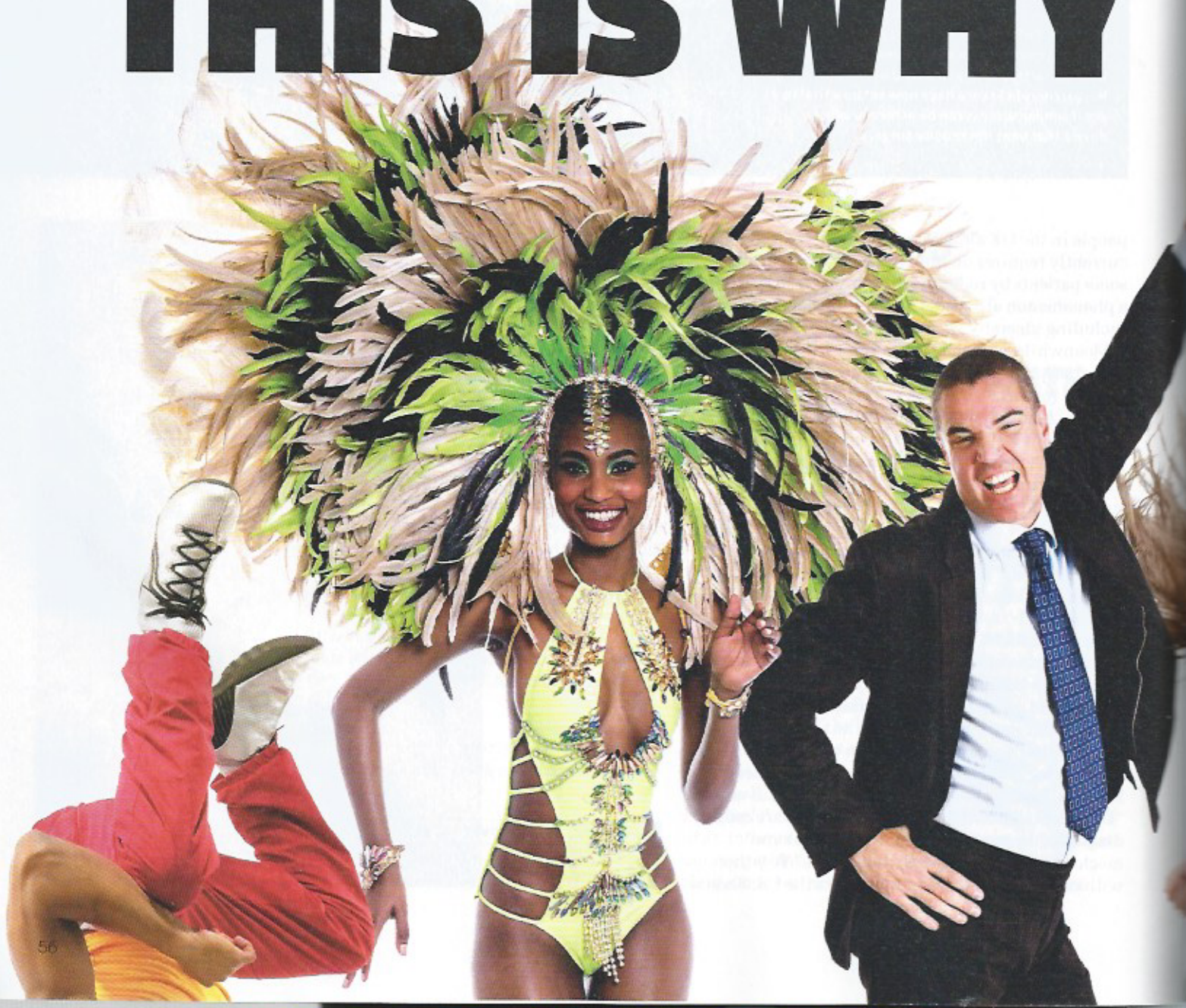




# THIS IS WHY







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# WE DANCE

As *Strictly* reaches its climax, millions of people will be tuning in to watch. But why are we such dance-lovers? Science might just have the answers...

Words: Dr Peter Lovatt







Dancing is in our DNA. It is found in every culture around the world throughout history, and is enjoyed by people of every age, from toddlers to the elderly.

From a scientific perspective, dance is an important human activity. Actually, from *any* perspective dance is an important human activity. It's important for enjoyment, for interpersonal communication, for social bonding and for our general health and well-being as well.

Scientists have long been interested in dance because it can tell us about our innate responses to music, about why some people get dizzy and others don't, about how we find a mate and about the very essence of being human. Dance is something that only we can do (no other animals on the planet can dance creatively like us), and which every human being is equipped for. If you love to dance, welcome to the club. Now let's find out *why* we dance...

#### BOOGIE BRAINS

It all begins in our brains. The human brain is specialised for the control of movement – it needs to be, in order to manipulate our 600-plus muscles. The motor cortex, located at the rear of the frontal lobe, is involved in the planning, control and execution of voluntary movements. Meanwhile, the basal ganglia, a set of structures deep within the brain, works with the motor cortex to trigger well-coordinated movements, and may also act as a filter by blocking out unsuitable movements, such as that ill-advised funky chicken. The cerebellum, at the back of the skull, also performs several roles, including integrating information from our senses so that our movements are perfectly fluid and precise.

Just lifting a cup of tea to our mouths involves an unimaginably complicated sequence of nerve impulses, so how can our brains cope with a full-blown dance routine? In 2006, researchers at the University of Texas Health Science Center at San Antonio asked amateur tango dancers to perform a basic dance step known as a 'box step' while lying in a PET (positron emission tomography) scanner. The researchers saw activation in a region of the brain called the precuneus, which is associated with spatial perception. They suggest that this region creates a map of our body's positioning in space, helping us to keep track of our torso and flailing limbs as we plot our path across the dance floor.

RIGHT Good at keeping time to a beat? Thank your cerebellum for that (highlighted in red)



Of course, dancing also tends to involve music. By comparing the tango dancers' brain scans both with and without music, the researchers noticed that those performing to music had more activity in a particular region of the cerebellum called the anterior vermis, which receives input from the spinal cord. It might be that this region of the brain acts as a kind of neurological metronome, coordinating our different brain areas and helping us to keep time to a beat.

Just like any activity, the more we dance, the better we get, as new neural connections are forged and strengthened. What's more, it seems that our brains may even reward us for having a good boogie. Music has been shown to activate the reward centres in the brain, and some motor areas are also connected to reward-related regions, so dancing can give us the satisfaction of feeling good. It's part of a virtuous circle: we generate rhythm, we move to it, we feel great, we do it some more. Let the good times roll...

**A GROWING BODY OF RESEARCH SUGGESTS WE ARE BORN TO DANCE. WHY ELSE WOULD WE MAKE OURSELVES LOOK SO RIDICULOUS AT SCHOOL DISCOS OR THE OFFICE PARTY?**





Bulgarian cave paintings dating back to the Bronze Age appear to depict ritualistic dancing

### BORN TO BOP?

We still don't know for sure whether humans have evolved an innate instinct to dance, or whether dancing is a learned social activity. Nevertheless, a growing body of research suggests that we are indeed born to dance. Why else would we make ourselves look so ridiculous at school discos or the work Christmas party, when we're desperately trying to impress someone?

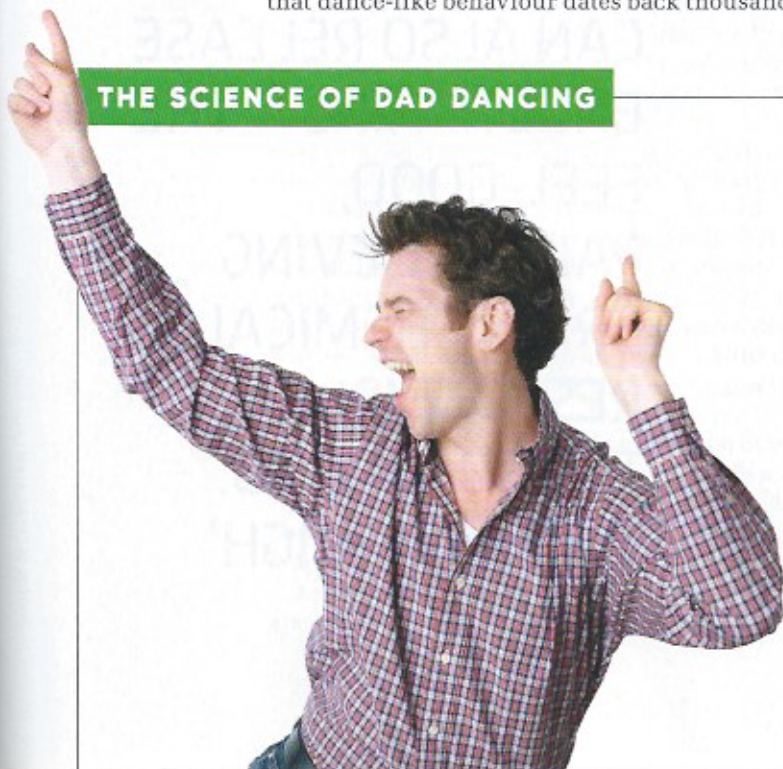
To investigate whether dancing is an innate activity, researchers need to look at three factors. First, do humans show an *inclination* to dance – a natural tendency, or an urge? Second, is dancing *automatic* – ie, are people able to dance without being taught? And finally, is dancing *universal*? Do people from all parts of the world display dance-based behaviour?

This last one is easy: dance is truly universal, both in time and place. Anthropologists have shown that dance-like behaviour dates back thousands of

years. Early Bronze Age paintings in the Magura Cave in Bulgaria appear to depict a fertility dance, while dancing was an important part of life in Ancient Greece and Egypt. Dance has played multiple roles throughout history, in religious ceremonies, rituals and festivals, and as a way to heal, entertain and tell stories. It might even have served as an early form of language.

Meanwhile, there's also evidence that dancing is both a natural urge and an automatic behaviour. In 2009, researchers led by István Winkler at the Hungarian Academy of Scientists showed that babies as young as two days old are able to detect a simple beat. When the babies heard a missing downbeat, their neural activity suggested that they were expecting the downbeat to be present – so newborn babies appear to have an innate sense of rhythm. In a separate study in 2010, Marcel Zentner and Tuomas Eerola showed that older babies make more rhythmic body movements in response to ●

## THE SCIENCE OF DAD DANCING



The concept of dad dancing gets a bad press. Even its dictionary definition is disparaging: "Awkward or unfashionable dancing to pop music, as characteristically performed by middle-aged or older men."

In 2011, I carried out a survey of almost 14,000 people (including over 8,000 men), looking at dance confidence and dancing styles at different ages. I found that men's dancing confidence typically starts at a very low level in the early teens, steadily increasing with age, peaking and plateauing in the mid-to-late thirties before coming down again after 40. At the same

time, their freestyle dance movements tend to become larger, less coordinated and more random the older they get. Eventually, it's like they're dancing to music that only they can hear.

This slightly awkward dancing style may be evolution's way of signalling reduced testosterone levels, warning younger women that the dancer is past his sexual prime and that they might be better off looking elsewhere.

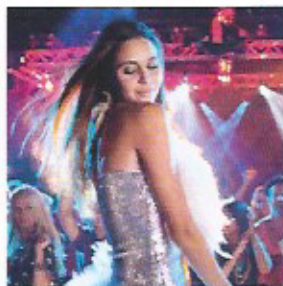
But men, don't let any negativity put you off. The benefits of dancing are enormous. In the name of science, we should reclaim dad dancing, rebrand it and embrace it.



# 5 REASONS WHY DANCING IS GOOD FOR YOU

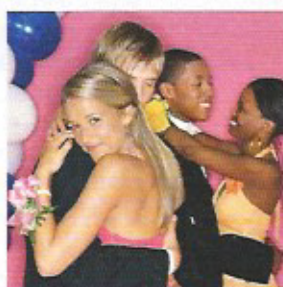
## IT BOOSTS SELF-ESTEEM

Several studies have shown that dancing can help to increase feelings of self-worth. In one 2007 study, researchers from Laban and Hampshire Dance found that children aged between 11 and 14 who took part in creative movement classes reported improved self-esteem, motivation, and more positive attitudes towards dance, as well as better physical fitness.



## IT HELPS YOU FIND A MATE

It was Charles Darwin who suggested that dancing can act as a form of sexual selection, and research suggests that we are indeed communicating to potential mates when we strut our stuff. A 2011 study asked women to rate men on their dancing prowess. The winning formula? Head shaking, torso bending, and twisting of the right knee, apparently.



## IT TACKLES DEPRESSION

Dancing has been shown to reduce feelings of depression. But different dancing styles have different effects. In a study led by Andrew Lane at the University of Wolverhampton, dancing characterised by relaxed, free-flowing movements helped to improve mood, whereas dancing in a physically contracted way had the opposite effect.



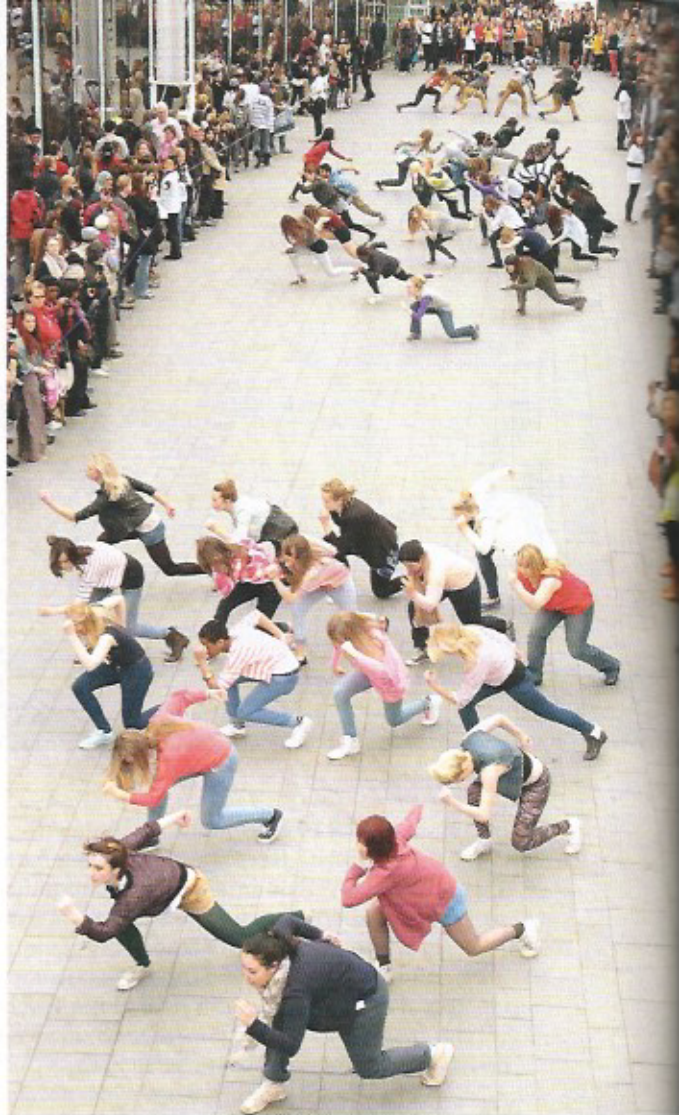
## IT HELPS SOLVE PROBLEMS

Just five minutes of freestyle dancing is enough to increase your creativity, according to researchers at Sheffield and York Universities. In 2014, participants were asked to either dance, cycle or sit quietly while listening to music, and it was the dancers who showed improvements in both mood and creative problem solving.



## IT RELIEVES PAIN

Rugby is a tough game played by tough people. But some rugby players will dance before a game – just think of the New Zealand team's haka. In 2015, researchers at the University of Oxford found that group dancing can increase a person's threshold for pain. Dancing, it seems, can release endorphins, helping to take the sting out of a full-contact tackle.



AS WITH ANY INTENSE PHYSICAL ACTIVITY, DANCING CAN ALSO RELEASE ENDORPHINS – THE FEEL-GOOD, PAIN-RELIEVING BRAIN CHEMICALS RESPONSIBLE FOR THE SO-CALLED 'RUNNER'S HIGH'





ABOVE LEFT: Flash mobs aren't just good fun, they may help participants to bond too

ABOVE RIGHT: Grab your friends and have a dance if you want to enjoy a social high

• music than they do to human speech, and some even speed up their movements when the tempo is ramped up. The evidence all suggests that humans are hardwired to boogie.

#### DANCING FOR JOY

If our brains are primed for dancing, it's no surprise that we love to get our groove on. But there's another reason, too: it's a fantastic mood enhancer. I've been drunk on disco, made merry by a merengue and felt the euphoria of dancing in a hot, sweaty nightclub. And it seems that everyone can experience that euphoria: Zentner and Eerola even found that their baby subjects smiled as they moved to the rhythm. The more they moved, the more they smiled.

So why does dancing make us feel better? It might be because as we move together in response to music, we also move in response to each other's rhythms, helping us to form a social bond. It's one of the reasons why we love music festivals. A 2010 study by Sebastian Kirschner and Michael Tomasello at the Max Planck Institute for Evolutionary Anthropology showed that after a session of paired music making, four-year-old children were more likely to behave cooperatively and helpfully. Music and dancing act as a kind of social lubricant, helping us to bond and form positive relationships.

As with any intense physical activity, dancing can also release endorphins – the feel-good, pain-

relieving brain chemicals responsible for the so-called 'runner's high'. In fact, Bronwyn Tarr and colleagues at the University of Oxford have found that just dancing in time with someone might be enough to release these neurohormones into the bloodstream. They asked Brazilian high school students to dance in groups of three to fast-paced music, finding that those who synchronised their movements had an increased pain threshold (as measured by inflating a blood pressure cuff around their arm). This suggests that there were more endorphins in these dancers' bodies, so the researchers speculate that we might get a social 'high' from dancing with others. That would explain flash mobs, at least.

Dance is one of the most important activities we can do. We are born to groove. It's what our brains are wired for and it helps us bond. Dancing is good for you. So this Christmas, throw caution to the wind and get your body moving to all those cheesy festive tunes. •

Dr Peter Lovatt is a dance psychologist who runs the Dance Psychology Lab at the University of Hertfordshire.

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