

From the lab to the dancefloor:

Investigating benefits of dance for people with Parkinson's

Dance is becoming increasingly popular as a therapeutic activity for people living with Parkinson's disease, with classes now being offered in the UK, Ireland, United States and another 25 countries around the world. There is some evidence that dance can have beneficial effects for people with Parkinson's, with reports of improvements in movement, mood and cognition.

Researchers in the Body Eyes and Movement (BEAM) Lab at the University of Manchester became interested in the effects of dance in Parkinson's following their recent ESRC-funded project on action representation, which found that observing, imitating and imagining actions can influence simple hand movements in Parkinson's. These processes are known to activate brain areas involved in producing movement, as well as having a role in empathy and social interaction. Since dance naturally utilises observation, imitation and imagery, the team wanted to explore how these processes may contribute to the effects for people with Parkinson's. In particular, skills practiced in dance (such as using imagery to enhance movement quality) may translate into strategies to facilitate everyday tasks and activities. In addition to potential effects on aspects of movement, dance may lead to other positive outcomes relating to action observation and imagery. For example, imagery and imitation in dance may improve communicative actions such as facial expressions and gestures, which can be affected in Parkinson's.



Watching dance: emotions and eye movements

With a joint seedcorn award from MICRA and Manchester Metropolitan University, Dr Judith Bek and Dr Ellen Poliakoff (BEAM Lab) collaborated with Dr Matthew Sullivan (MMU) and Dr Gayathri Ganapathy (Equilibrium Dance and Arts), to explore how people with Parkinson's and healthy older adults watch and respond to videos of dance. The study showed changes in eye movements and emotional responses (suggesting greater attention, enjoyment and embodiment) in both groups when the dance involved facial expressions, or when a meaningful context was provided. These preliminary results indicate that the effects of dance for people with Parkinson's and healthy older adults may be increased by certain elements such as meaning and emotion.

From the lab to the dancefloor

Taking the research out of the lab, the project **More than Movement** was funded by an Impact Accelerator Award from the Economic and Social Research Council (ESRC). In partnership with English National Ballet, the research team investigated effects of a pilot dance programme co-developed with dance artists, physiotherapists and people with Parkinson's.

The programme drew on English National Ballet's approach to dance and Parkinson's, as well as elements of the classical Indian dance form Bharatnatyam, which features story-telling, hand gestures (mudras) and expressions. Classes followed themes inspired by the cotton industry with its links to local history. This helped to promote expression and imagery, allowing participants to be creative and explore new ways of moving, rather than focusing on the limitations of their condition: *"...you were creating something and enjoying it, and just being immersed in it, rather than 'this will do you good'"*. Classes were followed by tea and cake, providing an opportunity for the participants, dance artists and researchers to chat, ask questions and get to know each other better.

Potential effects of the classes were explored by taking measures in the lab before and after the 6-week pilot programme. Movement during the classes was also recorded using wearable sensors, and participants rated their mood before and after each class.



Preliminary results suggest that the dance programme may help to improve everyday mobility and hand movements, as well as mood, well-being and emotion recognition, although further research is needed to explore these effects. Comments from participants revealed additional benefits such as increased confidence and motivation, as well as the use of elements from the classes (such as imagery) to help with everyday tasks: *"Imagination helps with movement in normal life...I have used the 'lotus' flower movement to help with some daily tasks at home, and the 'weaving' to stretch during the day".*

Engaging with stakeholders

Alongside their research, the team has held several workshops for people with Parkinson's, dance artists, health professionals and other researchers, to share findings and discuss ideas for future research and practice. For more information see: <http://beamlab.lab.manchester.ac.uk/research/danceandparkinsons/>.

The research has also been presented to patient and community groups including Parkinson's UK and the North West Coast Clinical Research Network.



The project helped to demonstrate the real-world relevance of basic science research, by harnessing findings from behavioural laboratory-based studies to inform understanding and practice of dance for Parkinson's. The participants valued the opportunity to contribute to the project – as one volunteer commented, *"It hasn't felt like research, which is a great benefit"*. Working closely with people with Parkinson's also highlighted the importance of involving those affected by the research in developing ideas and methods to make them as relevant and useful as possible.