

Review: Neuroscience - Dance Movement Therapy

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Abstract

Neuroscience and dance are connected through various auditory processes and interaction in the brain. Dance engages various brain regions, including the motor cortex, cerebellum, somatosensory cortex, and basal ganglia, facilitating the integration of sensory information, motor planning, and precise execution of movements. Many people today struggle with their mental and physical health on a daily basis, whether it be because of school, work, family, etc. Dance Movement Therapy (DMT), a form of physical movement therapy. Studies have shown promising outcomes in using music-based interventions, such as dance, for neurorehabilitation, pain management, and mental health disorders. Dance has been found to evoke intense emotional experiences, stimulating the release of neurochemicals associated with stress reduction.

Introduction

Dance is an intricate and captivating art form that engages both the body and the mind. Dance Movement Therapy (DMT) is the use of movement and the connection between the body and mind to help individuals achieve “emotional, cognitive, physical, and social integration”. DMT aims to aid in both physical and mental health, used for stress reduction in addition to disease prevention and other health conditions one might face. [1] However, there is a complex network of brain regions working together, behind the scenes, to allow for an individual to master this art and get the most out of the learning process. These regions include the motor cortex, the basal ganglia, the somatosensory cortex, and the cerebellum. DMT has been shown to aid in stress relief, PTSD, Parkinson’s Disease, Schizophrenia, and eating disorders.

Brain regions crucial for dance

There are 4 major regions of the brain that work together and contribute to the learning and mastering of dance. These regions are the motor cortex, somatosensory cortex, cerebellum, and basal ganglia. The motor cortex is primarily responsible for executing voluntary movements. This region allows for the individual to have control of their body and coordinate the dance steps accurately. The somatosensory cortex is responsible for motor control and hand-eye coordination. This region is crucial to an individual in order to enable precise control of their body to perform the dance smoothly. The cerebellum aids in the planning of motor actions. The basal ganglia is responsible for motor coordination. These regions together are needed for an

individual to dance as it enables the smooth execution of the dance steps with proper balance and posture. [2]

The benefits of DMT on the brain

Dancing has many positive effects on the brain itself. For example, dance has the ability to stimulate nerve growth factors. These nerve growth factors are proteins that are crucial for maintaining sensory neurons and their function. Dancing has been seen to boost the connectivity between the right and left hemispheres of the brain. Additionally, long term dancing can strengthen the brain as a whole. This combination of exercise and sensory and mental enrichment of the brain can improve neuroplasticity (the brain's ability to form new neural connections and change its responses based on stimuli). Therefore, DMT can be used to aid in neurological diseases, such as Parkinson's Disease. [3]

Another positive impact of dance is its ability to boost memory. A study conducted that worked with individuals 75 and older aimed to monitor the rate of dementia, including Alzheimer's Disease. In this study, many activities were conducted, ranging from non-physical and physical, including reading, playing cards, swimming, biking, and dancing. At the end of the study, it was seen that out of all of the physical activities, dancing was the only one to offer protection against dementia (76% risk reduction) and had the highest risk reduction percentage in comparison to all the activities conducted, both physical and non physical. This study shows that DMT can provide a healthy way to limit if not prevent memory loss. [4]

DMT and stress relief

Dancing has been shown to aid in various conditions such as substance abuse, depression, anxiety, etc. A study conducted in 2019, surveying 1,000 dancers, has shown that in the 81% of those dancers who self-reported stress-related conditions, 88-96% of them said dance was their coping mechanism. Dancing provides an outlet for an individual to express themselves. Dancers can use movement as a way of relaying their emotions that might be difficult to articulate verbally. Additionally, the study reveals that the spontaneity of dancing or "being in the zone" is a connector to the neurological aspect of relief through movement. Spontaneity in dance is hypothesized to have these positive psychological effects on individuals as it allows for the "emotional brain" to take over. Anxiety and depression can cause one to feel detached from their bodies, however freestyling with dance can allow for the individual to tap back into their senses and regain a sense of control of their emotions and physical body. [5]

DMT and PTSD

Trauma affects a person both mentally and physically in ways that can be extremely detrimental. During a traumatic event/trigger, the body reacts through “Fight”, “Flight”, or “Freeze”. It is possible for individuals to remain in one of these three responses even after the threat has passed, potentially causing “somatic symptoms of trauma”, such as nausea, migraines, etc. On top of physical symptoms, an individual struggling with PTSD might struggle with interoception (a sense that helps one understand what is going on inside their body), making it difficult for an individual to identify pain, hunger, etc. Trauma can also be responsible for alexithymia (the inability to name and understand emotions)

Dance Movement Therapy (DMT) helps people express themselves non-verbally, helping individuals struggling with trauma to feel calmer, increase self-awareness, and develop coping skills. DMT allows for individuals to cope in a healthy way, by feeling connected within their body, understanding their triggers, and learning to use dance as a method of relaxation. People living with PTSD often are unable to use words to express themselves.

“The body speaks its own language and releases the suppressed voice and emotions hidden deep within their bodies and minds, and dance movement therapy has the ability to free an individual from turmoil and give a quality of life to someone who doesn’t feel deserving.” [6]

DMT and Parkinson’s Disease

Studies have shown that individuals with Parkinson’s Disease that have been progressing through DMT have shown significant improvements with balance, shown by an average improvement of 4 points on the Berg Balance Scale, with a biweekly, 10 week tango class. However, when a group of individuals without PD went through the same tango class, there were no signs of balance improvement. This study was one of the firsts of its kind and gave way to evidence of Dance Movement Therapy, in this case the Argentine tango, aiding individuals with Parkinson’s Disease. [7]

DMT and Eating Disorders

Eating disorders are continuously becoming more common as time passes. However, there aren’t many treatments that attend to the needs of the individual - physical, social, and emotional. In the past several years, DMT programs have been put in place for people struggling with eating disorders. DMT aims to address anxiety and low self-esteem and work to help the individual feel more comfortable about their body and use physical movement as a



method of expressing their feelings and feeling more confident. Programs such as EDP (Eating Disorders Program) work to help individuals feel comfortable with themselves through various exercises and activities all aimed to develop senses of control, confidence, and awareness of their body. Rather than using surveys and monitoring eating, EDP used drawings as a method to collect information as to how an individual was feeling before and after the program. For example, a scribbled circle (before the program) changing into a more neat and rounded circle (after the program) shows that the individual feels more control of their body and their surroundings. Like this, art can represent what one is feeling so clearly, whether it is in physical form or even visual form. [8]

Conclusion

Dance Movement Therapy (DMT) is the use of movement focused to improve one's physical and mental health. Many regions of the brain work together in order to enable an individual to learn and master the art of dance. These regions are responsible for individuals to have control over their movements and perform the dance smoothly. DMT aids in various different positive factors in terms of healing. Dance has been seen to improve neuroplasticity and memory of an individual, solely through learning and adapting to dance choreography. Dance helps people handle stress and PTSD by allowing them to express themselves non verbally without pressure. Additionally, dance also helps people struggling with eating disorders and Parkinson's Disease helping people feel more comfortable with their bodies and has shown significant improvements in balance in people who dance.

References

- [1] GoodTherapy Editor. "Dance / Movement Therapy (DMT)." *Dance / Movement Therapy*, 15 May 2018, www.goodtherapy.org/learn-about-therapy/types/dance-movement-therapy.
- [2] Edwards, Scott. "Dancing and the Brain." *Harvard Medical School*, <https://hms.harvard.edu/news-events/publications-archive/brain/dancing-brain#:~:text=Stimulating%20movement&text=Studies%20using%20PET%20imaging%20have, and%20executi on%20of%20voluntary%20movement>.
- [3] Laguipo, Angela Betsaida B. "Is Dancing Good for the Brain?" *News*, 14 Mar. 2023, www.news-medical.net/health/Is-Dancing-Good-for-the-Brain.aspx#:~:text=The%20combina tion%20of%20exercise%20and, Parkinson's%20disease%2C%20and%20cerebral%20palsy.
- [4] Powers, Richard. "Use It or Lose It: Dancing Makes You Smarter, Longer." *Dancing Makes You Smarter*, 30 July 2010, <https://socialdance.stanford.edu/syllabi/smarter.htm>.
- [5] Perkes, Courtney. "'Free Moving' Dance Has Healing Benefits for Mental Health." *UCLA Health System*, 22 July 2021, www.uclahealth.org/news/free-moving-dance-has-healing-benefits-for-people-with-mental-health-concerns.
- [6] Araminta. "Dance Therapy and Trauma Healing." *Khiron Clinics*, 11 Aug. 2022, <https://khironclinics.com/blog/dance-therapy-and-trauma-healing/>.
- [7] Earhart, Gammon M. "Dance as Therapy for Individuals with Parkinson Disease." *European Journal of Physical and Rehabilitation Medicine*, 1 June 2010, www.ncbi.nlm.nih.gov/pmc/articles/PMC2780534/.
- [8] Woods, Virginia. "Dance-Movement Therapy in an Inpatient Eating Disorders Program - DTAA." *Dance-Movement Therapy in an Inpatient Eating Disorders Program*, <https://dtaa.org.au/wp-content/uploads/2017/03/Woods2009DMT-in-patient-disorders-program.pdf>.