Western Faculty Profile: Dr. Daniel Ansari

Background

Dr. Daniel Ansari is an Associate Professor at the Brain and Mind Institute at Western University where he holds a Canada Research Chair in Developmental Cognitive Neuroscience. Dr. Ansari has won many awards for his work, including the Schloessmann Award, the Society for Research in Child Development Early Contribution Award, and the APA Division 7 (Developmental Psychology) Boyd McCandless Award. His research focuses on discerning which regions of the brain are involved in our ability to calculate, such as how activation of the brain is affected during calculation by the particular arithmetic operation being performed. Jas Sahota and Nicole Kim spoke with Dr. Ansari about his work and research.

Questions for Dr. Ansari

Where did you complete your undergraduate and graduate studies?

I did my undergraduate education at the University of Sussex, my Master's at the University of Oxford, and I obtained my PhD at University College London.

How long have you been at Western University?

This is my seventh year at Western.

Why did you choose to work and set up your research lab at Western University?

I decided to come to Western because it is known to have a great history of excellence in human cognitive neuroscience research, which is something I am greatly interested in. What also lead me here is the great environment, especially my colleagues around me such as Melvyn Goodale, Adrian Owen, and various other people who are internationally renowned in their fields. I was also offered a Canada Research Chair, which has allowed me to devote more time in research and freed me from some teaching obligations. This was during the start of my career where I needed a lot of time for my research and to establish my record.

How do you think your research in developmental cognitive neuroscience, specifically in the numerical cognition of children, can be applied to children who struggle with mathematical concepts and have poor numeracy skills?

The aim of our research is to identify the precursors of mathematical success and disabilities, and to develop tests for early diagnosis and intervention, accordingly. Also, one of our main goals includes raising awareness of various cognitive developmental disabilities such as dyscalculia (people who only struggle in math). The earlier the diagnosis of such disabilities, the better it is for the children. For that reason we are trying to develop optimal programs to address the disabilities and to identify the strengths and weaknesses such children might display, and also to improve future diagnosis. Some of the results we obtain can be combined with brain imaging. This will allow us to make connections with the actual structures of the brain and show us whether or not there are improvements.

Do you think the findings from your study linking basic math skills and PSAT math scores, specifically that rote memorization skills triumph over problem-solving based strategies, conclude that the popular problem-solving based math learning should be re-evaluated?

Over the years, a dichotomy has developed between the fluency and problem-solving aspects of math. What really should be stressed is that math is about both fluency and problem-solving. We shouldn't forget about math fluency and go completely for problem solving based strategies. The "fluency" aspect has been purposefully pushed aside, but it really is the groundwork for problem-solving. The idea of "drill and kill" has really given this method a negative connotation, but children who have a higher fluency and can recall facts actually have a more working memory available to do the problem solving. Math isn't 'either or', it's both. You have to have the fluency to actually become a good problem solver. Through my research, I don't intend to suggest that math learning should be re-evaluated, but rather to stress the importance of both fluency and problem-solving to be proficient in math.

What are the benefits of investigating how different brain networks interact in problem solving, and how the brain is involved in the ability to calculate?

Researchers get involved in research for scientific curiosity. So one of the benefits is just for scientific curiosity; you always want to figure out how things work. Researchers aren't always thinking about how they can apply their research to the classroom. However, that's a part of science. Right now the research may not have any application but it might within a decade or two. With math there is a strong link since everyone has to learn math, so finding out more how these brain networks work and differ from person to person can be valuable information that could have some implications in the long run. It works the same way in medicine where you don't do a medical research study and just know how to treat something. There are always intervening factors that can be quite complex.

In your opinion, what qualities would make one an excellent researcher?

Most certainly passion. Researchers have to work hard, long hours, and most of the time being unsure of where it will end or what to expect. You need to have the ability to work hard and to face adversities because research is not always full of rosy successes. We publish the research that works and passes peer-review, but a lot of things don't work so you need to be able to get over frustrations. Therefore a researcher, who is truly passionate in the work they are involved in, will find their job rewarding. You need to find that curiosity in your belly and try to look at research like a detective piecing a puzzle together. Furthermore, dedication and persistence are important traits because a researcher will encounter countless difficulties and stiff competition.

What would you say is the hardest part about being a researcher? And the best part?

The hardest part is dealing with the lack of success, and the repetitive ups and downs. The hardest part I find about research is that a researcher's work is never done. If you have a normal 9-5 job, you always have the time where you can say your work is done for the day. As a researcher you can always keep going, but at some point you have to draw the line. We can just go on forever and ever without stopping.

The best part is the diversity; being able to teach graduate and undergraduate students at the same time as conducting research. It is often incredibly rewarding to see my students succeed in their paths and make contributions and develop their own passion towards research. It is a really great job if you don't want to get bored doing just one thing in your life because it's constantly evolving.

What qualities do you look for in a potential research assistant?

In a potential research assistant, I would like to see some knowledge of my research, and that he or she has taken the time to familiarize themselves with the purpose of my work. I'd love to see a lot of interest, curiosity and passion, and see that they are willing to invest the time and effort. It can be difficult dealing with students that just want to tick a box, but it isn't the fault of the students because it's just a result of the system. In addition, I look forward to good relationship with the students, so I can keep in touch with even after they leave Western. There will be lots for me to learn from them as well, so it really is a positive bidirectional relationship.

What advice you would give to an undergraduate student interested in getting involved in research?

Get out there and seek opportunities! Try to get involved as much as you can and try many different things, because you never know what will be "best" for you. Look at the big picture and think big, and also keep on top of your academic record because that matters extensively. Western is a wonderful school and I absolutely love it here. But don't forget that there are plenty of opportunities outside of Ontario as well. Even look into opportunities in different countries. Once you find something you love then really get into that and pursue it ambitiously.

To read more on Dr. Ansari's lab and research, please visit his website at:
<http://www.numericalcognition.org/>