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History of the Department of Psychological and Brain Sciences

GREG BALL

Interviewed By

Bill Leslie

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Interviewees: Greg Ball

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Subject: History of the Department of Psychological and Brain Sciences

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BL: I'm here with Professor Greg Ball from the Department of Psychological and Brain Sciences. This is Bill Leslie, it's June 16, 2014. We're going to talk about the history of your department, and your recollections, reflections, and so forth. So, perhaps you could start with your coming here and what the department was like when you arrived. You had done your graduate work at Rutgers?

GB: Rutgers at a place called The Institute of Animal Behavior, which was one of the early attempts to try to have a program in behavioral neuroscience. At the time, my degree was called psychobiology, where we tried to combine the study of biology with the study of behavior. And it was before, when I did that PhD, neuroscience grad programs were really just getting started and so there were various names that the biological bases of behavior has used - biopsychology, and at the time, psychobiology was the popular one, that's now fallen out of favor. And this was founded by a National Academy member named Daniel Lehrman and it lasted about 30 years, 35 years and then they sunset the institute. But it was in psychology and zoology in the institute and my training was in those two departments as well.

BL: When did you get your degree?

GB: 1983.

BL: Okay, and then you did a postdoc?

GB: Rockefeller University - the Field Research Center headed by Peter Marler, another academy member. He was the pioneer in the study of birdsong from England. He came over here to Berkeley and then Rockefeller and he was part of the neuroscience development. At Rockefeller, they originally tried to do neuroscience and behavior, they hired a series of physiological psychologists and ethologists, Donald Griffin was hired at the time, Carl Pfaffmann, and the mathematical psychologists. They now, it's very interesting, in both places I went to, the neuroscience and behavior, the brain and behavior, went mostly to just neuroscience. So, they both evolved. So the Institute of Animal Behavior was closed, and now it's the Institute for Cognitive and

Neuroscience, but it's really very neuro based. The Behavior and Field Research Center at Rockefeller is now closed. They have a very strong neuroscience program that I participate in but it's more cell molecular neuroscience.

BL: When you say the field study, was that out of Princeton?

GB: It was at Dutchess County, New York. So they had, right next to the Cary Arboretum of the Institute of Ecosystem Studies, which studied ecology, they had a place to study animal behavior, in Dutchess County, about 1,200 acres. It was set up to keep wild birds and study wild birds and that kind of thing. So, I was based more in the country but then I was one of the people who really tried to do the interface and I went and worked in Bruce McEwen's lab at Rockefeller to learn chemical neuroanatomy. I was studying seasonal changes in the brain and we knew that steroid hormones were mediating these changes of physiological state. And McEwen was starting to say "okay, where are steroid hormones acting in the brain?" And he wanted to find out where the receptors were, and then "what changes were they inducing?" We knew there were transcription factors introducing gene changes in the brain. And he, this was before the genetic revolution hadn't quite gotten there, where you could study gene expression so well, so he was actually using chemical neuroanatomy, which was the cutting edge method, to localize proteins tied to neurotransmission and then see how steroids would act to change those proteins. Because you were trying to link how the steroid would induce a chemical change in the brain that would result in these behavioral changes. And I had this remarkable system where you know the birds seasonally, it's like they're different animals, they just, what they care about, what motivates them, what they - their plumage, their appearance, their voice, it changes qualitatively through the year. It's like they go through puberty every year, they go through these changes. And so I realized that if I could link what happens in the brain with these remarkable seasonal changes in behavior that would be a very powerful approach to brain and behavior. So I went, I was one of the only people who was at the Field Center who actually liked to go down to Manhattan, and I learned these chemical neuroanatomy methods and set them up. And that prepared me to then go on to the job market, I was a very competitive candidate at the time, and I was at Boston College briefly, and then it was a classic Hopkins move where I had sort of proven myself as an advanced Assistant Professor and then they went after me. And that, itself, was an interesting story, David Olton, who was one of the leaders in the field at the time, he was coming back from the Society for Neuroscience meeting, he was sitting next to my lab mentor at Columbia, Rae Silver, who was at Barnard at Columbia. And I had been one of her first lab assistants and he described they have a small high quality biopsych group here at Hopkins. It was Elliott Blass, David Olton, Stewart Hulse, and Randy Nelson, and Blass left for personal reasons. And they say down and said okay, we have this lab suite, they had recently renovated Ames Hall, they had this lab suite and they

sat down, Randy Nelson said I want someone who studies hormones, Stew Hulse had moved to study auditory perception of birds, and said I'd love a songbird person. And Olton said, I'd like to have kind of a comparative learning and Rae Silver said, I've got the guy. He studies hormones in songbirds and looks at the learning thing, and David says why hasn't he applied? And I had not applied because one of the postdocs at Rockefeller at the Nottebohm Lab had done his PhD here with Hulse. And no one had been tenured through the ranks in the department for a decade and the reputation was that they wouldn't tenure anyone, they treat people like dirt. Randy Nelson was still untenured, and I'd also just moved to Boston, and so it felt a little awkward to immediately start looking for another job and this postdoc, Jeff Cynx, who'd gone here, just said, oh, they treat their junior faculty very poorly, they're not going to support you, you'd be crazy - and there were other things like that. And then David Olton after his conversation with Rae Silver just picked up the phone and called me and said I understand we have a job that you haven't applied for, why not? He's that kind of guy. And so after that I said, okay, and so I just came down here and it was one of the best job interviews I ever gave because I did not need the job. I had, I was very open in Boston, I went to my chair and told my chair I have this invitation and he says, oh, you should go, Greg, assuming I'd never get the job. He said, it'll help me get you a better raise this year, and all this, and I came down here and they gave me their worst. Every hard question they could, they threw everything at me and I was completely relaxed, and had a great time answering the questions, and I got the job offer. And then I had a big career decision, when Boston heard that, they said we're putting you up for tenure next year. Of course, Hopkins then, we were on what we call the old system now, so I was coming as an Advanced Assistant so even if they made me associate it wasn't going to be with tenure. So I had to put up with that and I read the tenure guidelines, and I said this is the most pretentious school I've ever seen in my life! When I read the tenure guidelines, then I said, well, but I met all these people down there and I'm as good as them, so if they got tenure, I can!

BL: That's how I felt, I gave up a tenure line job to take a postdoc.

GB: You did - so when I arrived here in the department, they were known as a small high quality department. They still hadn't recovered from the fact that the Cognitive Science Department had formed, so they had lost some positions and the notion was that they were going to get them back and replace them and they never really did. The university could never really do that. And so it was only 12 people, at the time, and it was really a tale - we still had some social psychologists and then we had the cognitive psychologists who were right in the main line from when the department started in the late 1800s. They were doing perception, attention, psychophysics, and this was the core area the department studied. The other kind of line that we'd established in the 30s was in physiological psychology,

that's what it was originally called because Cliff Morgan came here as a chair. And Cliff Morgan was one, he was one of the first behavioral neuroscientists as we call him now, and he wrote this textbook that you've probably seen with the famous guy that went to Penn, he's so famous that I can't remember his name now [NOTE: Ball later remembers it is Eliot Stellar]. Morgan and, who was a junior faculty member here, they wrote a book on physiological psychology which is still, I have it in my other office, I'll have to show it to you, you need to look at it if you haven't seen it yet, it's still - I'm amazed at how comprehensive that book was.

BL: What was the rough date of the publication - ?

GB: It was in the 30s.

BL: It was in the 30s?

GB: 30s, I think, yeah. And he was the chair of the department for many years, and some of the old alumni will talk about him. And he was apparently an extremely difficult person because we had some outstanding junior faculty who left, went to Penn and became member of the National Academy, and basically he left because Morgan was so mean to him. And Warren Torgerson used to tell a story when Morgan finally passed away or left, he took over his chair, this is around 1960, and some rankings came out, and we were ranked the number one physiological psychology department in the country. Torgerson went to the dean and said you should give me a bonus or raise, and he says why? He says I'm saving you a huge amount of money, and he says what do you mean? I just got these results and we're the number one ranked physiological psychology department in the country and you don't have any faculty. So I give you a number one ranking and we're not paying a single salary in that area!

BL: Those rankings typically lag.

GB: It was then that they renewed the department in that area and they hired Olton and Blass. And they both ended up being extremely visible in the community, Olton especially. You know, hippocampus in memory emerged as one of the subareas in neuroscience in general and he did all these key experiments with the radio arm maze, which at the time was called by many people the Olton maze, at the time. And he would have none of it, he felt that was inappropriate, he didn't want to have his name associated with it, no no no, the maze is used by everyone, to his credit.

BL: Yeah. Now what about the line that was human factors psychology coming out of World War II through maybe about the 60s...?

GB: Right, and that was extremely well here, and like everything, like many things at Hopkins, it was basically one person. And then he retired, when I got here, I voted on him being emeritus.

BL: Who was this? Alphonse?

GB: Yes, Chapanis, yes right. He was a real pioneer and very good. And the human factors he did coincided with the perception very well because part of the human factors was how do people assess, what is the gestalt that they face, the cockpit, or something like that. And so he, that perceptual work, he got along with the perceptual people scientifically, because their basic research he would use to try and figure out, okay we put it here or we don't put it there. Now, personally there was some tension in between them. There were people, one of the many things I learned as a junior faculty member, how there were people who did not want to give him emeritus status and I just had his CV and I was like well, excuse me, but I know a good CV when I see one. This guy is very good and it just came to them that they found him an unpleasant person that they didn't like.

BL: If we disqualify all emeritus on that basis, we'd have very few.

GB: I actually don't know what happened with that, I think he did get official emeritus status in the end, but it would be interesting for you to pull that up, it would have been - yeah.

BL: Well, he had a very interesting piece in that centennial history of the department where he talked about G. Stanley Hall's lab but then he talked about the human factors lab that the Navy had supported at Hopkins. I guess originally in Rhode Island and then at a place on St. Paul and then finally in Ames Hall.

GB: Was in site during that whole time - did he work in those labs in those different places?

BL: He worked in those labs and he talks about how Ames Hall was designed, really by the Psychology Department, on the basis of those earlier labs, the interior lab space could be redivided... I guess that he was talking about the second floor and there were twelve doors outside but you could reconfigure -

GB: The cubicles could have different configurations and perceptions and all that.

BL: He talked about the legacy of that. But that does take me to the subtitle of that collection, which I thought was interesting -

- GB: Elliot Stellar, that's who I was trying to remember, he was the guy who went to Penn. It was Morgan and Steller, that textbook was a classic. Anyway, sorry, carry on.
- BL: No, that's okay. So, the subtitle of that centennial is *G. Stanley Hall and the Johns Hopkins Tradition*. We've already talked about several different traditions, but when you hear G. Stanley Hall, what is that tradition about?
- GB: So, what the tradition means is when the roots, the intellectual roots of psychology came from several different fields, as you know. So one was philosophy, there was this whole, it was coming from Harvard, psychology was tied with philosophy, it was like experimental philosophy. Another root was psychiatry, the whole Freudian thing, came via psychiatry and these were theories of behavior. And then another was physiology, and the physiologists realized that you couldn't, when you tried to study how people used their sensory system and how they responded to stimuli it wasn't a simple veridical engineering system. There was a whole layer of interpretation that needed to be explained and with the methods they had at the time they couldn't explain it in purely physiological terms. And so people, and this is Vundt and people like that, they said, well, we need to study this scientifically and that gave rise to the field of psychophysics and things like this. Where we're going to, we can't use physiological measures and understand this interpretation, but we're going to use scientifically rigorous methodologies in order to study these relationships and that's when you have, you know, the basic laws of psychophysics, the just noticeable difference was discovered and things like that. And Hall went over to Germany for his training and was steeped in that particular variation of it. Now he also was exposed to Freud, we have, in our seminar room, you've seen the picture of G. Stanley Hall having the famous conference when he went to Clark with Freud and he brought all the psychoanalysts over.
- BL: And Jung also, I think is there.
- GB: Yeah, Jung's in there, Freud's in there, I think Adler may even be in there, it's a wonderful picture. But when he was here, that kind of rigorous experimental discipline was established, that this is the science, this is kind of a science of perception and behavior. You do experiments, you collect data, you analyze the data, you don't sit and make up big bullshit theories and all that kind of stuff, you experiment, experiment, experiment. And that tradition continues to the department to this day, everybody gets data, everybody does experiments, and where the department has - why did the Cognitive Science Department start? Because, why did the Cognitive Science Department form? Because the tradition of the department did not, could not hire theoretical linguists. That just does not fit in this department. And Alfonso Caramazza who came to the language through empirical studies, he was trying to understand, you know, stroke, the effects of stroke, and did experiments and collected data, he came

to realize that he needed to talk to linguists and he wanted to have a department where he could talk to linguists and maybe computer scientists. People who model, and they don't collect data, and the department said no, that can't happen. And that's when he went to Steve Muller and said we need a new department for a new field.

BL: I see.

GB: And he took with him two faculty, well Mike McCloskey he took and then Brenda, I guess, had just graduated or, I can't remember. Brenda did her PhD in the Psych Department and then was a faculty member.

BL: This was Brenda Rapp?

GB: Brenda Rapp, yeah, she was one of the first -

BL: Still here, last I checked?

GB: Yeah, you should chat with her.

BL: Yeah.

GB: And so is Mike, but that is one example of the tradition and we still have this with job interviews today and everything, is that people, when people do a lot of theory the advice is always show your empirical data for your job, what are you collecting? And even, you know where Olton and Blass got into trouble, is they started having, well, not Olton, he always, always, always had behavior, but Blass started to have variables that were physiological and not behavioral. Because he got so into this thirst, and the control, and then the development of water intake. In actuality, I was in danger of that. When I got the job, I was, my dependent measure, for about half my papers, was the brain not behavior. My independent measure was behavior and then I looked at what happened to the brain. And the old guard was skeptical about me, whether I belonged. I didn't publish in the journals they liked, *Journal of Comparative Neurology*? What's that? You know, when in reality that was one of the first neuroscience journals in the 1800s and it was originally *Journal of Comparative Neurology and Physiological Psychology* for a brief period of time and then they thought it was too premature to try and connect the brain and behavior and they just went on brain. And remember the word neurology didn't mean what it means now. Neurology then meant neuroscience. And so the *Journal of Comparative Neurology* would be called the Journal of Integrative Neuroscience if it was started now. Anyway, that's an aside. So when I got hired, the bio people loved me, Howard Egeth thought I was okay, but Torgerson and then the social people, they were not tenured, so they didn't have much power. Torgerson and Green, they were very skeptical, very skeptical, but they went along. And, you know how I converted

everyone? I taught Introduction to Psychology for ten years by myself. And then, once I did that, because at that time, the Academic Council was forcing the department to teach Introduction to Psychology like Biology didn't, when I came here Biology did not teach General Biology, we did not teach General Psychology. It was classic Hopkins, you immediately went into a series of more specialized classes when you were a freshman. And so they started Introduction to Psychology, and nobody wanted to do the whole thing, they were tying up three faculty teaching the class. Now I had taught, as a graduate student, the entire Introduction to Psychology because I was hungry for experience and then when I was at Boston College, they had a year long course, Psychology as a Natural Science, Psychology as a Social Science, and I taught the natural science part. And so, I had, it was easy, it was easy, so Howard says, I said, what's the teaching load here? And Howard, he just goes, well, that's an interesting question. That's how he answered it, is that classic or what? That's an interesting question. He said some people do this and some people do that, and basically what I got out of him is I should have one undergraduate class that is kind of general, and one undergraduate class that is more specialized. So for the general one, I looked around and said, I'll teach intro. He goes, what? I said, I'll teach intro. The whole thing? Everything. The social and all that? The whole thing. Freud? The whole thing. And I went to Warren Torgerson and Bert Green's office and said I'm giving the lecture on testing and intelligence and I'm, tell me about Thurstone and I'm going to say this, and what do you think about that? For an hour, they told me all this, it was great, told me the story of the history and all that. And I said okay, well, I'm going to stress this, and I showed them my slides, or overheads, an uh, they said it's okay.

BL: So is it fair to say that psychology here was much closer to the natural sciences than the social science, from the beginning?

GB: Absolutely. Always was, always was. And for me, that's part of the G. Stanley Hall tradition. That, that strand for psychology was one of the first ones that got started. Because see even, even the people doing the classic perception and cognition, their closest people they would talk to would be the physiologists who were trying to, you know, someone trying to understand how the retina works would be interested in the psychophysics. That's exactly right.

BL: It is telling that Hall's lab, such as it was, and it's interesting that he gets a lot of credit for a very short number of years, it was only up and running five years -

GB: Yeah, it was.

BL: Before he left. But it was in the Physiology building first. Then it went to Physics, then it went somewhere else. But that's interesting.

GB: Exactly right. And so that kind of, to the extreme, and another indication of that tradition, was when we got rid of the social psychologists. And so when I arrived here, we had four areas of students in training - biopsych, cognitive psych, quantitative psych, social psych - we still had social psych. Right before I came here, they tried to hire a senior social psychologist from Ohio State as the chair, a guy named Bill Crano, this is a classic Academic Council/department screwup, he gets approved by the department, by the dean, he just has to go through council, they have him come out, he's sitting in his office, the council I guess didn't get to it until the fall, and they don't approve him as a professor.

BL: Because of the perceived fit of the, with the department?

GB: Yeah, they didn't think he was that eminent, he was a full professor at Ohio State and they were snotty about it. So when that happened, then one of the other junior social psychologists, Steve Breckler, was denied tenure, and then Paula Niedenthal, who was very enthusiastic left, because she was just saw there was so little critical mass. So then we had a meeting, and said, well, do we need social psychology? And that's when we decided that to give the department breadth we were going to do cognitive development rather than social psychology. Because everything develops, and development adds kind of a social element but it can tie into cognitive much better. And so that's when we hired Peter Jusczyk.

BL: Okay.

GB: And then he died tragically, he was a great colleague of mine. You should know we taught this course together, called Words and Birds, where Peter was fascinated, see, and that's one of the reasons why it fit him, he was fascinated by, he was human developmental psychologist through and through, but he was fascinated by what happened in vocal development in animals. And he loved talking about that stuff.

BL: Now the Mind Brain Institute must have come along fairly shortly after you arrived, it was sometime in the early '90s, I don't know.

GB: Correct. When I arrived Terry Sejnowski had just left, and that was unfortunate, and what I always heard was that Mountcastle chased him away. They made the decision to bring, Guy McKhann was the director, and they made the decision to bring the so called Bard Labs, which had been in the Physiology Department for many years.

BL: At the medical school?

- GB: At the medical school. And then when Neuroscience was formed, they went in there, and they were, then the Bard Labs were directed by Mountcastle for many years. He retired and then they moved up here, and Steve Knapp always says that all his Sol Snyder in order to agree asked for a lot of money. And so Knapp said his entire dowry as dean went to Sol Snyder. And Sol said since I was losing him, I needed to rebuild, I need a little bit of money. He just took all of Knapp's money, whatever that number was, at the time, and then they moved up here and set up the labs. Mountcastle was never happy about that. He was, he didn't think much of psychology in general, or this department, or Homewood. He thought, he was an MD, and he was a snob, he was an MD snob. He said the only reasons why the Mind Brain Institute was here in Homewood was because Steve Muller insisted that it had to be.
- BL: And did, because if you look at their website, their own history stresses that, you know, connects the medical institutions and Homewood, etc. Doesn't sound like that was quite the case, it wasn't intended to be so much collaboration.
- GB: Well, the people, so I have to distinguish Mountcastle from the people. The people, like Ken Johnson and Steve Hsaio, Ed Connor, they wanted to talk to the people up here, they wanted to talk to perceptual psychologists, they were tired, because Sol Snyder, who started neuroscience, started out stressing molecular cellular neuroscience. And they just were cut off from it. Rick Haganir, who is now the chair and is a great guy, but when Rick was a young up and coming faculty member he was working at a level, he couldn't have a conversation with Steve Hsaio and understand each other. They just, Steve didn't know enough microbiology and Rick didn't know enough physiology. I mean, Rick Haganir, a biochemist for god's sake, that's his PhD. So they could talk more, just Howard Egeth, than to the other neuroscientists, because they were training the monkeys to do the kind of tasks that Howard did with the humans. And so then they started being on each others's theses defense and all that. So in that sense, it was connected. It's just that Vernon was kind of the grandfather of the place, and he was a big snob about the whole thing. Now, you know Vernon was a fascinating guy to get to know, I don't know if I ever told you my story when I gave the talk at the medical school, it's just hilarious. So when Vernon retired, Sol had an oil painting made of him which now hangs in the Mountcastle Auditorium. But before that auditorium was dedicated to Mountcastle, they had a small seminar room in Wood Basic Science and that painting is huge, so you walk in there, it's like a whole wall. So, I'm up there ready to give my talk, and there's this very distinguished white-haired gentlemen staring at me with these bright blue eyes, and I'm like who is that? Who is that? And then I turn and there's an oil painting, and I go, I think he's important. I tell you, there's nothing more intimidating than have someone staring at you and you see a huge oil painting.

And then I figured out it was Vernon Mountcastle. And thank god at the end, he very, complimented me on my talk and we had a great exchange so I was...

BL: That's the ultimate compliment at Hopkins, is that your students commission a great oil painting and present it. It's been going on since Gildersleeve. And it's particular...

GB: Well, that's what happened. So anyway, the Mind Brain Institute was starting at that time during my job interview. I met with Guy McKhann, and David Olton actually told me find out everything you can, we don't know what he's doing exactly, so I want you, just act naive and get him to tell you as much as you can.

BL: But they were in Roland, already? Or at Homewood.

GB: Right, what became Krieger, right.

BL: But the connections with Psychology were -

GB: Just getting started. My first years in this department, we had all the Mind Brain people come by and give a talk to the department. I remember those kind of introductory talks, we had like two or three one year and then two or three the next, a colloquium series. And then we started giving them joint appointments, and then they started being on theses and stuff, and then I remember by the 90s, the mid-90s, we had a student who started out doing a thesis somewhat with us and then transferred over to do a thesis on monkeys in the Mind Brain.

BL: But did Mind Brain, was that a department? Or an institute with people in other departments?

GB: No, institute. The notion, McKhann's naive notion was that people in all kinds of departments would come, like oh, maybe a physicist would get excited about neuroscience, but it wasn't practical. A physicist isn't going to move his Physics appointment and start studying the brain and get the funding and all that. And so you know the appointments in the Neuroscience and the School of Medicine, junior appointments, are much easier to organize because the commitment of the institution is so much lower. You give them startup but then their salaries are, a high percentage, is paid off grants. So they ended up, well first they moved a bunch of people who had medical school appointments and they kept them, and then the new people they tended to give them med school appointments because it was just easier. So we did finally do a hybrid appointment, so Veit Stuphorn is 50% Krieger and 50% medical school in his appointment, he's in the Mind Brain, and we should probably do more of those. Adam Falk, that was one of the first things I did when I was in the dean's office, Adam was the dean, was I facilitated that... No that was when I

- was chair of the department. So I was department chair recruiting Veit, then I moved to the dean's office and I kind of shepherded that whole deal through.
- BL: You mentioned it in passing, but the neurosciences, Sol Snyder's group, etc. Were there any close connections with Psychology -
- GB: When I first arrived?
- BL: Yeah, that started about 1980, I think.
- GB: Yeah, So yes, the biopsych, the person who made the closest connection was David Olton. So he recognized early on that he needed to do more in the brain, so David was really a behaviorist who learned about the brain. But he really didn't have in depth training in neuroscience. So it's interesting to contrast him with him say with Michela Gallagher, who replaced him after he passed away. And they had grown up in similar tradition but Michela knew so much more about the biochemistry of the brain and the techniques, David really said what I'm good at is clever experimental behavioral experiments to test ideas on how the brain is controlling, and he was. He was extremely, read the obituaries, they're very accurate, they say that. And then he started collaborating with people to start measuring variables in the brain that might be changing to code memory. He wanted to find the neural bases of memory. And so he, and then he would get some people to do their PhD at the med school and come postdoc with him so he had, in some ways, a little bit more neurology, all these neurologists. But there's all these neurologists looking at aging and memory, and he worked with a lot of them and with those people. So there were good interactions when I arrived with the medical school there. Quite a bit.
- BL: But it was never a joint program like Biophysics or Biomedical Engineering?
- GB: No. When I arrived here, Sol did not have an umbrella policy on appointments. So, for example, we were not cross-appointed in the School of Medicine, and then it got to a certain level and Sol opened the umbrella and everybody in psych who was relevant got an appointment in the School of Medicine.
- BL: Okay.
- GB: Which I still have to this day.
- BL: I have one too, although, I can't cure a thing. I want to talk a little bit about the Neuroscience program at the undergraduate level. Was that like Public Health is one of our signature undergraduate programs. What can you tell me about the origins?

GB: All about it! So the dean at the time, so in the '90s, I can't stress to you how limited the undergraduate choices were, especially in the life sciences. Biology was completely overwhelmed, they had an absurd number of majors and every kid who wanted to go to medical school majored in biology. And, I'll just be truthful, they had too many people and we weren't doing a good job. Now David Olton had set up, he took the natural science area major, and he designed something he called Behavioral Biology. And he got some money out of the dean's office and he set up a major that he ran, he was such a workaholic, he ran that personally. And basically what happened is he realized that the psychology majors would come into his lab to run his rats and then he would have lab meetings and they would start talking about the brain and the connections and the kids didn't know anything! They had taken like one class, like physiological psychology, or they started doing, you know, basic biochemistry and they didn't know anything. And he said these kids aren't getting, straight psychology majors is not the right training for what I'm doing, I'll start a major. And so then they had to take, you know, chemistry, physics, calculus, and then he pulled together different classes, some in psychology, some in other fields, and that major had like, probably at the time, fifty or sixty people, he did it all himself. He was their only advisor, he ran the whole, when I first got here, I said, can I help you with that major, David, I mean? No, no, this is mine. He had no interest and the biology major, they must have had three hundred majors at the time, it was ridiculous, so then, it might have been the year Matt Crenson was the dean a couple of years, right? He was interim dean...

BL: Yes, in '93, something like that.

GB: Right around then, Matt went to the Mind Brain, the Mind Brain had finally got set up, he's talking to Guy McKhann and part of the Mind Brain endowment was that they were supposed to do something with undergraduates too. That was the Krieger endowment, none of them were teaching, and they were kind of this entity unto themselves on campus. And Matt had said, well, why don't you guys get some people together and start the neurosci- look into having an undergraduate neuroscience major. Because they were just starting to pop up around the country. Like Oberlin was an early developer, and so he brought together a program committee and I was a junior, David had passed, me and Randy Nelson went from Psychology and represented the department. At the time we had Andy Harris in Biophysics, who was a neurophysiologist, and we had Doug Fambrough in Biology, and then people in Cog Sci, Brenda and Mike, and then Guy and some people. And then we sat around talking the major and then we basically developed the major and came up with the ideas. And Guy especially had the idea that we'd have, you'd have the option of doing a fifth year and getting a masters. And he'd been reading biographies of great scientists and then when they were young they had some time to make a discovery and we'd have this dream that we would give kids a whole year to do research, and they could come from anywhere, and again we had this thing,

they could come from any field, you know, we had a physicist who could come in here and it just wasn't, it turned out not to be practical. But what we did maintain was that you could do concurrent bachelors-masters and the masters would require an entire research year. You would have meetings with the other masters students presenting your data and stuff but you wouldn't take courses.

BL: Now this would this be your fourth year or your fifth?

GB: Your fifth, the way it worked is you would apply the second semester, so what we finalized, the second semester of your senior year, over the summer and then the first semester of your fifth year, and then the second semester of your fifth year you came back and took some graduate courses and wrote it up. They had a semester after you collected all the data, so you had a year of collecting data, so you wouldn't disappear and not publish it. That was the original idea, so he pushed that. And so in the mid-90s we announced the major and we took a lot of existing courses and then the Psych department was responsible for the systems course, the Bio department was responsible for the cell molecular course, and Cognitive Science was responsible for the cog sci class. And we had these three one semester courses which were the core and then you had to take upper level classes which started out just being existing classes, and then you had to do research. That was the other thing, you had to do independent research, and this is where we could only do that because we had the medical school, we didn't have enough labs. But you know it was interesting when we set the majors like we're throwing a party, is anyone going to come, we just wondered. And then it just took off, and we were supposed to have rotating chair of the program committee. And the program committee ran it, and it rotated around until it hit me and then no one, and I got stuck there for a decade, over that. And then you know, we had various crises in the major, it was very fragile, we had to go see the dean. And then through a combination of making new faculty hires in some departments and hiring a couple teaching faculty we kind of stabilized it.

BL: What size is it now, roughly?

GB: About, two hundred, three hundred majors, I think, sophomores, juniors, seniors.

BL: I mean it's right up there with Public Health, it may have surpassed Biology, I'm not sure.

GB: Well, you know, the tricky thing with Biology, when you look at the numbers, Biology split themselves, and to be fair to them, they have a Cell Molecular, as well as a Biology major, when you put those two together, they're up there with them. But if you do them separately they're not. They deserve, they still

run a very big major, yeah, and then IR of course, is the big one, natural sciences, you know.

BL: For medical students especially, pre-medical students, the Neuroscience and the Public Health have changed the landscape enormously.

GB: They have. They've given a lot more, and it's been good. You know, Kelly Gebo, when she started the Public Health Major, she came to us, and said, we're starting this major and I laid out all these things we were doing and she said this major, she had been looking at the departmental major, this gives me a lot of ideas, this, and so we did a lot, I mean she's terrific and I don't want to take the claim for it, but she will tell you she benefitted. She sat down with me and I went through everything we did and, like, we ran the clubhouse, I said because we were not in a department, we were worried about the students having community, and I talked about the socials we ran, and all that kind of stuff. And that was one, ironically, why those two majors are popular, because we didn't have a department behind it, we were worried that we wouldn't treat the students right, so we did something which wasn't typical at Hopkins, we were very intentional about having social events for the students outside, which many of the majors, you know, sink or swim. And now they've sort of, after we set up the DUSs and everything, there's been this kind of feedback, you know, why don't you start thinking about best practices and helping your majors and that kind of thing. But we pioneered those things. And so yeah, it just, I remember for a while, the major, I had a cardboard box under my office, that was the administration, then they hired us a part time... The dean's office actually recognized, they said, you're not running the major yet, I said, no I'm trying to get tenure, so they said what we're going to do is get you an administrator, I said, oh, that's a good idea!

BL: Now I remember, I think I'm recalling this correctly, the name of the department now is Psychological and Brain Sciences, and I think you told me once was that actually was what it had always been but the name finally recognized what it was.

GB: Correct.

BL: And I want, would like you to comment on that.

GB: Right, okay, so it's good to recognize, when did the word psychology emerge. And it emerged in the late nineteenth century and it emerged before there was any clinical psychologists or anything like that and it emerged out of this Vundt tradition that we were talking about. They were trying to quantify, so what is the etymology, you know this Greek word psuché, it means life's breath, kind of spirit, or that kind of stuff, and you know logos, the discourse of, and what it meant was the kind of study of something which they couldn't put a physical number on. It was, basically, it was an emergent property of

your nervous system. And they wanted to quantify that and study it in an experimentally rigorous fashion. That's where the word psychology came from. Now what happened in the United States was the rise of clinical psychology where the techniques and the use and the study of behavior led to a notion that you could practically help people with behavioral problems in a way different from psychiatrists. And then the Boulder model developed, which you may be familiar with, there was a conference in Boulder, CO, where they said the clinical psychologist is going to do a research-based PhD and then do an internship, so they're going to be strictly trained in the science of psychology and so they can apply that to clinical applications. And that, because of the way medicine controlled psychiatrists and the need for mental health professionals the, and also the pricing structure, there's a whole complex sociology there, the interest in people with this training, given the need just grew and grew and grew. And so what happened is that by the time I got my PhD, I started graduate school in the '70s. If you, in those days you still got the American Psychological Association was still a big phonebook size directory, it's all online now, of course. But what happened was that they have all these divisions, division one, two, three, you know. Division three is experimental psychology, right? Division six was the one I'm in which is comparative psychology and neuroscience. And then they have division twenty-five, psychology of gender differences, and they have division thirty-seven, like you know they have all things like this. Those classic divisions of experimental science are now, if you look at the phone book, are two little thin things like this. And then then clinical and all that is this enormous... So the modal psychologists, if you meet someone and they say I'm a psychologist, the highest probability is that they're going to be someone like that. And so, people just said, when you hear psychologist, that's what you think of. And when you go to Psychology section of the bookstore and it's self-help and thinking about yourself and personality and all that. Now what happened to us, is people started making assumptions on what we had in the departments. I told you one young woman who we rejected for the PhD program, we told her not to apply for it, she applied for it, she said she wanted to go to clinical psychology, we said we're not it, she threatened to sue us! And we said we don't do that, we don't have anyone, we can't train you, if we accepted you it'd be under false pretenses! And so, that was why the department name changed, and again it was to reflect that we're still doing this kind of tradition of experimental psychology and not, and making no judgment on the applied, the judgment is it's been a good thing. But nonetheless, yeah.

BL: Two last questions, one because I can't resist because he's the most famous person ever in that department, John B. Watson -

GB: Correct.

BL: - and where he fits into this trajectory, is there a line that runs through this?

GB: Yes, great question. So Watson, you know he studied behavior and he actually started studying, his training, his trajectory, I studied watching birds in the field and trying to understand, and then trying to experiment and analyze, and you know that's how he started. He went to the Dry Tortugas and his first paper is on the noddy terns in the Dry Tortugas down there, and so where he fits into the tradition, and the training he got was at Chicago. And there's always a lot of similarities between us and Chicago, and I believe his PhD was from Chicago.

BL: Yes.

GB: And then he was hired here, and I think the reason why they hired him is he said he was an extreme experimentalist, you do experiments to understand the causes of behavior and he had no time for intervening variables that couldn't be defined. And that was radical behaviorism, it went too far because it assumed that the nervous system was just this complex black, you could not study the nervous system in a scientific way related to behavior, nope. Now, they're wrong, it's not easy, but part of it, you couldn't blame them, they just didn't have the methods. Now if you read, what we knew about the brain then yeah.

BL: This is 1915.

GB: Yeah, exactly! So that's how he fit it. He was empirical, he was experimental, and I think that's why they hired him, that's why it made sense, and it was in that learning tradition. And that became one of the traditions of the department, you know, Stew Hulse was basically hired in that tradition. So, god I remember Stew telling me how he was hired, they just did things so differently. He was finishing his PhD at Brown in the '50s and the chair of the department was Tex Garner, I guess. And they said, ah we need someone in this area, so he gets on the phone and starts calling his buddies up the east coast. You got anyone in this area this year? And next year, he calls Brown, and they say yeah, he's just going to finish. Send him down! And so the chair at Brown comes to see Stew and says take the train down to Hopkins on Monday, comes down there and Garner talks to him, and says okay, you can start in the fall. No talk, no nothing.

BL: You know, that tradition lasted a long time, my appointment was made over the phone on the say-so of Al Chandler at our department.

GB: Is that right?

BL: He called me up, and that was 1980. There was no job interview or anything else.

GB: Really?

BL: Down you came, it was the old boy network of the old school.

GB: Isn't that interesting, you didn't send your first book down or anything like that?

BL: I showed up, I had the job, I was already here, there was no...

GB: Yeah, Stu talked about it. He said yeah, the secretary would bring my mail to my desk.

BL: Your who? Your what?

GB: And we all went to lunch together at the club every day.

BL: Howard still does.

GB: Yep, he does.

BL: I still see him there, he may be the longest serving member of the department, he came on the job in '65.

GB: Yeah, he came in the '60s. We were just laughing, we were talking about students of some of the younger faculty, and I said yeah, I started to feel old because a couple of my students are now full professors. And I said, you know wow, but I said Howard trumps me, I said a couple of his students, I remember he came up to me, he said, I don't know what to do, one of my students is retired. And the junior faculty says what! Howard says, I have two retired now! I trained them, they had a full career, they became professor and they retired.

BL: That's also an old tradition, because, of course we had 70 as the retirement age for a long time, but people stayed on. Last question, which is, when I looked at the website of the department, it's still pretty small, you know depending on how you count it, it's a dozen or so, new appointment.

GB: Yeah, it is.

BL: Is it possible to be competitive with a department of a dozen against peers with many times that?

GB: It's a challenge, so a couple of observations about that. One, in favor of it being there is, a guy from UCLA came out to give a talk about four or five years ago and he's more senior than I am, he says when I was a young faculty member I came out here, one of my earliest talks was at Hopkins, it was so

exciting. I came here and you guys had a very exciting biopsych group and it was Elliot and Olton and all that. And he says I haven't been here now in twenty years or something, he says, you know what, you guys have a very exciting biopsych group. He says it's been completely transformed, you have a new set of people, he had met everyone, he says it's a terrific group, I didn't know all of you before I came here and so in that sense, yeah, you can do it. But in another sense, the other thing to keep in mind that saves us is that the areas that we stressed are areas that we can benefit from the rest of the community. So when people think about the Brain and Behavioral Sciences, at Hopkins, our department, they know that Barbara Landau and Mike McCloskey is right across the door and street in Cog Sci. They know that if you're interested in doing visual perception the student will come here and work with Howard Egeth in [inaudible 52:18] but can also talk to Ed Connor, who's no... And they know that if you're doing behavioral neuroscience, there's all these molecular neuroscientists at the School of Medicine. So, we, in our selective excellence, we did the selective excellence in a way that connects with other departments. So we just hired a new colleague, Shreesh Mysore, and he already got one of these Science of Learning grants with two colleagues in the medical school. Now, having said that, the department is strained, has been strained, and one of the biggest frustrations in my time in the dean's office is that even with the investment of tremendous resources, we keep running into problems and roadblocks. We can't get the size up. You know, like Mike Yassa decides to leave for personal reasons, he was one of our young cognitive psychologists coming up. We've hired new, Amy Shelton, denied tenure, I could have strangled the council, you know, she was going to be the next department chair, and she had a tremendous, she was a tremendous citizen in teaching and everything. She gets denied tenure. So we continue to have this kind of two steps forward, one step backwards, and now, well frankly, I'm leaving. This is a big deal, not to overshoot myself, but... And you know part of it, I've already been a strain on them because I've been so much in the dean's office. That's been an issue.

BL: Now if I were looking, last question, but if I'm looking for somebody who's going to, as I mentioned, one of the titles that they used to give was Professor of Experimental Psychology. It was always about experiment, they stress in the laboratory. If I were to look for the person in the department that exemplifies that tradition now, who would I, who would you suggest?

GB: Jon Flombaum, he's the young guy, Assistant Professor, came from Yale, he's an extremely clever. He is doing experiments on human perception. He does not do fMRI, but he is using clever experimental approaches to making unique inferences. He did his PhD at Yale, brilliant guy, Harvard, Yale, didn't do a postdoc, and maybe he should have, just in terms of, but it's just very interesting to see how we have this relatively new PhD, and you can just draw the line through. He's doing, Vundt could understand what he's doing and would go wow, that's really cool. He has a whole new, you know, he's using

computers, but Vundt would get computers completely, he would have loved, he would have been salivating over the idea, you know. How he presents the stimuli and can set them up and all that kind of thing. He follows in that tradition because, and we had a big discussion about this, you know one of the things I should mention in the department if you still have time is one of the biggest changes that occurred is when I arrived, the only people who talked about the brain were the people studying animals. The cognitive people were still drawing boxes with arrows, the sentry register, and here's the short term memory, and we have this. And, but they couldn't map that onto the brain. And then people recognized that the cognitive neuroscience revolution was happening with the imaging and we hired Susan Courtney, who had, she trained in Physics, she's the current chair, her PhD is in Physics and she did a postdoc at some of the big labs in NIH, that first did this FMRI. And she came, they set up the Kirby Center and then Steve Yantis completely retooled and became a cognitive neuroscientist. And then we hired some other cognitive neuroscientists, including one of our own, Mike Yassa, who grew up here as an undergraduate, he was one of our first neuroscience majors, and did that. And so now, at the seminars, everybody talks about the brain, you know everyone, they're doing the imaging, it's just really integrated. And Michela Gallagher, when she was chair, she moved, we had a problem with upstairs, downstairs, all the biopsych people were downstairs in the labs, and all the cognitive people were upstairs. She said nope, all the faculty are going to be on the same floor. And it meant we had to walk down to our labs, but she said I want the faculty on the same floor, this bullshit has to end. And it did, and so then she started the memory seminar, which had half the people studying humans, half the people studying animals, and then it's just been off to the races since then. Now Shreesh Mysore, who we just hired, he studies animals, he studies attention in animals, he's going to the vision seminar with all those human cognitive people. So the model system was too much of an impediment to intellectual exchange when I arrived, and that's gone now, that's gone now because the methods have improved.

BL: Does that mean eventually or in the near term, maybe cognitive science and psychological and brain sciences come back together?

GB: That's an interesting question, you know every dean has asked me why we have this configuration of three, and you know, if you just stand at thirty thousand feet, you say the most efficient thing would be to merge them into one large department. And my answer to that question is, is that they have evolved niches that involve really careful thought of selective excellence that if you have a general homogenized department, would go away. When I did the Academic Council review of Cognitive Science Department, where I finally said, I'm ready to defend that department being separate. Because I went in, you know when, you did those on council, right? You really get into the guts, I mean, I knew about the department but when I talked to all the graduate students, so you know in the NRC rankings they were rated the

number 1 linguistic department in the country, so how did that happen? Linguistics is a field that was in big trouble. People couldn't decide what it did or where it was going, it was dying, and the way for linguistics to survive was to hire someone from Hopkins. Why? We were training kids who got theoretical linguistics from Burzio and Smolenski and Legendre, where they could sit and talk to the linguists about all their crazy, sort of morphed, da, da, da, duh, dum... People in my department hate all this theoretical crap, you know we have Occam's Razor, get rid of it, get rid of it. But, they also are learning from Brenda and Mike and Barbara, empirical, driven, hardcore, experimental research in a cognitive science tradition. And so you hire that person, all of a sudden, the departmental neuroscience program says hey! That person in linguistics, we want them on our training grant, hey, we want them over here! The linguistics department where there are dusty books with word glyphs from different cultures, all of a sudden they're hiring someone that the dean goes, oh my god, you know, he's on the NIH grant, how did that happen? And these kids, because these kids, they set up that particular niche training, these kids, their placement record across institutions in the country is phenomenal. I just did not realize until I really got into the weeds how good it was. And it is true that if they hadn't set up a separate department that particular configuration training probably would not have happened. Because other people have said, well, we can do that that, but we're going to dilute it, you know, you move towards a mean. And so that's the case, now the case, there's also a case against. And actually just speaking confidentially, I think some of the concern among my colleagues with me leaving is that there's not going to be someone right in the dean's office who can articulate so, who knows the detail, articulate why the model works, so they're nervous that a new dean will come in...

BL: My little department has every review is why aren't you part of history, same thing. But there's a good argument, which you make, which is in organization theory, decentralized yields innovation, centralized yields efficiency. And for departments, innovation is what we look for, not efficiency.

GB: I think it's perfectly justified to ask you guys that question, but I think you guys can answer. Right, and we'll see, I mean, I think there is, it will be interesting to see how it evolves, what a new dean will want to do and, you know we have some, we will have a [inaudible 101:18] on the horizon, as you know.

BL: No, but let us end the interview here.