at all important	0	0%
Of little importance	13	9.4%
Quite important	57	41.3%
Very important	68	49.3%
<b>Importance when compared to the average person</b>		
Less	11	8.0%
Same as	38	27.5%
Little More	48	34.8%
Much more	40	29.0%
No response	1	0.7%

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 7**

Music Listening Behavior Questionnaire: Music in a Cognitive Associative Context

	N	%
Time in my life	80	58%
Important event	5	3.6%
Partner/Friend	9	6.5%
A place I like to go	4	2.9%
A film I like	4	2.9%
Where I am when I usually listen to it	8	5.8%
My religion	12	8.7%
Other	15	10.9%
No Response	1	0.7%

# IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 8**

**Music Listening Behavior Questionnaire: Frequency of Usage of Music for Pain Management**

	N	%
<b>Listening to Music for Pain Management</b>		
All the time	24	17.4%
Sometimes	48	34.8%
Occasionally	18	13.0%
Seldomly	18	13.0%
Rarely	16	11.6%
No Response	14	10.1%
<b>Began to listen to music for Pain Management</b>		
More than a year ago	75	54.3%
In the last year	20	14.5%
In the last month	12	8.7%
Recently	17	12.3%
No Response	14	10.1%

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 9**

Music Listening Behavior Questionnaire: Music in a Cognitive Associative Context for Pain Management

	N	%
Time in my life	44	31.9%
A holiday	2	1.4%
Important event	5	3.6%
Partner/Friend	5	3.6%
A place I like to go	14	10.1%
A film I like	1	0.7%
Where I am when I usually listen to it	14	10.1%
My religion	15	12.3%
Other	22	15.9%
No Response	14	10.1%

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 10**

**Bivariate Correlations Between Religion Variables and Pain Outcomes**

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Belief in Religious Beliefs	--								
2. Engagement in Religious Behaviors	.796**	--							
3. Feelings of Religious Affiliation and Belonging	.586**	.724**	--						
4. Emotional Reaction to Pain	-.044	-.119	-.155	--					
5. Limitations to Daily Life Caused by Pain	.077	.088	-.041	.592**	--				
6. Pain Interference with Social and Personal Functioning	.046	-.059	-.056	.694**	.715**	--			
7. Pain Severity in the Moment	.155	.177	.117	.280**	.434**	.437**	--		
8. Pain Severity in the Past 24 Hours	.154	.160	.117	.328**	.512**	.504**	.763**	--	
9. Listen to Music for Pain Management	.172	.229**	.207	.094	.153	.137	.281**	.308**	--

*Note.* Belief in Religious Beliefs: (1=Strongly Disagree – 5=Strongly Agree). Engagement in Religious Behaviors: (1=Never – 6=Very Often). Feelings of Religious Affiliation and Belonging: (1=Not Applicable – 7=Absolutely). Emotional Reaction to Pain: (0=Not Intense at all – 5=Extremely Intense). Limitations to Daily Life Caused by Pain: (0=Not at all – 5=Extremely). Pain Interference with Social and Personal Functioning: (0=Not at all – 5=High amount). Pain Severity in the Moment: (1 – 10). Pain Severity in the Past 24 Hours: (1 – 10). Listen to Music for Pain Management: (0=Strongly Disagree – 10=Strongly Agree).

\*\*p < .001

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 11**

Results of *t*-tests for Negative Pain Outcomes and Dimensions of Religion by Extreme Responses to the statement “For Pain Management” under the Question “Why do you listen to music”

	Condition				<i>t</i> (df)	<i>p</i> -value
	High Extreme		Low Extreme			
	M	SD	M	SD		
Pain in the Past 24 hours	6.8	1.86	5.15	2.55	t(92)=-3.51	.001
Pain in the Moment	5.91	2.33	4.21	2.41	t(92)=-3.48	.001
Limitations	4.41	1.29	3.86	1.37	t(92)=-2.01	.047
Feelings of Affiliation and Belonging	5.34	1.48	4.56	1.39	t(92)=-2.64	.01
Engagement in Religious Behaviors	63.29	27.96	46.09	26.95	t(92)=-2.68	.003
Belief in Religious Beliefs	75.63	28.41	63.49	31.05	t(92)=-1.98	.05

*Note.* “For Pain Management” within the question “Why do you listen to music” within the Music Listening Behavior Questionnaire scoring (Low Extreme scores are those  $\leq 5.67$ , High Extreme scores are those  $\geq 9.99$ ; range 0-10).

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Table 12**

Results of *t*-tests for Dimensions of Religion by Religious Denomination

	Condition				<i>p</i> -value
	Christian		Not Christian		
	M	SD	M	SD	
Feelings of Affiliation and Belonging	5.42	1.36	4.26	1.38	<.001
Belief in Religious Beliefs	83.03	18.41	45.43	28.49	<.001
Engagement in Religious Behaviors	70.74	20.72	32.29	25.41	<.001

*Note.* Christian = Identifies as a member of the Christian faith, Not Christian = Does not identify as a member of the Christian faith; scoring (Christianity=1, All others=0; range=1-7)



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**Table 13**

Results of *t*-tests for Dimensions of Religion by Listening to Music that Reminds Individuals of Religion in a General and Pain Management Context

		Condition				<i>t</i> (df)	<i>p</i> -value
		Do Listen		Do Not Listen			
		M	SD	M	SD		
General Context							
	Feelings of Affiliation and Belonging	6.50	0.65	4.88	1.48	t(23.64)=7.14	<.001
	Beliefs in Religious Beliefs	93.40	13.47	68.06	28.51	t(22.14)=5.45	<.001
	Engagement in Religious Behaviors	89.76	13.50	54.81	28.11	t(21.74)=7.54	<.001
Pain Management Context							
	Feelings of Affiliation and Belonging	6.66	0.51	4.83	1.42	t(64.20)=9.85	<.001
	Beliefs in Religious Beliefs	95.83	9.43	67.87	27.69	t(69.99)=7.94	<.001
	Engagement in Religious Behaviors	89.95	11.80	54.34	27.35	t(49.54)=9.14	<.001

*Note.* Do Listen = listens to music that remind the participant of their religion, Do Not Listen = does not listen to music that reminds the participant of their religion; scoring (My Religion=1, All others=0, range=1-9)

## Appendices

### Appendix A: Demographics

Please answer the following questions to the best of your ability

What is your Year of Birth?<sup>a</sup>

---

What is your gender identity?

- Male
- Female
- Transgender
- Gender Nonconforming
- Prefer not to say

What is your Ethnicity?

- White
- Asian
- First Nation
- African American/Black
- Latinx
- Middle East North African

Have you ever been diagnosed with a chronic (lasting more than 3 months) pain condition?

- Yes
- No

What chronic pain condition have you been diagnosed with?<sup>b</sup>

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## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

How long have you been experiencing the above chronic pain condition?<sup>c</sup>

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Do you consider yourself a member of an organized religion and if so, which organized religion?

- Christianity
- Islam
- Judaism
- Hinduism
- Buddhism
- Sikhism
- None of the above

*Note:* What is your Year of Birth?<sup>a</sup>: (Participants selected their year of birth from a drop down menu. What chronic pain condition have you been diagnosed with?<sup>b</sup>: (Participants self-reported their chronic pain conditions). How long have you been experiencing the above chronic pain condition?<sup>c</sup>: (Participants responded with their month and year of diagnosis).

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

**Appendix B: Music Listening Behavior Questionnaire**

How often do you listen to music for enjoyment?

- All the time
- Sometimes
- Occasionally
- Seldomly
- Rarely

When did you start to listen to music for enjoyment?

- More than a year ago
- In the last year
- In the last month
- Recently

On a scale of 0 to 10, where 0 indicates not at all and 10 indicates extremely, please answer the question: To which degree do you associate music with getting you into a particular mood

	Not at all 0	1	2	3	4	5	6	7	8	9	Extremely 10
Relaxed											
Uplifted											
Motivated											
Cheerful											
Sad											
Thoughtful											
Nostalgic											
Other											

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

Does the music you listen to remind you of anything in particular?

- A particular time in my life
- A holiday
- An important event
- My partner/ a friend
- A place I like to go
- A film I like
- Where I am when I usually listen to it
- My religion
- Other

All animals make specific sounds. Cows go moo, birds go chirp, frogs go ribbit. Select the sound that a bird makes<sup>a</sup>

- Chirp
- Ribbit
- Moo

How well do you know the music you like to listen to?

- Very Well
- Slightly Well
- Well
- Not well
- Not well at all

Do you play a musical instrument?

- Yes
- No

On average, how many hours a day do you spend listening to music? : \_\_\_\_\_

How important is music to you in your life?

- Not at all important
- Of little importance
- Quite important

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

- Very important

How important would you say music is to you when compared to the average person?

- Less than the average person
- Same as the average person
- Little more than the average person
- Much more than the average person

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

On a scale of 0 to 10, where 0 indicates strongly disagree and 10 indicates strongly agree, please answer the degree to which each statement personally answers the question: Why do you listen to music?

	Strongly Disagree 0	1	2	3	4	5	6	7	8	9	Strongly Agree 10
To enjoy the music											
To be creative/use my imagination											
To relieve boredom											
To help when I feel lonely											
To help me get through difficult times											
To relieve tension/stress											
To express my feelings/emotions											
To get myself into a particular mood											
To keep myself in my current mood											
To get out of a bad mood											
To help me perform activities that I would normally find boring											
To set a mood when I'm with others											
To make me feel more relaxed											
For pain management/relief <sup>b</sup>											

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

How often do you listen to music for **pain management**?

- All the time
- Sometimes
- Occasionally
- Seldomly
- Rarely

When did you start to listen to music for **pain management**?

- More than a year ago
- In the last year
- In the last month
- Recently

Does the music you listen to for **pain management** remind you of anything in particular?

- A particular time in my life
- A holiday
- An important event
- My partner/ a friend
- A place I like to go
- A film I like
- Where I am when I usually listen to it
- My religion
- Other

On average, how many hours a day do you spend listening to music for **pain management**?

Total : \_\_\_\_\_

*Note:* All animals make specific sounds. Cows go moo, birds go chirp, frogs go ribbit. Select the sound that a bird makes <sup>a</sup>: (This was an attention check question). For pain management/relief <sup>b</sup>: (Participants who responded with a one or greater were asked the pain management specific questions).



## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

### **Appendix C: Bodily and Emotional Perception of Pain**

On a scale of 0 to 5, where 0 indicates not intense at all and 5 indicates extremely intense, please specify how intense were the following moods in the occasion you felt the strongest pain.

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

	0 Not intense at all	1	2	3	4	5 Extremely Intense
Irritability (I lose my patience at the slightest thing)						
Feeling powerless						
Depression (Deep sadness with loss of any interest)						
Feeling of injustice (Why me?)						
Pessimism (A negative vision of the future)						
Anxiety						
Feeling guilty (I feel I am a burden for my family)						
Frustration (I can do nothing about it and I am angry at this)						
I lack confidence in my abilities and skills						

IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

I'm afraid I will not recover						
Confusion (I felt my mind is less clear)						
I do not recognize myself						
I feel I have become older						
I feel impaired						
I don't feel independent						

On a scale from 0 to 5, with 0 indicating not at all and 5 indicating extremely, in the past month how seriously did this pain limit:

	0 Not At All	1	2	3	4	5 Extremely
Your working performance						
Your capability to move						
Select 5, Extremely <sup>a</sup>						
Your sports activity						
Your social role						

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

On a scale from 0 to 5, with 0 indicating not at all and 5 indicating to an high amount, in the past month how seriously did this pain interfere with:

	0 Not At All	1	2	3	4	5 High Amount
Mood (inner affective-emotional tone, e.g.: I'm more sad, more often cheerful)						
Interpersonal Relationships						
Sleep						
The pleasure of living						

Please select the number that best describes the severity of you pain best:

On average in the past 24 hours

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

In this moment

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

*Note:* Select 5, Extremely<sup>a</sup>: (This was an attention check question).

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

### **Appendix D: Multi-Religion Identity Measure**

Please select the option below to indicate how much you agree or disagree with each statement

I am happy that I belong to my religion

- Not Applicable
- Very Slightly
- Slightly
- Moderately
- Strongly
- Very Strongly
- Absolutely

I have a strong sense of belonging to my religion

- Not Applicable
- Very Slightly
- Slightly
- Moderately
- Strongly
- Very Strongly
- Absolutely

I am proud of my religion and its accomplishments

- Not Applicable
- Very Slightly
- Slightly
- Moderately
- Strongly
- Very Strongly
- Absolutely

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

I feel a weak attachment towards my religion

- Not Applicable
- Very Slightly
- Slightly
- Moderately
- Strongly
- Very Strongly
- Absolutely

I am not positive about my religion

- Not Applicable
- Very Slightly
- Slightly
- Moderately
- Strongly
- Very Strongly
- Absolutely

# IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

## Appendix E: Religiosity Inventory

How important is religion in you daily life?

- Highly Important
- Very Important
- Important
- Unimportant
- Very Unimportant
- Irrelevant

Aside from weddings and funeral, how often do you attend religious services?

- More than once a week
- Once a week
- Once or twice a month
- A few times a year
- Seldom
- Never

Outside of attending religious services, how often do you pray?

- Several times a day
- Once a day
- A few times a week
- Once a month
- A few times a month
- Seldom
- Never



## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

There is a heaven where people who have led good lives are rewarded

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

There is a hell where people who have led bad lives are eternally punished

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

At night the sky is dark and during the day, the sky is usually bright. Select the option that describes that sky during the day<sup>a</sup>

- Dark
- Cloudy
- Bright
- Foggy

Religious miracles occur

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

Angels and demons are active in the world

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

There is a life after death

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

People have an immaterial soul, a part of themselves that is beyond their merely physiological and physical properties

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

*Note:* Select 5, At night the sky is dark and during the day, the sky is usually bright. Select the option that describes that sky during the day<sup>a</sup>: (This was an attention check question).

## IMPACT OF RELIGIOUS MUSIC ON CHRONIC PAIN

### Appendix F: Pre-Screening Questionnaire

Have you been diagnosed with a chronic (lasting more than three months) pain condition?

- Yes
- No

Select which (if any) chronic pain conditions you have been diagnosed with and have been experiencing for three months or more

- Myofascial (oral)
- Sciatica
- Any neuropathic associated conditions
- Do not select
- Endometriosis
- Lower back pain
- Cancer-related pain
- Fibromyalgia
- Pelvic
- None of the above