

INTERVIEW

Bryan Kolb: Pioneer in Neuropsychology and Role Model for Teaching, Mentoring, and Involving Undergraduates in Neuroscience Research

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*Bryan Kolb is a native of Calgary, Canada and is currently a Professor in the Neuroscience Department at the University of Lethbridge, where he has been since 1976. He received his PhD from Pennsylvania State University in 1973 and did postdoctoral work at the U of Western Ontario and the Montreal Neurological Institute. His recent work has focused on the development of the prefrontal cortex and how neurons of the cerebral cortex change in response to various developmental factors including hormones, experience, stress, drugs, neurotrophins, and injury, and how these changes are related to behavior. Bryan Kolb has published five books, including two textbooks with Ian Whishaw (*Fundamentals of Human Neuropsychology, Sixth Edition; Introduction to Brain and Behavior, Third Edition*), and over 300 articles and chapters. Kolb is a Fellow of the Royal Society of Canada and a Killam Fellow of the Canada Council. He is currently a member of the Canadian Institute for Advanced Research program in the Experience-Based Brain Development program. Bryan Kolb has won numerous teaching and research awards during his illustrious career, and his experience with mentoring undergraduate students provides an excellent model to emulate, for both young and seasoned faculty members who strive to provide their students with the best possible learning opportunities.*

GD: When and how did you get interested in neuroscience?

BK: I was working on my Master's degree in the 1960's at the University of Calgary, studying differences in learning in various species of mammals and became interested in the question of how differences in learning related to differences in the brain. This line of inquiry led me to pursue a Ph.D. in physiological psychology with Mike Warren at Penn State.

GD: What topic did you study at Penn State?

BK: It was at Penn State where I got interested in the functions of the prefrontal cortex. Pursuing this line of research was rather risky at this time given that most researchers, including my advisor, questioned whether rats even had a prefrontal cortex. However, my interest in pursuing this line of inquiry was sparked by the work of Christiana Leonard who published a seminal paper in *Brain Research* using a silver impregnation stain to show the connections between the dorsal medial nucleus of the thalamus and the "prefrontal cortex" in rats. This paper

provided a basis for lesion experiments in rats as a means of exploring the functions of this part of the brain.

GD: Did you continue this line of research as a postdoc?

BK: I spent two years as a postdoc at the University of Western Ontario, working with Case Vanderwolf, who was using EEG techniques to study the functions of the cortex and hippocampus. Although I did continue to pursue some lesion studies in young animals, I realized that it was nearly impossible to get a job doing lesion studies during this period of time, in which electrophysiology became the dominant method for studying brain function, due primarily to the prominence of the celebrated work of Hubel and Wiesel who were mapping out the functional organization of the visual system using electrophysiology.

GD: What did you do after working at Western Ontario?

BK: I accepted a postdoc position to work with Brenda Milner at the Montreal Neurological Institute. This position

not only provided new perspectives in the area of brain function through working with human patients, but also new and unique opportunities to increase my marketability for a faculty position. When I arrived at the Montreal Neurological Institute I searched for courses and textbooks in the area of neuropsychology, but was unable to find any. There were no books on the subject in the library and no course on the subject existed. So, to orient myself to the subject area I asked each faculty member at the Institute what they considered to be the most important papers that have been published in this area. After assembling and reading 25 of these top choices, I prepared a syllabus and offered to teach a course in human neuropsychology, at no cost. The department chair, Peter Milner, indicated that a minimum of eight students would be needed to offer the course, and given that the physiological psychology courses never attracted over 25 students, it probably could not be offered. In the meantime, I wrote to every university in Canada about the course and immediately received six offers to teach. However, Peter Milner told me I couldn't leave because over 175 students signed up for the course!

GD: It does seem a bit ironic, yet quite refreshing, that you were able to receive more faculty position offers due to preparing an innovative course than for research. So, which of these offers did you end up taking, and why?

BK: I narrowed my decision to two places—University of Alberta and the University of Lethbridge. I was originally from Alberta and I prefer a smaller town atmosphere, but the opportunity to collaborate with Ian Whishaw, whom I met when I was an undergraduate, made Lethbridge my top choice—despite the fact that there was no lab and it meant I would be doing more teaching.

GD: What kind of teaching load did you have and what kind of courses did you teach?

BK: When I first arrived at Lethbridge, I was teaching the equivalent of five semester courses each year. I was actually hired as a clinical psychologist, so my teaching load included Introductory Psychology, Abnormal Psychology, Psychometrics, and Neuropsychology. I was already prepared for the Introductory Psychology course, but I was only about two hours ahead of the students in the Abnormal Psychology and Psychometrics courses!

GD: What about the Neuropsychology course?

BK: This was an interesting and fun course, because I was trying to convince Ian Whishaw to help me write a neuropsychology textbook, so he sat in the course and we spent most of the time arguing about interpretations of the various studies we reviewed—which, as you can imagine, really opened the eyes of our students!

GD: How were you finally able to publish a neuropsychology textbook?

BK: This was interesting. I wrote to all the major textbook publishers and got the same response—"neuropsychology" is not a field of study, therefore, there is no course for it, and, so, there is no need for a textbook. However, the one

exception was the W.H. Freeman Company, who had a visionary publishing agent, with a most appropriate name, Buck Rogers, who liked the idea. As it turned out, Buck consulted his neighbor, who happened to be Dick Thompson, who wrote one of the first textbooks in physiological psychology. Dick advised Buck to publish the book because it would define the field of neuropsychology.

GD: Given that you had a heavy teaching load and you had no graduate students during the first 20 years that you taught at Lethbridge, how were you able to establish a productive research program?

BK: Actually, I view the lack of graduate students during the early part of my program to have been a positive situation, because I did not have the pressure of ensuring that my graduate students would be appropriately trained and equipped to complete a thesis. The wonderful part of having undergraduates involved in your research is that you can have several of them working on a single project, unlike the greater time demands, per student, required to supervise a thesis. As Don Stein indicated in an interview in JUNE, you actually learn more during your first year of teaching than in four years of graduate school. Preparing new courses and establishing a research program are very time consuming, and not having the added pressure of supervising a graduate student during the beginning part of my academic career, was actually a positive thing. Although most first-year faculty members aspire to have a graduate student as soon as they are hired, as if it were a badge of prestige, I think many of them would be better served if they didn't have this responsibility during their first few years.

GD: How were you able to establish a neuroscience department and the Canadian Center for Behavioral Neuroscience?

BK: Although our facilities were modest—for example, we had to share a single stereotaxic apparatus—I was fortunate to have my first grant funded, and though it was only for \$8,000, it put me in a category of only four faculty members at the university who had funded grants. Then, in about 1981 or so, we got a new dean who reduced the teaching load to four courses, which provided more time for scholarly activities. I used the work I was doing for a manuscript on brain plasticity and behavior as a basis for a Killam award that I was fortunate to receive in 1995. This is a highly competitive award (6-8 given each year nationwide) which provided two years of course release, and the University President added a third year to this. Then in 1998, I was offered a University Chair, which provided a two-course release each year. Opportunities like these, offered us the time and funds to grow our program and help change the University culture to one that increasingly embraced research. It also provided a basis for expanding our programs to include graduate students and hire new faculty members. The addition of Jeff Kleim as a faculty member in our program, and who was a recipient of a Provincial Award, which provided a seven-year teaching release, provided the final impetus to prompt our University president to provide us with our own

building. This “build it and they will come” initiative culminated in a new 60,000 square foot building to house our new Canadian Center for Behavioral Neuroscience.

GD: This is a remarkable story and is a testament to what can be accomplished at a primarily undergraduate institution with the right focus and chemistry amongst the key faculty members. How do you keep the momentum going?

BK: I often use the analogy of a locomotive when starting an academic career. It takes a lot of work getting the locomotive up to speed, but once you get it going there is an incredible amount of inertia that keeps it going. I feel fortunate that I did not face some of the pressures that many junior faculty members faced at bigger schools, such as landing an RO1 soon after being hired and to supervise graduate students, often without sufficient time and the tools. I think a good piece of advice for new faculty members is to start out on projects that are relatively simple. Too many times, a new faculty member wants to win the Nobel Prize with their first research project as a faculty member and the project is so complex that they are unable to complete it in time to convince their colleagues that they will have a productive research career. It is much better to start out doing something simple and to keep focused. Too often, new faculty members will try to tackle too many research questions at one time, often with the consequence of not being able to adequately address any of them. By starting out with something that can be adequately addressed in a relatively short period of time, the faculty member starts building the confidence and the initial surge to get the locomotive started. Once they get it going on the right track, the inertia will often take over from there.

GD: Is there any other insights or pieces of advice that you can share that might help junior faculty members who are about to start their academic careers.

BK: Yes. First, I think it is important to always realize that having a job like ours is a privilege. We get paid to generate and disseminate new knowledge. With this in mind, I give public talks, without pay, to several service groups and organizations each year. Although some of my colleagues think that this is not a productive use of my time, I couldn't disagree more. I think it is critical that we strive to keep the community informed, because they are the ones that provide much of the funding for the research we do. Second, we should always keep in mind that our students are also paying our salaries, and they can always “vote with their feet.” Third, I take issue with the perception that good researchers are not usually good teachers. In fact, I would maintain that good researchers tend to be the best teachers. Finally, we should never lose sight of the questions we are asking. Although molecular mechanisms can be incredibly seductive, I think that too many researchers and students become “technically distracted” by the “how” of what they are doing—often to the point of losing track of “why” they are doing the research in the first place. This is why in our *Introduction to Brain and*

Behavior book, Ian and I start each chapter with a question.

GD: Bryan, I want to thank you for taking the time to share your remarkable story and for providing the readers of JUNE with some very valuable insights and helpful pieces of advice.

BK: It was a pleasure and a privilege, and I hope this will be of some help.

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