MARIE CURIE CAREER INTEGRATION GRANT FINAL REPORT

Researcher: Prof. Emily S. Cross
Grant Agreement Number: 322256
Project Acronym: WATCH AND LEARN
Project Title: The Impact of Observational Learning on Brain & Behaviour Throughout the Lifespan
Project/Laboratory Website: www.soba-lab.com

Final Publishable Summary:

Summary Description of Project Objectives

Throughout the lifespan, when learning a new skill such as riding a bicycle or dancing the tango, we benefit not only from physically practicing the new skill, but also from watching others who can already perform that skill. Our ability to learn by observation is a key ingredient for acquiring new motor skills, and thus, is essential for successful interactions within society. For over a century, it has been suggested that actions learned by physical or observational practice are represented within common cognitive and neural structures. However, behavioural and brain-based investigations to date have not satisfactorily addressed this question. Moreover, how age and individual differences impact our ability to learn via observation remain underexplored. Such a lack of evidence means that critical questions for understanding how best to use observational techniques in education and intervention contexts are ripe for exploration. Through the innovative combination of training interventions, cross-sectional research and univariate and multivariate neuroimaging approaches, the WATCH AND LEARN project sought to be the first to systematically evaluate how observational learning is manifest in the brain and behaviour throughout the lifespan.

Description of Work Performed and Major Findings

Over the three years that the project ran, the three main studies outlined in the original proposal have been completed, as well as a number of other related research activities. Significantly, the three keystone studies of the project, investigating physical and observational learning among healthy young adults, healthy older adults, and healthy young adolescents, each involved over 80 hours of fMRI scanning (with identical pre- and post-training scanning sessions) and hundreds of hours of dance training with the X-box Kinect set up. The major findings discovered by this research concern the additive nature of sensorimotor experience on neural engagement and learning efficacy when individuals are attempting to learn complex new motor sequences (Kirsch & Cross, 2015), as well as the degradation of action prediction abilities as we age (Diersch, Jones & Cross, 2016), which has serious implications for motor and social function in later life. Ongoing analyses of data collected with all three populations are revealing via multivariate analyses how individual action sequences are coded by sensorimotor brain regions, and the team is aiming to publish the final three papers from this project over the next year. A final aim of the research team after the primary empirical research papers are published is to write a review/synthesis paper that sets out the potential use of these findings in more applied contexts.

Training and Integration of Marie Curie CIG Researcher

The three years of the WATCH AND LEARN project enabled the lead researcher to firmly and resolutely accomplish her stated goal of establishing her research career within the EU. Naturally, it is disheartening for all involved that the host Country has opted to leave the EU, but we must not let poor decision making on the part of the British public undermine the value and significance of past and present EU funding for early career researchers in the UK. Prof. Cross and her team received hands-on training and mentorship from the supervising scientist, Prof. Downing, as well as the wider social neuroscience group at Bangor, to support her team's use of multivariate fMRI analyses, cross-sectional aging approaches, and linking in the research goals of the CIG project with other funding and research opportunities within the host department and host country more broadly. Moreover, the host department also supported the Researcher with additional resources for supervising 5 PhD students (one fully dedicated to working on the WATCH AND LEARN CIG project), and 3 postdoctoral research fellows. The support provided by the CIG funding and the Researcher's host department were instrumental in helping the Researcher successfully compete for additional grant funding, including funding from the Ministry of Defense in the UK and €1.8M for a 2015 ERC Starting Grant, for her SOCIAL ROBOTS project that will run from 2016 – 2021.

Professional Dissemination

Since the start of the project, Prof. Cross has published 16 manuscripts in peer reviewed journals, co-edited a book on sensorimotor foundations of social life, co-edited a theme issue of Philosophical Transactions of the Royal Society B on social cognition, and been invited to present 30 professional seminar talks or keynote lectures on this work in 12 different countries. She also organised four symposia at large international conferences and one interdisciplinary workshop that touched on many of the themes under investigation in the WATCH AND LEARN project that attracted a diverse and accomplished group of attendees to Bangor University in August 2015.

WATCH AND LEARN

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