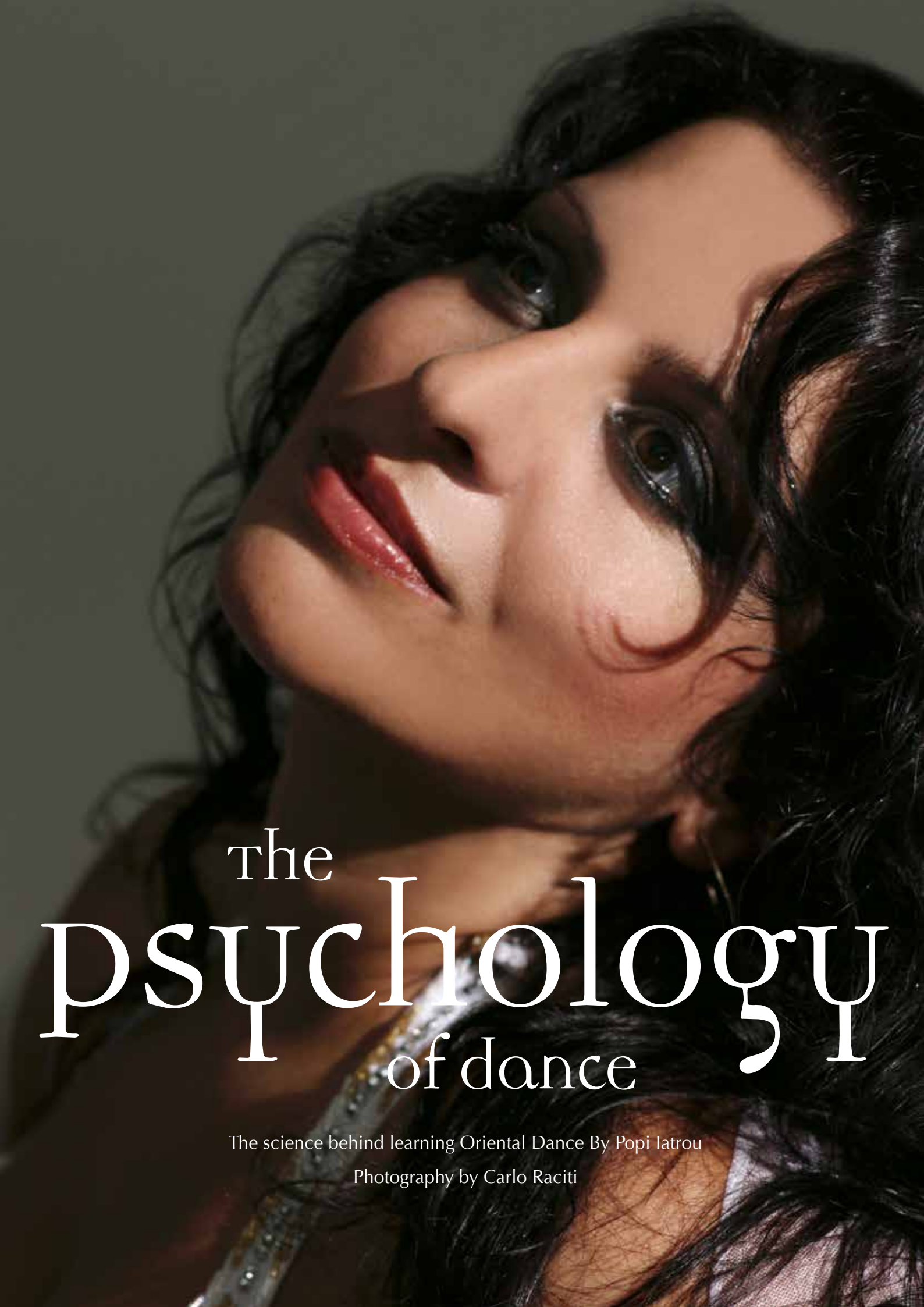

The psychology of dance

The science behind learning Oriental Dance By Popi Iatrou

Photography by Carlo Raciti

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Popi

Rocking soothes a crying baby to sleep, music animates toddlers into spontaneous fits of movement, primary school kids go crazy for The Wiggles and adolescents show their skills in street dance, while many adults either dance socially or follow a stream of interest like tango, swing or bellydance.

What is it about movement through dance that has shaped our development and continues to be passed down and creatively transformed? How does dance influence the human body, brain and mind? What evidence supports the health benefits that I have touted to my dance students over the past ten years?

Cultural festivals and healing ceremonies all over the world, that date back thousands of years, are living testament to the power of music and dance. Indigenous cultures have used drum and dance rituals such as the *Ngoma* ceremonies of Central and South Africa to deal with medical illness and other stressors. Rituals such as the hair-whipping *Zaar* of Egypt may not be recommended by my chiropractor, but I have certainly experienced a deep sense of emotional release and altered state of consciousness after the experiences I had. These were nothing compared with hours of rhythmic swaying that culminate in a frenzied, kinaesthetic *catharsis* to the point of collapse - and I would not recommend anything that could harm the delicate cervical spine and brain - however, we can still glean some benefits using safe dance practice. When a safer, modified version of a Congolese *Zebola* ceremony was performed with a group of participants with chronic illness, they reported benefits including increased exercise tolerance, stress reduction, feelings of group support and beneficial spiritual experiences.[1]

Ancient Greeks believed that dance was important in the development of personality and wove dance into the core of their educational programs. Knowing this, a group of Greek researchers explored the dance/ movement therapy literature on the role of dance in the psychophysiological development of children and personality expression. They found evidence that children use movement and dance to express themselves through non-verbal communication; this is central to the development of social skills. Dance assists with the integration of body-mind connections and with the exploration of self in space and the environment. Dance therapy is an effective method of intervention for children with learning difficulties and emotional problems; it appears to improve motor control, self-esteem, emotional expression, relaxation and social interaction. The physical benefits of dance have been documented among children and adolescents, notably in the reduction of injuries in young athletes, while also impacting beneficially on heart disease, diabetes, obesity and the ill effects of chemotherapy.[2]

The complexity of the brain and body system can be likened to an intricate choreography of mechanical, electrical and chemical communication. *Thinking with the dancing brain: Embodying Neuroscience* (Minton and Faber) is a comprehensive look at the various aspects of dancing and the brain with practical exercises to use in class or in your own practice.

With the advancement of brain imaging technology, we have been able to look at how the brain behaves in response to experience at a cellular level. It has always been suspected that the brain changes in response to new learning, but now we can better see how this occurs. Neurogenesis is the growth of the brain cells called neurons. For years it was thought that we are born with a set number of neurons and that adults cannot generate new ones. Recently, science has discovered that certain areas of the brain such as the hippocampus, which is implicated in memory and learning, can generate new cells. Hippocampal neurogenesis is thought to be affected in people with Alzheimer's, Schizophrenia, Parkinson's, depression, anxiety and insomnia. On the upside, exercise can improve the proliferation of neurons in this area of the brain through increased secretion of certain brain chemicals.[3]

Claims about the benefits that dance can have on mental acuity are supported by studies of ageing populations and rates of dementia. A twenty-one year study tracked the rates of dementia in people over the age of seventy five and their

engagement in various activities. Of the leisure activities, reading, playing board games, playing musical instruments and dancing were related to a reduced risk of dementia; dancing frequently was the greatest protective factor.[4]

Neurogenesis is only one way of growing the brain; another is by strengthening existing connections. Rehearsal of specific movements causes groups of neurons in different areas of the brain to communicate. The more the neurons communicate, the stronger the channels of communication become. Like telephone cables, they insulate themselves in a process called *myelination* which shuts out interference from other messages, creating more refined and efficient pathways. This occurs to the greatest degree during adolescence, along with a process called pruning, the body's way of removing lesser-used branches of neurons. This is the premise behind "use it or lose it". I encourage all the teenagers I work with to keep up the activities they loved as children and to explore new ones to preserve their neural pathways for the future.

A study of ballet dancers in 2016 showed that as dancers learnt a new choreography, their brains were more active when they visualised the dance up to week seven of rehearsal, compared with less active brain patterns after thirty four weeks.[5] This may indicate the brain's more efficient, automated use of the required neural pathways as the explicit memories of the dance (known in the brain) become implicit (known in the body). Explicit memories are what we typically understand memory to be; an event that we can recall and describe in vivid detail. Implicit memories reside in the unconscious and are often held in the body. Procedural memories are a part of implicit memory where our body automatically runs through the set of complex movements we have learnt in order to complete a repeated task, such as tying shoelaces.

I have witnessed fumbling novice students gain mastery over intricate muscular movement patterns over and over again. I see them struggle for three or four weeks, depending on the movement and on how much their brain is in touch with that part of their body. Suddenly, after struggling for weeks to engage, stabilise and relax the right muscles, they grasp the movement and are surprised by their ability to do a belly-roll or a shoulder shimmy.

New learning is encoded into long-term memory during our sleep. If students are frustrated with their mastery of a movement or sequence, I advise them to "sleep on it". I often tell my students about a study of mice that learned to navigate a maze to reach the tasty snack at the other end. Their brains were tracked during the task and while they slept afterwards. The exact pathway used to get through the maze lit up over and over again as the mice slept.[6]

There was an amazing study where subjects were asked to imagine moving their finger or bicep. The finger muscles of those visualising finger flexing increased by 53% and the bicep-curling daydreamers increased the strength of their bicep by 13.4%. Athletes have been studied extensively by sports psychologists; it is clear that a 'dry run' or visualisation of the movements required significantly contributes to personal best performances. This can be translated into dance performance by visualisation for rehearsal. My students and I often walk through a routine in our minds as part of our rehearsal before a performance.[7]

Inhibition is a very important part of brain development. As we grow, our brains mature from the back to the front. The frontal lobes of the brain are like the brakes that stop you from impulsively saying or doing something that you know might get you in trouble. The dividing wall between the two sides of the brain is called the *corpus collosum*; it plays a huge role in keeping the signals of the right and left brain separate. This, along with the *myelination* mentioned earlier, makes the messages sent around the brain, to and from the body, clearer and faster. The electrochemical signals can interfere with each as they shoot around the brain, so the developing brain becomes better at tuning out unwanted noise. Inhibition, or muffling of unwanted noise in the brain, helps dancers keep their hands still while they perform a hip shimmy, or perform the correct sequence of steps learned in a new routine when the old routine wants to take over.

We all know the frustration of unlearning an old sequence of movement to make way for a new sequence. We achieve this with a complicated recipe of new memory making, recalling and suppressing bodily memory, creating or erasing chemical pathways in the brain, electrical firing of co-ordinated brain regions that link to specific body parts and genetic processes that either enhance or suppress long term memories. The brain is simply amazing in its ability to change itself to adapt to our environment, and this process continues to occur throughout our lives.

Emotions are held in the body and are processed most efficiently by the body. The mesmerising experience of watching an emotionally expressive dancer can transfuse our senses with joy, grief or love. When a nursing home provided dance therapy to a group or residents, their depressive symptoms were reduced, while the control group showed worsening depression. Some of the residents in the dance group had their antidepressants reduced, and fewer were given new

prescriptions, compared with the non-dance group.[8]

Another study compared tango dance with meditation and circuit training in a clinical trial.[9] The tango group showed greater decreases in stress, anxiety, depression and insomnia, along with increased mindfulness. These benefits were maintained over time. There were less diverse effects in the other groups. I have found that learning mindfulness and yoga contributes immeasurable benefits to my dance experience and I encourage my students to engage in a variety of practices.

Another study in Poland examined the change in mood of three groups of ballroom dancers. Recreational dancers reported more positive mood and experience, greater energetic arousal and lower tense arousal than competitive dancers who danced regularly or took part in a dance competition.[10] The pressure of competition appears to take away the benefits that recreational dance provides. There is a certain thrill associated with performance and competition, but that is not what most students seek when they start a class. My own survey in 2016 of the bellydance intentions of my students indicated the most common reason for attending classes was for improved health and fitness, to "do something for myself", to express their feminine self, and to learn new technique. The least favoured response was to perform for an audience.

We strive to experience being swept away by our favourite song or losing ourselves in a creative pursuit, sport or other beloved activity. That feeling of 'Zen' or 'Flow', where 'time stands still' does not come easily; it is achieved through a process of long self-development. This progression often takes years. Once you dive into the realm of dance, you realise the endless scope, and that it can never be fully explored, even in a thousand lifetimes.

One way for dancers to hone these skills is to move through the 'four stages of competence', a learning stages model developed in the 1970s by Noel Burch (Gordon Training International) to explain the progression of skill acquisition in any area of learning. The first stage is 'unconscious incompetence', when you think you can dance but do not realise how unskilled and unco-ordinated you are. This is followed by 'conscious incompetence' when you recognise that you actually know very little and have a lot to learn. The third stage is 'conscious competence' where you know you have some skills under your hip belt, and the final stage of 'unconscious competence' is achieved when you do not realise how amazing you are and that the skills have been truly embodied.

Go ahead and lose yourself in dance.•

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