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LIVING AND LEARNING

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Dance to Advance: The Powerful Link Between Movement and Learning

Can dance lessons truly impact a report card or a standardized test score? According to neuroscientists, a resounding yes.

Over the past two decades, neuroscientists have discovered that the part of the brain that controls movement (cerebellum) also controls learning. The cerebellum is still known as the part of the brain that controls balance and posture, and movement; however we now recognize it has a very powerful role in sending messages to *all* areas of the brain including the cerebral cortex.

Since this discovery, there have been more than 100 studies that demonstrate a link between the cerebellum and memory, language, attention and decision making. "The effect of movement on learning is something we dancers and dance teachers have always known. But it is nice to finally have some scientific evidence to validate our points!" said **Krissie Atkins**, a manager at Gainesville Tiny Dancers. Simple movements like chewing food are controlled by basic brain circuits nearest the spinal cord. Complex movements like dance steps are controlled by the prefrontal cortex and the rear two-thirds of the frontal lobes.

Karen Taylor, who operates the Gainesville Dance Center with her sister Patricia said, "We've always known that there is a connection since all of our serious dance students are always honor roll students at school."

Dancing Reshapes the Brain

A study of mice at the Salk Institute for Biological Studies in California showed dramatic brain growth from daily intensive movement compared to mice that participated in no movement activities. Dancing students also experience a correlation between periods of intensive dance practice and periods of high academic achievement.

At Gainesville Tiny Dancers, manager **Krissie Atkins** said her grades plummeted when she stopped dancing in high school. "I thought it would be too much to dance and keep up with my studies. I returned to dancing and my grades in every course soared. I maintained a 3.9 GPA. Strenuous dance and aerobic exercise "boosts the production of brain cells and stimulates neurogenesis—the birth of neurons" according to Dr. Gwen Dewar a researcher at University of California Berkeley.

Alannah Boyle Sweeney and her sister Ellen Boyle Gibbons own four local Irish Dance studios including one at the Hylton Performing Arts Center.

Boyle-Sweeney said she and her sister were challenged by Dyslexia since they were very young. "Mine was severe," said Alannah, "and yet I was accepted to Oxford University." Neither of the sisters attended public school. "I attribute my success in overcoming Dyslexia to studying Irish Dancing since the age of four. Ellen became the head nurse of Pediatrics at Georgetown University Hospital," said Boyle-Sweeney.



Irish: Students learn precision dancing from Boyle School of Irish Dance at the Hylton Performing Arts Center in Manassas.

Dance Enhances Memory and Linked to Academic Achievement

A study at the Salk Institute demonstrated that strenuous movement (exercise and dancing) has shown to substantially increase the size of the hippocampus – which affects long term the functioning of the long term memory.

Julie Colgan, owner of Stage Door Dance Studio in Manassas has noticed how mental discipline and extensive memory use in dancing has affected students' academic performance. "I see how the regimen of dance affects high school students. Training enhances their memory and strengthens their ability to think and respond quickly and precisely," said Colgan.

A local pediatrician and mother of six boys, **Aileen Foeckler** decided to register all her boys for Irish Dancing after she learned of the cognitive benefits. Her sister, who has a son with autism, noticed that he was much more open to learning after a period of jumping on the trampoline. An occupational therapist told her sister that Irish Dancing would be a better choice. After hearing about the therapists' advice, Foeckler registered her oldest son, who was age five at the time in Irish Dancing. Now age 20, he is still performing, and according to Foeckler, doing exceptionally well in college.

Dancing and the Release of Brain Chemicals

There are chemical benefits of dancing according to neuroscientists at UC Irvine. One is that dancing releases BDNF, a "brain-derived neurotrophic factor" that boosts cognition by enhancing the ability of neurons to communicate with one another

A second benefit of dancing is that it reduces stress—which can adversely affect and long-term memory formation. Another benefit is the release of serotonin, a neurotransmitter that is known to positively affect one's mood and strengthens one's ability to concentrate. Serotonin also enhances learning and memory functions. Dancing can also increase the level of norepinephrine and dopamine, two chemicals that can positively affect mood and also are known to enhance one's long term memory.

Dance steps with patterns linked to math ability.

Dancing and exercise contribute to the development of neural pathways such as "patterning" that is essential to language acquisition, reading and mathematical ability. Research has shown that elaborate movement ability is related to the acquisition of more complex cognitive skills.

Boyle-Sweeney provides an example of how dancing affects cognitive skills. "In Irish Dancing, timing is extremely difficult. It requires many hours of practice and requires an understanding of timing. In competition 25 percent of the score is timing and 25 percent is rhythm." Boyle-Sweeney added, "Students must learn to pay close attention to time signature, which specifies how many beats there are in a measure and which note value constitutes one beat

Laura Edwards, a public school teacher, and mother of 12-year old Lauren Edwards, said she signed up Lauren for Irish Dancing when she was five years old. At the end of Kindergarten her daughter was tested for the Gifted and Talented program. "She qualified for the program based on her high math score, and I attribute that the Irish Dancing," said Edwards.