University of Western Sydney

RESEARCH DIRECTIONS

Musical health: Understanding the neurophysiology of group music

Have you ever wondered how an 80 part symphony orchestra manages to create a complex musical performance without verbal communication? While much of this ability may simply be practice, Associate Professor Peter Keller believes there is something more to it. Drawing on a global research body spanning multiple scientific disciplines, he has been granted funding through the Australian Research Council's Future Fellowships program to investigate the underlying neurological mechanisms of group music creations and behaviour, which may have major implications for health treatments. A post-doctoral fellow, PhD student, and Honours student will also be involved in the research.

'To understand humans' amazing ability to play musical instruments in harmony with others, we have to look inside the human brain,' Associate Professor Keller explains. 'The complex interactions between temporal monitoring, maintenance of divided attention during an ensemble performance, and non-verbal communication with fellow musicians remain largely undocumented – although music in therapy has long been known to promote social bonding and mental health.' This comprehensive study will aim to explain the relationship between behaviour, social factors, and brain structure and function in group music creation – potentially aiding those who have deficiencies in these areas.

Musicians and non-musicians will be administered a variety of tests over a four year period at the MARCS Institute, including measurements of neuroplasticity for non-musical individuals after six weeks of musical training, and analysis of motion capture data from group music performances in naturalistic settings. Neuroimaging technologies such as fMRI will be used to follow brain activity,

and specific tests will be implemented to calculate each participant's ability to synchronise with another person.

Apart from the well documented positive emotional effects linked to music creation in therapy, this research will enable more efficient and accurate treatment programs to be devised for those with impaired motor and social skills, for example, people with Parkinson's disease, individuals with autism, and those with social anxiety.

Project Title: Psychological and neurophysiological mechanisms underlying human interaction in musical contexts
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