A Serendipitous Event Leading to a Career in Animal Bioacoustics

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When I think about serendipitous events in my life, there are a few. My favorite noncareer happening was when my husband and I took my stepdaughter into the adoption agency we had been working with for years to drop off some cans for their food drive. When we serendipitously poked our heads in to see our adoption caseworker, she excitedly ushered us into her office saying she had just been about to call us. We got the privilege of hearing, in person and after two years with that agency, that we had been chosen by my daughter's birthmother to raise our (now) daughter just minutes after the caseworker had received the special news. Do not get me wrong, the announcement would have been fantastic on the phone as well; it was just extra exciting to be surrounded by all the people we had worked with for years to grow our family and feel the enthusiasm from the whole office. It was a joyful moment for everyone involved. I can easily list this serendipitous moment as one of the best moments of my life and something I will never forget.

But beyond serendipity in life in general, serendipitous events in my work life all arise from one serendipitous moment with one person, Robert J. Dooling (aka "Bob"; see bit.ly/3zCf4P0) from the University of Maryland, College Park (UMD). The saying "to know him is to love him" truly applies to this man who absolutely changed the course of my life in all the best ways. I owe him everything and often wonder what my life would be like had this initial serendipitous event never happened.

I was not someone who envisioned this career I find myself in, not even close. I chose my undergraduate institution, St. Mary's College of Maryland, St. Mary's City, because they had an excellent elementary education training program. When I got to St. Mary's, instead of the many human development courses, I found myself taking a lot of psychology classes because they fascinated me. In my sophomore year, I took "Sensation and Perception" as well as the "Psychology of Learning." The "Psychology of Learning" class had an attached laboratory where each student got their own rat. We used operant conditioning to train our rat to press a bar for a food pellet. We measured rates of acquisition, compared schedules of reinforcement, and tracked extinction. I absolutely loved it and was captivated by my little rat and its actions each week.

I was also taking "Sensation and Perception" that same semester. I had always been fascinated by the visual system and visual illusions. My father was working on his master's degree in education while I was a middle schooler, and I remember poring through his "Sensation and Perception" textbook with him, marveling at the old woman/young woman, duck/rabbit, vase/face figure-ground, after illusions, and Muller-Lyer illusions (for examples, see bit.ly/4cN1w1k). Learning about how our sensory systems work (and how they can be fooled) intrigued me like nothing had ever intrigued me before. I still feel like that kid when I encounter these illusions in the real world. The more recent blue dress/gold dress (see bit.ly/3WkPkj3) and Yanny/Laurel (see bit.ly/3zzOoy5) social media controversies are evidence that I am not alone in my curiosity about how our sensory systems operate.

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A SERENDIPITOUS EVENT

Needless to say, after my sophomore year of college, I no longer wanted to be an elementary school teacher. Unfortunately, there was only one animal laboratory at my small undergraduate institution, and in it, they studied the effects of various drugs on rat behaviors. I volunteered in that laboratory until I finished my degree, but the field never appealed to me like the sensory/perceptual discipline did. I did realize, however, that I wanted to enter the psychology research field. I did not, unfortunately, know how to go about this. So, I found myself wandering over to the college's notoriously underutilized Career Center. When I explained my changing interests to the career adviser, he suggested we call some local universities to see if any psychology research laboratories were in need of a research assistant.

This is where the serendipity came into play. At the time, Bob Dooling was the associate chair of the Psychology Department at UMD. Bob has never made it a habit of hanging out in the main office of the department, but for some reason, he was there that day working in his administrative role. He heard the message my career adviser was leaving on the voicemail and just happened to need a research assistant at the time. He took over the call, and we set up an interview for me in the coming weeks. I put on my new suit (yes, it was the first and last time I ever wore an actual suit), visited Bob's bird psychoacoustics laboratory, and landed the job that ultimately set me on my career path. If, serendipitously, Bob had not been in the Psychology Department office that day and taken that phone call, I do not know where I would be right now. It is highly unlikely that he would have received the message and called back.

I am still not sure why Bob took me on. I was pretty useless in the laboratory in the beginning, with little experience in computers, programming, electronics, experimental design, animal care or husbandry, or knowledge of the auditory system. The one thing I had going for me was a willingness to learn. I took on any project Bob proposed, eager to make myself indispensable. After two years in the laboratory as a research assistant, I was enjoying the research so much that I decided I wanted to pursue a PhD. Luckily, Bob continued to see my potential and accepted me into the PhD program in biological psychology at UMD.

I was a trainee in the Dooling laboratory for nine years total (two years as a research assistant and seven years as a graduate student). Yes, that is a ridiculously long time to be a trainee. I am aware that I just did not feel the need to rush out of there. I wanted to soak in as many experiences as I possibly could. Bob was the absolute best mentor, and we worked so well together. I remember many a human psychoacoustics seminar where he would lean over and say "let's try this in the birds to see what they do" or when he would introduce me to a collaborator and a new project would take off from there. This led to me getting to work on hair cell regeneration projects with Brenda Ryals from James Madison University, Harrisonburg, Virginia (see bit.ly/3S1XHxq), spatial unmasking projects with Ole Naesbye Larsen from the University of Southern Denmark, Odense (see bit.ly/4cYx44j), Schroeder-complex masking projects with Marjorie Leek from Loma Linda University, Loma Linda, California (see bit.ly/3WlKbqM), and a cochlear brainstem anatomy project with Catherine Carr at UMD (see bit.ly/4623w3E). The collaboration with Ole led to my attendance at the Odense University Summer School in Acoustic Communication, which was a fantastic field/classroom course that then serendipitously led to a six-month research fellowship at the Technical University of Munich, Munich, Germany, studying hearing in barn owls with Georg Klump (see bit.ly/461uFUk) when I found myself sitting next to Georg on a long bus ride to a field site.

I learned about the precedence effect, or the perception of a leading stimulus while suppressing an echo version of that stimulus, sitting next to Bob at a conference. For once, I leaned over to him and said, "Let's try this in the birds and see what they do." Here was my chance to dive into understanding one of those auditory illusions in an animal, and it ended up being the topic of my doctoral dissertation. We thought that since the birds we studied (budgerigars, canaries, and zebra finches) were terrible at sound localization that they might not experience the precedence effect, because timing cues, including binaural timing cues, were thought to play a role in the suppression of echoes by the auditory system. We turned out to be wrong; the timing of the precedence effect differed from what had been previously measured in other animals, but it was still present in the small birds.

Bob suggested that I reach out to Tom Yin at the University of Wisconsin-Madison (see bit.ly/3W4PAkz) for a postdoctoral position, and he gave me the best advice yet again, saying we would really hit it off and that I would have a great experience with Tom. I was not super enthused to potentially move to Madison, but Bob said to keep an open mind. Tom met me at the Madison airport in shorts and flip flops, took me for a beer and some popcorn at the Terrace at Memorial Union overlooking Lake Mendota, and we talked science for hours. Tom was another fantastic mentor that I feel lucky to know and to have worked with in my career.

So, Bob was absolutely right that Tom was a great match for my postdoctoral work. I was able to gain more experience and knowledge of animal models of hearing (and specifically spatial hearing), and I added animal physiology to my repertoire of techniques. While there, I learned to record from the inferior colliculus of awake cats while they were behaving in a spatial hearing task. I recorded suppression to "echoes" at various timepoints following initial sounds in precedence effect paradigms, and I studied another auditory illusion that had never been measured in an animal species, the Franssen effect. The Franssen effect is related to the precedence effect in that secondary sound sources are suppressed by the auditory system (see bit.ly/3LmZadW).

As fabulous as it was working with Tom and Dan Tollin at Wisconsin, the number one thing the work taught me was that cat behavior was NOT for me. The cats had attitudes like the birds never had. I still say that there is a reason people generally do not train their cats to do tricks. I knew that I wanted to return to measuring hearing by birds when I got a position in my own laboratory.

Even though I was out of Bob's laboratory for a few years by the time I went on the job market, Bob was also the one who helped me get my first (only) academic job. I serendipitously applied for a junior faculty position at the University at Buffalo-State University of New York (SUNY), Buffalo, New York, not thinking I had any connection to the place. However, just a few years earlier, Buffalo had tried to recruit Bob to be their Psychology Department Chair. They really wanted him, and he really wanted to go, but he had personal reasons for wanting to stay in Maryland. Bob reminded me of all this when I got the call to interview at Buffalo.

He also reminded me that I not-so-politely declined moving with him as a graduate student were he to go, deeming Buffalo "too cold and snowy." I was a naïve youngster then, thinking academics could pick and choose easily where they wanted to live. The realities of the job market years later made me realize that you go where you can get a job, and I was thrilled when Buffalo had me in to interview. Every person I met in the Department during my interview week remembered Bob and was very fond of him. To this day, I think I got the job because I was "close enough." It also did not hurt that Richard Salvi was on the hiring committee and that he and Bob had been great friends for years.

Even my current academic collaborations have Bob Dooling connections. Bob knew I loved traveling and sent me to the International Conference on Neuroethology in Cambridge, England, as a graduate student. While there, I went out to dinner with a group of friends of friends that included Matthew Xu-Friedman. I remet Matthew at the new faculty orientation at Buffalo, where he reminded me of our dinner in England years earlier. Matthew, Dick Salvi, and I had regular lunches together during our first few years in Buffalo and started doing mouse psychoacoustics a few years later. We teamed up with Amanda Lauer, who was a graduate student in the Dooling laboratory toward the end of my time there, and Amanda and I have been trying to convince study sections of the importance of animal psychoacoustics ever since!

Bob also sent me to the Binaural Bash at Boston University, Boston, Massachusetts, one year where I was serendipitously assigned to stay with Barbara Shinn-Cunningham. A long conversation with her and David McAlpine about my precedence effect in the birds project helped me understand a lot of things I did not consider about the binaural system and complex hearing processes. To this day, Barb remains a great sounding board and consultant and is always readily available to offer advice when asked. I would put her in the same category as Bob and Tom when I think of supremely generous human beings eager to help others succeed.

Finally, my serendipitous events leading to my connection with Bob also led me to my position as the associate editor of *Acoustics Today* (*AT*). Bob and Arthur Popper (editor of *AT*) were a famous twosome during my graduate school days, so, of course, I knew Art well and have

always considered him a second mentor. He asked me to write an article for *AT* about animal psychoacoustics after I gave an Acoustical Society of America talk several years ago. I guess he decided that we worked well together and pitched me the position of associate editor of the magazine. I have learned so much from Art and I am certain I would not have been on his radar at all for such a job if he had not known me from my days as a graduate student in the Dooling laboratory.

In summary, I have no doubt that the intercepted call by Bob from my undergraduate career counselor was THE defining serendipitous event of my career. It led to many other serendipitous events that have helped me thrive as a scientist all these years. Working closely with and learning from someone so knowledgeable, respected, and giving continues to have been an effective strategy for my career as an animal bioacoustician to this day, over 30 years later. I still do not know why Bob was in the main office that day, four floors away from his laboratory where he was usually found, but I am grateful for the serendipitous nature of his wandering.

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