



TENNESSEE
PERSON-CENTERED
MUSIC PROGRAM

Music and Cognition

TPCMP Special Topics Training

In this TPCMP Special Topics Training we are going to be discussing music and cognition, specifically regarding older adults and the positive effects of personalized music playlists.

Webster's dictionary defines cognition as, “the act of thinking, understanding, learning and remembering”. This is a simple way to think of a complicated process. Music is a bit harder to give a definition to. Music is incredibly complex, and something that is beautifully unique to humans (Music Therapy: An Introduction to the Profession). Studies in neuroscience have found that music induces emotional processing, which also recruits diverse and widely distributed brain regions (Neuroscience of Musical Emotion).

So, what does music and cognition mean to the Tennessee Person-Centered Music Program?

Some widely experienced symptoms of older adults with Alzheimer’s and other related dementias are: decreased ability or an inability to understand verbal language and increased agitation (Use of Individualized Music). These are symptoms that individualized music can help alleviate for some residents. When it comes to caring for older adults, it is important to work towards improving quality of life, and music can help to do this.

Recent studies have shown that music can: decrease agitation, create meaningful interactions, and help with communication (Use of Individualized Music). This is all because of the way that music interacts with the brain. This music can also be used in personal and social settings. Between Bluetooth headphones and speakers there are so many ways to share music with residents to help get desired responses.

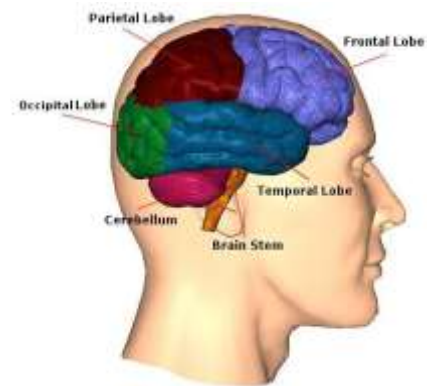
Music is processed in the same parts of the brain that control stress levels, motor function, communication, and emotions amongst other things (Music Therapy: An Introduction to the

Profession). That means that music can tap into all these brain functions and be used to help improve overall quality of life for older adults.

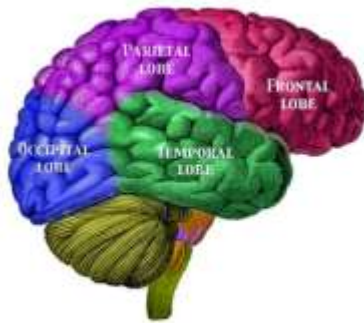
Music and the Brain

Scientists have broken brain processing into three categories: sensory, cognitive/emotional and motor processing (Music Therapy: An Introduction to the Profession). There is a common misconception that music is processed on the right side of the brain and speech is processed on the left. However, more recent research has shown that it is more complicated than this, and that music and speech are processed on both sides of the brain (Music Therapy: An Introduction to the Profession). Music interacts with every category of brain processing and can be used in a variety of therapeutic ways.

For example, music can affect the amygdala and hippocampus (Music Therapy: An Introduction to the Profession). Both the amygdala and the hippocampus are located in the temporal lobe (Music Therapy: An Introduction to the Profession). These are parts of the brain that play a crucial role in cognitive/emotional processing. Pleasant and unpleasant music stimulate different regions of the amygdala and hippocampus. Research shows that during pleasant music, the neuroendocrine response is associated with reduced stress, and during unpleasant music the hippocampus is inhibited and does not aid in protecting against downstream mechanisms that stress can cause (Music Therapy: An Introduction to the Profession). During pleasant music dopaminergic neurons in the ventral tegmental area (VTA) are activated, resulting in increased dopamine in brain regions involved with reward (Music Therapy: An Introduction to the Profession). After the age of three, reward-based systems are crucial for learning new things, and because pleasant music allows for this dopamine release, music can be used as a reward to help learn and/or re-learn skills (Music Therapy: An Introduction to the Profession). Studies today have shown that, “Both anterior cingulate cortex's (ACCs) regions in the left and right hemispheres have differential functions and respond differently to music. The left is involved with music-based working memory, whereas the right ACC is involved in improvisation. . . Both the right orbitofrontal cortex (OFC) and the



right prefrontal cortex (PFC) are more active during disliked or adverse music, while the left OFC and left PFC are active during preferred, light, happy and joyful music. Taken together, this information supports the use of resident-preferred music” (Music Therapy: An Introduction to the Profession). Different music activates different regions of the brain, and pleasant resident-preferred music can be used to help bring process memories. The use of a personalized music playlist can bring pleasure to residents, be used as a rewarding/de-stressing activity, as well as something that can be used to help memory.



Music can also play a crucial role in sensory processing. Studies have shown that music affects the Broca’s area and the Wernicke’s area which associate meaning with sound. (Music Therapy: An Introduction to the Profession). The Broca’s area is located in the frontal lobe in the left hemisphere of the brain, and the Wernicke’s area is located in-between the parietal and temporal lobe also in the left hemisphere (Music Therapy: An Introduction to the Profession). Therefore some residents can sing after losing the ability to speak. “When speaking with another person, one must interpret what is said and then put together the correct order to speak back. In music, particularly singing a familiar song, the order is already together and tied to long-term memory. Thus, a person needs only to recall the song and the order of words, which is already in place.” (Music Therapy: An Introduction to the Profession). This means that music can be used to help residents communicate, and deciding between music they like and do not like allows an opportunity for personal choices to be made.

Conclusion

In this special topics training we have covered music and cognition and how this helps us understand why personalized music playlists work for older adults. The subject of music and the brain is incredibly complex, and something that neuroscientists today are continuing to learn more about. With the research we have today we can see that music interacts with the brain in a special way, which allows us to use music to aid residents in many ways. Through

the Tennessee Person-Centered Music Program, we are using resident preferred music to alleviate agitation, increase communication and improve quality of life.

Work Cited

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