ARN
ASSOCIATION POUR LA RECHERCHE EN NEUROÉDUCATION / ASSOCIATION FOR RESEARCH IN NEUROEDUCATION

Revue NEUROEDUCATION Journal

September 2016 | Vol. 4 | Issue 1

5th Conference of the Association for Research in Neuroeducation

May 24-27, 2016

Université du Québec à Montréal (Canada)

GRADUATE STUDENTS' SYMPOSIUM

« Graduate Studies Integrating Education and Neuroscience: Challenges and Perspectives »

Abstracts in English

(Oral presentations)

Published in September 2016
Neuroeducation, 4(1), 12-14.
ISSN: 1929-1833

ORAL PRESENTATIONS (MAY 27, 2016)

BECOMING A RESEARCHER INTEGRATING COGNITIVE NEUROSCIENCE AND EDUCATION: IS A TRANSDISCIPLINARY APPROACH THE KEY TO OVERCOME VARIOUS TRAINING ISSUES?

Jan-Sébastien Dion

Education Faculty, Université de Sherbrooke, Canada

In the last 20 years, cognitive science has made considerable progress especially because of the advancement of neuroscience (OECD, 2007). The education community, mainly in the last decade, has started to realise that some relevant knowledge about the brain could help reconsider educational paradigms, question practices, and improve educational research. Knowing caution is needed while standing at the intersection of cognitive neuroscience and education (it offers no panacea), researchers from many different fields are converging at this crossroads, contributing in a wide array of manners to an emerging field and, most importantly, trying to improve children and adults' educational outcomes and well-being. Federal grants (ex. in Canada and the USA) have been awarded to neuroeducation projects, therefore creating real opportunities to train students in the field. Some graduate students now wish to tread this trail but their training needs can easily exceed their program's frame because of the interdisciplinarity. Also, the solutions to the unprecedented issues they can experience need to be reflected on and discussed, but their low number fosters isolation and impairs sharing. Therefore this communication aims to reflect on graduate students' issues that can be encountered while conducting research combining cognitive neuroscience and education, through the lens of my own ongoing doctoral neuroeducation project. Four parts will compose this presentation: (1) Choosing to use neuroimaging techniques to address educational problems: wants vs needs; (2) Choosing a (right) supervisor: what criteria matter in a neuroeducation project?; (3) Interdisciplinarity, multidisciplinarity or transdisciplinarity: Mastering at least two distinct fields' theories and epistemologies in a unidisciplinary program to contribute to a novel conceptual field; (4) Methodological training: the need for external bootcamps. In contrast, perspectives will also be raised throughout these four parts. To conclude, a reflection on transdisciplinarity will be proposed to further address these challenges linked to training.

BEHAVIORAL EXPERIMENTS IN NEUROEDUCATION: MASTER PLAN OR CONTINGENCY PLAN?

Emmanuel Ahr

Université Paris Descartes, Université Sorbonne Paris Cité, France

The proposed opinion communication will argue in favor of the insertion of (at least) one behavioral experiment in a neuroeducation thesis. It will be suggested that it is in the interest of Master and PhD students to strengthen their theses with experimental psychology. First, neuroeducation in its modern form is defined as a tripartite field grounded in neuroscience, education, and psychology (Tokuhama-Espinosa, 2011). So, as the first generations of students in neuroeducation (a field also called "mind, brain and education"), it would be advantageous for us to learn to skillfully juggle with all three epistemologies rather than only one or two. Second, modifying learners' brains may remain meaningless, as long as these changes are not linked with measurable improvements of school, logical, social, emotional or cultural skills. Conveniently, experimental psychology is the one field specialized in measuring cognitive skills. Third, a well-thought behavioral task could serve as a pre-test bringing crucial information for designing the most appropriate fMRI task. Indeed, fMRI being cost and time demanding, the experimenter should make every (psychological) effort to insure that the right cognitive process or representation is activated during the fMRI acquisition. Fourth and fundamentally, starting with a behavioral experiment assures students to get quick and clean data to analyze and publish. It thus provides a security for PhD students who engage in a three or four year single neuroimagery project that is inevitably risky (i.e. with no guarantee of publishable results). The level of priority to attach to the behavioral experiment in a neuroeducation thesis will be discussed. A fifth and last point will underline the relevance of a rising trend in neuroeducation that utilizes the now great amount of knowledge in neuroscience as a basis for conceiving fine-grained behavioral experiments (Borst et al., 2015) or science-based neuroeducational tools for educators.

EXAMINING THE EFFECTIVENESS OF ATTENTION TRAINING IN SCHOOL FOR STUDENTS WITH NEURODEVELOPMENTAL DISORDERS

Domenico Tullo

Educational and Counselling Psychology, McGill University, Canada

Decreased selective and sustained attention abilities are often characteristic of atypically developing populations. Several cognitive-based training approaches have been developed to remediate such difficulties by targeting these attentional particular subcomponents (Sonuga-Barke et al., 2014). Multiple object tracking (MOT) paradigms (i) can be used as a measure of sustained, selective, dynamic and distributed attention, (ii) are non-verbal in nature and (iii) are accessible to children with different levels of cognitive and language abilities. We examined the efficacy of a novel, 3D-MOT attention training program (NeuroTracker) to assess whether increased 3D-MOT performance transferred to another test of attention (i.e., near-transfer; Redick et al., 2014). In our pilot study, a group of adolescents (n = 30; 12 – 17 years old) with a neurodevelopmental disorder (ASD, ADHD, or SLD) underwent a pre-training assessment of IQ using the Wechsler Abbreviated Scale of Intelligence - II (WASI-II) and attention, via the Continuous Performance Test - 3 (CPT-3). Pre-training analyses revealed an association between 3D-MOT performance with both, perceptual (non-verbal) reasoning intelligence measure ($r2$ = .55) on the WASI-II, and CPT-3 performance ($r2$ = .20). Participants were randomly assigned to (i) experimental (n= 10), (ii) control (n = 10), or (iii) treatment as usual (TAU) groups (n = 10). The experimental group received 3D-MOT training three times a week, over a period of five weeks (15 sessions), while the control group played a puzzle-like math game (2048). Improvement on 3D-MOT transferred to improved CPT-3 performance following the training period, with improvement averaging 10%; no significant changes were found for either control or TAU groups. The effect of near-transfer, along with the association between intelligence and attention specific to a population with a deficit in attention, provides the basis for examining 3D-MOT-related improvements in attention to academic success (i.e., mathematics). Additionally, results described here highlight the need to examine brain areas active throughout training and assessment on attention-based tasks. Conducting research in a school setting poses challenges with regards to interpreting results from psychometric measures collected across disparate levels of functioning. We suggest using methods as presented here, incorporating an adaptive training task that best reflects the child's specific ability. Furthermore, we recommend implementing the methodology used here with the inclusion of a treatment as usual group to control for a learning or practice effect at post-test. In addition, soliciting students throughout the school-day can potentially influence the participant's performance on the outcome measure. Therefore, the use of an active placebo group (2048) can control for these effects.