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# Concept Analysis: Music Therapy

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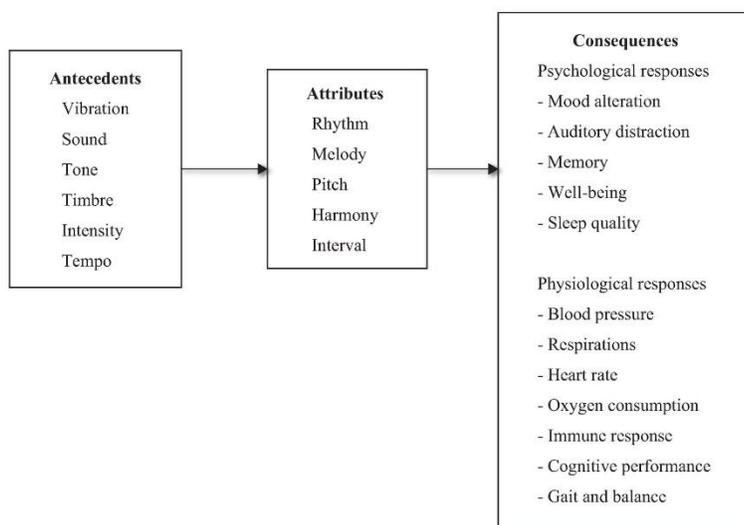
## Abstract

Down through the ages, music has been universally valued for its therapeutic properties based on the psychological and physiological responses in humans. However, the underlying mechanisms of the psychological and physiological responses to music have been poorly identified and defined. Without clarification, a concept can be misused, thereby diminishing its importance for application to nursing research and practice. The purpose of this article was for the clarification of the concept of music therapy based on Walker and Avant's concept analysis strategy. A review of recent nursing and health-related literature covering the years 2007–2014 was performed on the concepts of music, music therapy, preferred music, and individualized music. As a result of the search, the attributes, antecedents, and consequences of music therapy were identified, defined, and used to develop a conceptual model of music therapy. The conceptual model of music therapy provides direction for developing music interventions for nursing research and practice to be tested in various settings to

improve various patient outcomes. Based on Walker and Avant's concept analysis strategy, model and contrary cases are included. Implications for future nursing research and practice to use the psychological and physiological responses to music therapy are discussed.

Concept analysis is a method for clarifying an overused concept that may be prevalent in nursing and health care literature. Without clarification, a concept can be misused, thereby diminishing its importance for knowledge development. For example, the literature is replete with studies of music therapy to alter mood, provide distraction, and as a cue for movement. However, the therapeutic properties of music based on the attributes, antecedents, and consequences as a foundation for music therapy are not clearly defined. Thus, the purpose of this article is clarification of the concept of music therapy using the framework of defining attributes, antecedents, consequences, and a model case (Walker & Avant, 2010). Furthermore, the concept analysis of music therapy will provide insight into the conceptual model of music therapy to provide direction for interventions in nursing research and practice (Figure 1). Hence, the conceptual model of music therapy can serve as a framework for developing and testing music interventions in various adult populations to improve health outcomes.

FIGURE 1 Model of the concept of music therapy.



## DEFINITIONS AND THERAPEUTIC USE OF MUSIC

Music has been defined as both the science and art of ordering tones or sounds in succession, in combination, and in temporal relationships to produce a composition having unity and continuity (Merriam-Webster's Collegiate Dictionary, 1994). Down through the ages, music has been universally valued for its therapeutic properties of the psychological and physiological responses in humans (Murrock & Higgins, 2009). Musical compositions are complex blends of organized sound which invokes both psychological and physiological responses within the listener (Murrock & Higgins, 2009). Psychologically, music stimulates the unconscious automatic response at the lower brain. Physiologically, music causes the brain to release endorphins and thus create an effect similar to that of morphine in the body (Hart, 2009). The physiological responses are caused by the stimulation of the autonomic nervous system (ANS) that controls heart rate, respiratory rate, electrical conductivity, blood pressure, and endocrine functions (Hart, 2009). Because of its integrative power, music is an

important intervention for nursing and health care because of its multidimensional effect on humans (Gallagher, 2011b).

In the literature, there are three different terms for using music to evoke the psychological and physiological responses. First, there is music therapy, defined as the controlled use of music and its influence on the human being to aid in the physiological, psychological, and emotional integration of the individual during treatment of illness or disability (Munro & Mount, 1978). In practice, music therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program (American Music Therapy Association, 2010). Music therapy is used to improve, maintain, remediate, or prevent one or more clinical issues for patient care (de Niet, Tiemens, Lendemeijer, & Hutschemaekers, 2009). For example, music therapy has reduced postoperative pain (Comeaux & Steele-Moses, 2013), improved pain management (Kwan, Soek, & Seah, 2013), decrease depression in older adults (Chan, Wong, Onishi, & Thayala, 2011), reduced anxiety in adult patients (Li, Zhou, Yan, Wang, & Zhang, 2012) and in caregivers of patients with cancer (Lai, Li, & Lee, 2011), reduced anxiety in ventilated patients (Korhan, Khorshid, & Uyar, 2011), decreased nausea and vomiting in patients with cancer (Karagozoglu, Tekyasar, & Yilmaz, 2012), and decreased posttraumatic stress in adults (Carr et al., 2012). Other music therapy studies reported decreased agitation in patients with dementia (Clare, 2014); decreased stress, anxiety, and depression in older adults (Mohammadi, Shahabi, & Panah, 2011); improved mood in patients with stroke (Kim et al., 2011); improved sleep quality and relaxation (Su et al., 2013); and enhanced psychological well-being in patients with cancer (Foster, Wiseman, & Pennert, 2014). Thus, there is empirical support for the conceptual model of music therapy based on the psychological and physiological responses in various adult populations.

A second term found in the literature is preferred music, which is defined as systematic presentation of music selected based on personal music preferences (Gerdner, 1997). Music can be used to introduce a sense of familiarity into a new environment or to maximize familiarity in an existing environment. To facilitate feelings of physical and mental relaxation, music can mask environmental noises and refocus an individual's attention on a more pleasant emotional state (Gerdner, 1997). Listening to preferred music can induce pleasant and positive feelings with activation of the limbic system (Menon & Levitin, 2005). Furthermore, listening to relaxing music decreased cortisol, which can reduce anxiety and promote relaxation (Menon & Levitin, 2005). As a result, preferred music can be a viable alternative to chemical and physical restraints to decrease agitation in older adults with dementia (Sung, Chang, & Lee, 2010). Listening to preferred music has also been associated with improved mood and problem-solving skills in professional adults (Lesiuk, 2010). Thus, listening to preferred music can improve the psychological responses to music therapy by impacting an individual's emotional state.

As an auditory time cue, music is also a stimulus for movement. Exercising to preferred music has demonstrated beneficial effects on the psychological and physiological responses of the individual (Hutchinson & Sherman, 2014). Preferred music enhances state motivation and arousal through the sympathetic branch of the ANS, which increases heart, blood pressure, and respiration rate (Guyton & Hall, 2005). Studies show that exercising to preferred music resulted in the psychological responses of improved mood in young adults and athletes (Karageorghis et al., 2011; Karageorghis, Jones, & Stuart, 2007; Karageorghis et al., 2010) and improved well-being in older adults (Madison, Paulin, & Aasa,

2013). Physiological responses reported are improved exercise performance in patients with dementia and long-term care residents (Johnson, Deatrack, & Oriel, 2012; O’Konski, Bane, Hettinga, & Krull, 2010), improved gait in patients with stroke (Jeong & Kim, 2007), improved cognitive function in older adults (Sato et al., 2014), and increased flexibility and reduced blood pressure in older adults (Madison et al., 2013). Also, loud volume music often distracts the individual from unpleasant stimuli, such as shortness of breath, fatigue, and muscle soreness (Hutchinson & Sherman, 2014; Karageorghis et al., 2011; Karageorghis et al., 2010). As a result, exercising to preferred music also produces beneficial psychological and physiological responses to improve various health outcomes.

Individualized music is the third term, which is music that has been integrated into an individual’s life and is based on personal preference (Gerdner, 1997). Individualized music is specifically customized to the preferences of the individual listener, which is particularly important for patients with dementia. When patients with dementia are exposed to music that they perceive as familiar and pleasant, this may override potentially confusing stimuli, such as sounds from the environment that are inaccurately interpreted by the brain owing to the dementia (Gallagher, 2011a). Music replaces the confusing stimuli with a familiar and soothing aural environment that may elicit positive feelings or remote memories. When individualized music is administered prior to or during periods of agitation, the positive responses elicited are decreased distress and improved relaxation, which often prevents or minimizes further agitation (Gerdner & Schoenfelder, 2010; Park & Specht, 2009). Regardless of the definition for using music, the therapeutic properties of music impact the consequences of psychological and physiological responses in various adult populations. Thus, the conceptual model of music therapy can serve as a framework for music interventions for future nursing research to improve various health outcomes.

## REVIEW OF THE LITERATURE

Music, commonly called the universal language, has been used throughout history as a powerful medium for health, healing, and wellness (Murrock & Higgins, 2009). As a pioneer in nursing, Florence Nightingale noticed the effects of music on pain in soldiers during the Crimean War (Nightingale, 1859/1992). Nightingale believed a healthy environment was an essential component of healing and music helped put the soldiers in a healing environment. Thus, to better understand the therapeutic properties of music therapy, music needs conceptual clarification based on its attributes, antecedents, and consequences. The attributes, antecedents, and consequences are the crucial elements of the conceptual model of music therapy (Figure 1).

To identify current nursing research and practice, a review of the recent nursing and health-related literature covering the years 2007–2014 was performed on the concepts of music, music therapy, preferred music, and individualized music. To further extend the literature search, the following keywords were searched: concept analysis, psychological responses to music, and physiological responses to music. These concepts and keywords were used to search these databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, ProQuest Nursing & Allied Health Source, PsycINFO, and Cochrane Library. Inclusion criteria included music history, music therapy, and music intervention studies in adult populations. Only articles written in English or translated to English were reviewed. Articles of music intervention studies in infants, children, adolescents, and meta-analyses were excluded from the review. The search resulted in 158 articles, 4 books, and 3 book

chapters and then limited to 75 articles, 4 books, and 3 book chapters that met the inclusion criteria and were not duplicate citations.

### Attributes of Music.

The attributes of music consist of five elements: rhythm, melody, pitch, harmony, and interval (Alvin, 1975; Bunt, 1994). These attributes are closely related, interdependent, and nonhierarchical. As the first element, rhythm is the pattern of repeated sounds and silences and is the most fundamental, essential, structural, and organizational element (Tramo, 2001). Rhythm captures an individual's attention and is the most important consideration when using music for specific and therapeutic purposes. As an auditory time cue, rhythm influences motor control and function based on its recurring patterns and predictable cues. Rhythmic cueing leads to skeletal muscle synchronization and determines the timing, cadence, and dynamics of physical movements (Thaut, 1997). Melody is the sequencing of musical pitch and intervals between musical notes. As the second element, melody is structured by its length and intensity and expresses a mood or an emotion (Schneck & Berger, 1999). As a form of nonverbal communication, melody can elicit emotions from one extreme response (happy, calm, euphoric) to another (sad, anxious, angry). Pitch, the third element, is the number of cycles that a particular sound vibrates per second (Aldridge, 1996). Faster vibrations cause high-pitched tones often associated with cheerful or happy reactions. Conversely, slower vibrations cause lower tones and typically denote bleakness or depression. The vibration rate influences emotional response as rapid vibrations are perceived as stimulating and slow vibrations are deemed relaxing (Bunt, 1994). The fourth element, harmony, is the result of blending pitches together to form a combination of sound. These blended combinations can be characterized as consonant or dissonant (Bunt, 1994) and form distinct patterns from the concurrent musical notes producing a musical chord. Interval, the fifth and final element, is the distance between each note and it is the integral component of the melody giving it its character and emotional response (Schneck & Berger, 1999). As a result, the five elements of music play a significant role in eliciting a broad spectrum of consequences such as emotional responses (psychological) and as a stimulus for movement (physiological) that can improve health outcomes in various patient populations.

### Antecedents of Music.

Antecedents are those events or incidences that come before the particular concept (Walker & Avant, 2010). For music, the antecedents are vibration, sound, tone, timbre, intensity, and tempo. To start, vibration is the quivering or trembling motion of molecules resulting in sound. Without vibration, nothing can be heard. To the human ear, sound ranges from the lowest audible tone (vibrating at 20 times per second) to the highest audible tone (vibrating at 20,000 times per second; Guzzetta, 2000). Sound makes its way to the auditory cortex of the brain where the primary auditory cortex discriminates for high acuity loudness and precise distinction of pitch. This is important for distinguishing tonal and sequential sound patterns (Curtis, Carroll, & Curtis, 1998). To differentiate sound from music, there must be resonance, which is the enrichment of a musical tone by vibration. Tone is the sound of definite pitch, whereas timbre is the quality of tone distinctive of a particular musical instrument or singing voice (Curtis et al., 1998). Another antecedent is intensity, which is a reflection of volume and vibratory amplitude (Jonas-Simpson, 1997). Intensity determines the overall impact of the music as consistently loud music is considered disturbing, whereas soft music is

considered soothing. Contrasting between soft and loud volumes, intensity is what makes music interesting. The speed at which the sequences of musical pitches are delivered is tempo (Schneck & Berger, 1999). Tempo is an important antecedent in determining the happy and sad emotional connotations of music. It has been suggested that the emotional responses to music originate from the brainstem (Pereira et al., 2011). For example, happy music is usually characterized by fast tempo of and major mode, whereas sad in music is expressed by slow tempo and minor mode (Pereira et al., 2011). Based on the conceptual model of music therapy (Figure 1), the antecedents impact the attributes, which in turn impact the consequences of the psychological and physiological responses in the human body. Thus, the six antecedents are the foundation for the therapeutic properties of music.

### Consequences of Music.

Consequences are the events or incidences that happen as a result of the occurrence of the particular concept (Walker & Avant, 2010). For music, the consequences are the therapeutic properties of psychological and physiological responses within the human body. Music produces psychological responses by engaging the right hemisphere of the brain, which is involved in intuitive and creative methods of processing information (Tramo, 2001). From the auditory cortex, music is processed in the limbic system known as the center of emotions, sensations, and feelings (Creutzfeldt & Ojemann, 1989). Music follows a complex syntactic structure (Seger et al., 2013) as attributes and antecedents such as pitch, tonality, rhythm, and volume play important roles in affective response and cognitive recognition (Wu, Li, Yin, Zhou, & Yao, 2010). The affective response is the subjective reaction of positive or negative emotions such as pleasure/displeasure or joy/sorrow that are associated with a particular musical composition (Vieillard, Roy, & Peretz, 2012). Cognitive recognition is the meaning and/or memory associated with the music in adults and adults with schizophrenia (Gold et al., 2012; Hars, Herrmann, Gold, Rizzoli, & Trombetti, 2014). Thus, mood alteration depends on the person's mood, response and recognition to music, musical preference, and culture (Thaut, 1989; Vieillard et al., 2012; Villarreal, Brattico, Vase, Østergaard, & Vuust, 2012).

Music training promotes brain plasticity resulting in structural changes in immediate cognitive performance. The cognitive performance is often enhanced over time, even when active participation in music training stopped (Gooding, Abner, Jicha, Kryscio, & Schmitt, 2014). Recently, a growing area of interest is the effect of music on cognitive abilities in various age groups, specifically in older adults. For example, continuous music training resulted in enhancement of cognitive control abilities in older adults and that early to midlife musical training enhanced late-life episodic and semantic memory (Amer, Kalender, Hasher, Trehub, & Wong, 2013). Six-month weekly music-based multitask training was correlated with improved cognitive function and reduced anxiety (Hars et al., 2014) and improved gait, enhanced balance, and decreased the rate of falls in community-dwelling older adults at risk for falls (Trombetti et al., 2011). Active music therapy in addition to standard therapy significantly improved the attention, visual-motor coordination, and memory in an adult patient with memory, attention, and verbal fluency deficits associated with vascular cognitive impairment (Giovagnoli, Oliveri, Schifano, & Raglio, 2014).

In the realm of mental health, group music therapy was effective in enhancing alpha waves, attention, calculation, language, as well as improving emotional relaxation and cognitive abilities for persons with chronic schizophrenia (Kwon, Gang, & Oh, 2013). In 89 dementia-caregivers dyads, both singing and

music listening enhanced mood, orientation, and remote episodic memory in persons with early dementia (PWED). To a lesser extent, it improved attention, executive function, and general cognition in PWED. Singing also improved short-term memory and caregiver well-being, whereas music listening had a positive effect on quality of life (Särkämö et al., 2013).

The physiological responses to music occur as music passes through the auditory cortex to the limbic system, affecting the ANS, which controls the cardiovascular, respiratory, neuroendocrine, and immune systems of the body. The physiological responses of music are caused by auditory vibrations that enter the ear via the pinna, travel through the ear canal, cross the tympanic membrane, ossicles, middle ear muscles, and cochlear fluid of the organ of Corti (Curtis et al., 1998). From the organ of Corti, the auditory vibrations are transmitted by nerve fibers to various centers of the brain. Mediated by the brainstem, hypothalamus, limbic system, and hemispheric integration, the auditory vibrations subsequently affect the autonomic, immune, endocrine, and neuropeptide systems (Botez, Botez, & Aube, 1983). Furthermore, the physiological responses also depend on the psychological responses to music. Music can alter mood as positive emotional states enhance parasympathetic activity to reduce heart rate, blood pressure, respiratory rate, and pain (Vaajoki, Kankkunen, Pietilä, & Vehviläinen-Julkunen, 2011; Wang, Dong, & Li, 2014), boost immunity (Lai, Liao, Huang, Chen, & Peng, 2013), and decreased cortisol levels and stress (Lai & Li, 2011).

Music can serve as a distracter by diverting attention away from an unpleasant stimulus. For example, pain typically leads to a stress response resulting in increased heart rate, respiratory rate, blood pressure, and state anxiety (Lazarus, 1991). Calm music may interrupt this stress response by releasing  $\beta$ -endorphins, the body's natural opioid pain relievers (Chlan & Halm, 2013; Comeaux & Steele-Moses, 2013; Kwan et al., 2013; Villarreal et al., 2012).  $\beta$ -Endorphins are associated with pleasant emotions, relaxation, and pain relief. As a result, music occupies sensory neurons and blocks transmission of painful, unpleasant stimuli. Thus, the physiological responses are because of auditory vibrations and psychological responses to music. Based on the literature, the antecedents and attributes are defined and the consequences of music are documented to support the conceptual model of music therapy.

## MODEL CASE

The conceptual model of music therapy includes antecedents and attributes to provide direction for developing interventions to influence the consequences. Understanding the attributes of music is essential part of music therapy when developing an intervention. Subsequently, the consequences of music therapy can be used to evaluate the effectiveness of the music intervention. The model case is an example of the conceptual model of music therapy that has all the defining attributes of the concept (Walker & Avant, 2010).

J.H. is a 64-year-old female who recently had hip replacement surgery. In addition to pain management after surgery, it is imperative for those who have undergone hip replacement surgery to restore physical function. While ambulating with the nurse from the bathroom to the chair, J.H. experiences moderate incision pain and feels that her heart rate and breathing are faster than usual. The nurse notices J.H. grimacing in pain and knows that she needs something in addition to pain medication so J.H. can walk to physical therapy. She complains to the nurse that she cannot do physical therapy today and wants to go back to bed. To help alleviate J.H.'s pain, the nurse turns on the CD player at her

bedside that plays big band music with a tempo of 60–80 beats per minute. As the musical composition begins, J.H. notices the constant rhythm of the drums, melody of the trumpets, pitch of the high notes of the flutes, harmony of the woodwinds, and the interval between each note in the trumpets' melody (attributes). The music starts out soft and slow with a tempo of 60 beats per minute and then becomes louder and increasing to a tempo of 80 beats per minute. As the musical composition comes to an end, the volume becomes soft again and the tempo returns to 60 beats per minute (antecedents). By the end of the song, J.H. feels her pain is tolerable and agrees to go to physical therapy. As a result, the music intervention shifted her attention away from the unpleasant stimuli of pain to a more pleasant stimulus of music (psychological consequence).

## CONTRARY CASE

Contrary cases are constructed to understand what the concept is not (Walker & Avant, 2010). For example, J.H. has returned from physical therapy and is complaining of pain. It is not time for pain medication so she asks the nurse if she can listen to music because it helped alleviate her pain prior to physical therapy. The nurse brings her a CD of nature sounds and starts the CD while J.H. is in bed trying to relax. As the CD begins, J.H. notices birds singing, a babbling brook, and other nature sounds. J.H. notices the different pitches and sounds of the bird calls. However, the pitches and sounds are not music and there is no rhythm, melody, or harmony of the bird calls and other nature sounds. By the end of the CD, J.H. does not feel as if her pain has decreased and asks the nurse if it is time for her pain medication. As a result, the CD of nature sounds did not distract her attention away from the unpleasant stimuli of pain. Even though the birds' singing included the antecedents of sound, tone, timbre, and intensity, it did not have the five attributes of music and did not lead to consequence of reduced pain.

## DISCUSSION

Concept analysis was used to clarify music therapy and provide a conceptual model of its antecedents, attributes, and consequences. The definitions of music, music therapy, preferred music, and individualized music are addressed as well as the consequences of music therapy based on these definitions. However, few studies mentioned the attributes of music therapy, which are the five elements that play an instrumental role in capturing an individual's attention (rhythm), eliciting an emotional response (melody), having high or low sounds (pitch), combining sound (harmony), and altering the distance between notes (interval). Based on the literature, these attributes are vital when developing music interventions to elicit the psychological and physiological responses to improve health outcomes. In addition, few studies mention the antecedents of music therapy, which are the foundation for the therapeutic properties of music. Only nine studies mentioned the therapeutic properties of the attributes and antecedents when testing a music intervention that resulted in the psychological and physiological responses of music therapy (Table 1). Furthermore, the model and contrary cases of music therapy illustrated examples of what the concept "is" and "is not" when using music therapy as an intervention to alleviate pain. Thus, the conceptual model of music therapy can serve as a framework for music interventions that have practical application in nursing research and practice to improve various health outcomes in various patient populations.

Table 1 Reported Attributes and Antecedents of Music Interventions

Attributes (AT) Antecedents (AN)	Psychological Responses	Physiological Responses	References
Melody (AT)	Major mode = happy		Pereira et al. (2011)
Tempo (AN)	Fast = happy/slow = sad		
<ul style="list-style-type: none"> <li>• Pitch (AT)</li> <li>• Intensity (AN)</li> </ul>	Emotional regulation in patients with schizophrenia		Gold et al. (2012)
<ul style="list-style-type: none"> <li>• Rhythm (AT)</li> <li>• Tempo-slow (AN)</li> </ul>	Decreased anxiety and depression in caregivers of patients with cancer		Lai et al. (2011)
Tempo-slow (AN)	Decreased depression		Chan et al. (2011)
Rhythm (AT)		Increased heart rate and improved gait in patients with Parkinson's disease	Thaut (1997)
<ul style="list-style-type: none"> <li>• Rhythm (AT)</li> <li>• Tempo (AN)</li> </ul>		Increased cognitive function	Satoh et al. (2014)
Tempo (AN)		Increased participation in an exercise program	Johnson et al. (2012)
<ul style="list-style-type: none"> <li>• Rhythm (AT)</li> <li>• Melody (AT)</li> </ul>		No change in immune markers	Lai et al. (2013)
<ul style="list-style-type: none"> <li>• Melody (AT)</li> <li>• Rhythm (AT)</li> <li>• Tempo (AN)</li> </ul>		Increased sleep quality and decreased heart rate	Su et al. (2013)

As a result of this concept analysis, the conceptual model of music therapy provides the underpinnings for other theories. For example, two middle-range nursing theories focus on the psychological responses of music reduce pain and decrease agitation. The theory of acute pain management (Good, 1998) uses music as a nonpharmacological adjuvant to distract a patient's attention away from a pain stimulus. It has been tested in abdominal surgery (Good, 1995; Good & Chin, 1998) and labor and delivery patients (Good et al., 1999) to reduce pain and pain medication usage. The other theory is the theory of individualized music intervention for agitation (IMIA; Gerdner, 1997). This theory proposes that individualized music must be familiar to the patient to have any impact on agitation. Music is proposed as a nonpharmacological intervention to reduce agitation medication and the need for restraints in patients with dementia (Gallagher, 2011b; Gerdner, 2000). However, neither theory describes the therapeutic properties of the attributes or the antecedents of music therapy for the psychological responses.

As for physiological responses, the rhythmic auditory stimulation (RAS) technique (Thaut, Miltner, Lange, Hurt, & Hoemberg, 1999) uses music as a cue for movement in neurologically impaired individuals. RAS is based on entrainment in which rhythmic auditory cues help an individual synchronize movements of his or her arms and legs. The attribute of rhythm serves as an anticipatory

and continuous time cue to keep an individual's walking cadence in time with the music. The RAS has been tested in patients with Parkinson's disease (Thaut, 1997), patients with Huntington's disease (Thaut, Miltner, Lange, Hurt, & Hoemberg, 1999), and patients with stroke (Thaut, McIntosh, & Rice, 1997) to improve gait and delay the progression of the disease. Finally, the theory of music, mood, and movement (Murrock & Higgins, 2009) combines the psychological and physiological responses to music to promote the initiation and maintenance of physical activity to improve health outcomes. It proposes that music alters mood, is a cue for movement, and makes physical activity more enjoyable leading to improved health outcomes. It has been tested in underserved adults to improve physical function, depression, and disability (Murrock & Graor, 2014) and in older adults to decrease depression (Chan et al., 2011).

## CONCLUSION

Currently, few studies define the purpose of music therapy or discuss the significance of the attributes and antecedents when developing music interventions to evoke certain psychological and physiological responses. Few studies identified a theoretical or conceptual framework as the foundation for the development and testing the music interventions. Thus, the conceptual model of music therapy should help to fill this gap as the assessment and selection of music should be based on the attributes and antecedents to evoke the psychological and physiological responses to improve health outcomes.

## IMPLICATIONS FOR NURSING PRACTICE

As an intervention, music therapy is safe, inexpensive, and noninvasive. For example, music therapy is easy to implement in different settings such as nursing homes, hospitals, waiting rooms, surgical, and outpatient centers. Music interventions can also be used by community-dwelling adults for pain management and relaxation in their homes, offices, and places of employment. Music therapy is portable giving individuals autonomy to self-administer music interventions when they need it most or at their convenience. In addition, music therapy gives nurses autonomy by allowing music interventions to be used at the nurse's discretion, especially when patients are not able to make decisions for themselves. As our population ages, music therapy can be used as an intervention to impact cognition and memory as well as gait and balance to reduce falls in older adults. Individuals with mental health issues can also benefit from music therapy as interventions to help improve relaxation, cognitive abilities, short-term memory, and quality of life. Because musical preferences are influenced by age, gender, and culture, music preferences should be a part of the routine assessment for music interventions. Overall, nurses need to use music therapy as interventions to place individuals in the best possible environment to promote health, healing, and restoration.

## IMPLICATIONS FOR NURSING RESEARCH

As a nonpharmacological adjuvant to reduce pain, depression, anxiety, and agitation, music interventions need further research to determine cost-effectiveness. For example, randomized controlled trials could document reduced hospital costs based on decreased use of pain and antipsychotic medication, decreased intubation time, and decreased length of hospital stay. Furthermore, it would be important to determine a "dose" effect of how many music therapy sessions are needed to obtain the desired outcome and also the long-term effect of music interventions on chronic pain, depression, insomnia, and agitation. For long-term care facilities, music interventions

implemented at night could reduce the use of physical restraints and the need for a health care professional to monitor “wandering” patients. In addition, the use of music interventions to improve gait and balance a reduce falls in older adults would result in a significant reduction in health care costs. Of note, recent studies support music therapy as an intervention to improve cognitive abilities in middle-aged and older adults. However, no research has investigated the impact of music therapy on positive thinking, which is a promising avenue for future nursing research. Thus, the conceptual model of music therapy provides an organizing framework that can be used to develop music interventions for nursing research and practice.

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