"My PhD Shaped the Way I Think and Solve Problems"

Joshua Henk Balsters

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Abstract In our interview with Joshua Balsters, he shares his journey from studying the cerebellum to leading neuroscience research for a market research company. Initially planning an academic career, Joshua realised his interests were more applied and aimed to have tangible impact. He values seeing his work influence real-world products and the faster project timelines. Joshua continues leveraging skills in experiment design, analysis, and communication honed during his PhD. Though sometimes constrained by business priorities, he cares about his consultancy role. Joshua encourages informational interviews to understand industry careers. He notes similarities in freedoms and obstacles between academia and industry. Joshua advises focusing on transferable abilities from PhD training beyond specific research areas.

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Chris: Can you introduce yourself and tell me a bit about your current position?

Josh: I'm Dr. Joshua Balsters and I'm Neuroscience Director for NIQ. To explain what I do, I want to start with this quote I really love. It's from a famous marketer named David Ogilvy:

> *Consumers don't think how they feel. They don't say what they think and they don't do what they say.*

I love this quote because it also applies to a lot of psychology and neuroscience. The key point here is that explicit market research (i.e. asking people what they think) isn't entirely reliable. Not only do consumers consciously lie but in some cases they're not even aware of what they feel or how to articulate it. The latter fits with the current boom in research on alexithymia and interception, but it's worth noting that David Ogilvy pointed this out in the 1970s. This idea has been around for a long time.

How does this relate to what I do? Companies are growing more aware of the issues surrounding traditional market research. If they're about to spend hundreds of thousands of dollars on a new product, ad campaign, or pack redesign, then they want to know what people really think about it. This means embracing new methods and working with people trained in studying human behaviour using the scientific method rather than marketers that usually come from business and economics. Hence, there are a growing number of positions for scientists to apply their skills in a commercial context. I use a combination of psychology and neuroscience techniques to get both implicit and explicit responses to ads, packaging, branding, and positioning, and in doing so I can more reliably tell companies what people think and feel about their products.

What was the focus of your PhD?

My PhD was pretty far removed from where I am now. I was Prof Ramnani's first PhD student at Royal Holloway University of London (2005–2009). My thesis was called "Cerebellar Contributions to Cognition: Anatomy and Function". Even now, the cerebellum is still considered to be a motor control structure. This is despite the mountain of studies – both fMRI and electrophysiology/lesion studies – that suggest otherwise. Countless anatomical studies have shown that the cerebellum is connected to the prefrontal cortex, and therefore the cerebellum must also process non-motor signals from the prefrontal cortex. My PhD showed that the parts of the cerebellum connected to the prefrontal cortex have grown more rapidly in humans compared to nonhuman primates using structural MRI. Plus, using fMRI, I showed in four separate studies that the cerebellum has an important role in accessing and automating cognitive processes. What I loved about my thesis (and most of the work I published) was the reproducibility of the findings. I really believe in this work because it was based on strong neuroanatomical principles and that meant I got the same results again and again.

As you were finishing your PhD, what were you thinking about your career plans?

I loved my PhD and I still love coming up with experiments and analysing data. But at the end of my PhD I realised two things: (1) the limitations in fMRI as a method (the questions I had about cerebellar function required another brain imaging method like simultaneous EEG or electrophysiology) and (2) I wanted my work to be more applied and hopefully contribute to clinical or real-world settings. That's why my first postdoc position at GlaxoSmithKline (GSK) was perfect as I got to learn about simultaneous EEG/fMRI plus I got to use it for biomarker development in aging and pharmaceutical research. But like all my career plans things changed with each experience.

I recently heard the expression "career sleepwalking". I think this is the case for so many academics because they think there's only 1 career path, i.e. PhD, Postdoc, Lecturer, and Prof. I had a lightbulb moment when I saw senior lecturers leaving academia for jobs in tech companies and charities. I just never thought of it as an option, especially as a lecturer when I was quite deep into the academic system. This broke me out of my sleep walking and got me to actively think about what I wanted to do.

About a year into my lectureship I knew I wasn't happy and decided to do a self-audit: What did I like about my job and what would I give up. I knew I hated marking and would give it up if I could. I loved talking about science (public speaking) and coming up with experiments to solve problems. So I started looking for jobs like this. There are so many opportunities for scientists in commercial settings,

whether it's data scientists or user experience (UX) researchers. It's fun taking science outside of the lab and seeing what holds in the "real world". You have to accept that you can't build perfect experiments and things are less controlled then you might like, but I've already seen so much replication and so many examples of quite dry psychological theories employed to explain marketing findings. I'm confident that you can do good science in an applied setting.

Do you have any advice on how students can find what type of jobs match with the parts they like about academia?

I'm hoping that psychology departments will update what they teach about careers to include careers in growing fields like data science, user experience (UX) and user design, behavioural science, and public policy. For PhD students, there are great opportunities to do internships with companies that will show them how to apply their skills. You can also do internships in government to see how science informs policy. These are great opportunities because most PhD students are still figuring out what they do and don't like. Having this practical experience adds another level to their development so when they're submitting their thesis they know about all the options rather than having to take a risk in a difficult job market. It does get more difficult for postdocs and above, but it's not impossible. Academic staff are going to see more and more of their colleagues leaving for industry or charity positions. Try to keep in contact with them (I recommend LinkedIn) and after 6 months get back in touch. You'll get an honest appraisal of what they're up to and how they use their PhD skills throughout the job. Academics are moving into a range of different careers so just stay in touch with people and compare notes down the line. This can also help you get an industry job as having an industry champion is a great way to prove that you're serious and suitable for a job in industry. The longer you're in academia, the harder it is to prove to businesses that you can adapt to their way of thinking. Having someone on the inside really helps getting shortlisted!

Where did you end up working for your first industry job and what did you do there?

My first industry job was my first postdoc with GSK. Although I worked for GSK, I was seconded to Trinity College Dublin so it felt more like a traditional postdoc position. The project was huge and involved lots of people working on the same problem from different angles. There was a molecular group and an animal behaviour group, and I was in the human clinical group. I was part of a team of around 20 people (not including the medical staff at the hospital) working on different projects but with the same end goal – to develop early markers of cognitive decline in aging. My job was to get simultaneous EEG/fMRI working. We ran lots of experiments

and collected datasets from young and older people looking at attention, working memory, resting state, emotion processing, and the effects of medication. Compared to a PhD where the work is very much your own, this was much more of a team effort and we had lots of meetings with GSK scientists and statisticians.

Looking back on it now, some of the practices from GSK were ahead of their time. Back in 2008 (before Open Science was as prominent), I was learning about pre-registration for clinical trials with clear action standards/endpoints. So even though we were running lots of experiments, we were writing down specific hypotheses of what we expected to see. At the same time, we had GSK statisticians telling us about the dangers of p-values (they only cared about effect sizes). Companies seemed to be a bit ahead of academia on these issues.

That sounds great that you were trained in more rigorous research methods here! Were there any other practices that they had that you think academia should also adopt?

I think academia has really caught up thanks to things like the open science movement. One of the things we do at NIQ that I love is having an independent data processing team. I'm the one who designs the study and I know what the client wants to see. No matter how hard I try, and even taking into account current open science practises on data analysis, I might influence the results if I was working with the data. To avoid this, we have a separate data analysis team who don't know anything about the project and just send us back the results. I have no influence on how the data is analysed or who is included in the final dataset. I wonder if such a model would work in academia as there are people I know that love working with data but don't necessarily care about a topic or writing up the results. Similarly, there are professors that would be very happy to never see raw data again.

Why did you leave this GSK position and where did you go next?

So the danger of working in industry is job security. In the case of GSK, we knew for quite some time that they were planning to stop the project. This was partly because of the results but also larger corporate restructuring that saw a change in priorities. The academics were all fine as they were already in tenured positions or managed to get lectureships, fellowships, and positions in other institutes. I saw a lot of loyal GSK staff being let go. Offices were closed. It was my first experience of the brutal side of business.

After Trinity College Dublin, I got offered a postdoc position at the ETH in Zürich. It was a great example of "who you know not what you know". Trinity College Dublin was hiring a new head of MRI and I was giving the candidates lab

tours. I got on really well with one candidate (Prof Wenderoth) and mentioned I was going to be out of contract soon so I would be looking for postdoc positions. In the end, Prof Wenderoth accepted a position in Switzerland rather than Dublin, but she reached out and offered me a job in Zürich setting up her new lab. During my time at Trinity College Dublin, I worked a lot on methods and was quite proficient with MRI, EEG, Eye Tracking, and putting them all together. I'd learned firsthand what did and didn't work in the labs and used this experience to advise what to buy, how to set it up, and also to supervise student projects. In return I had the freedom to explore topics that caught my interest. At that time, it was decision-making/neuro-economic approaches to understanding Autism Spectrum Conditions.

Can you tell us a bit about what day-to-day life is like in your current position?

The pandemic changed the way lots of jobs operate. Academics have always done work from home to some extent, but now industry has followed suit. Prior to the pandemic, I would have been in the London office 2–3 days a week and done a lot more travelling to see clients face to face. Now it's work from home and almost all my interactions are video calls. I'm part of a global team which means my hours tend to shift depending on whether I'm on Asian, European, or American projects. I always enjoyed flexible working in academia so this suits me really well and my boss is very supportive and makes sure I don't end up working all these time zones at once. One of the reasons I left academia was the expectation that you work outside your hours on your research, so I really appreciate my boss looking out for me like this. Most people I've spoken to that left academia say that they have a better work-life balance in industry.

When I was thinking of leaving academia I thought "what are the parts of my job I really like". It was designing experiments and giving talks. In that sense, my job now is quite similar to what I did in academia. Most of my time is spent explaining what we do, working with clients to design a study, looking through data, or reporting results back to clients. The work is really varied and the timelines are really quick (projects are typically wrapped up in 2 months). This speed suits me really well as I tend to get bored of academic projects after ~2 years. I also get to see my work in the real world when I go to the shops or turn on TV, which is really rewarding. I still get to lecture at universities and other events, only now it's about consumer neuroscience. I always loved lecturing (it's the marking I hated!) so it's nice to still stand up and speak from time to time.

What do you like most about your work?

I like seeing my work out in the world. Academics talk a lot about impact, but it's very rare to see the direct impact of your work in the real world. I know I'm not curing diseases, but I still get a kick out of seeing a product on the shelves I helped to design, or an ad on TV I helped optimise.

The speed of projects suits me so much better than academia. It typically takes years just to win funding, and then there's hiring, training etc. It's years before you get to see if your hypotheses were correct. By that time, I'm usually over it. In my new job, the timeline is typically 2 months so I'm still excited about the project when I'm wrapping everything up. I think it's very common in academia to see lab leaders getting excited about new projects before they've finished their current ones, which can sometimes mean PhD students and postdocs get put on the back burner.

I realised in my last job that I like psychology but I'm a neuroscientist at heart. I missed brains! At the end of my academic career, I was doing less and less brain imaging because I don't think it's going to help develop practical clinical tools. In my opinion, computer-based behavioural tools are going to help with diagnostics and assessing patient outcomes, not brain imaging. I'd abandoned brains because they weren't the answer to improving clinical outcomes, but strangely enough, brains are the best way to answer business questions about how consumers feel. My current job actually requires neuroscience because people struggle to explain what they might be feeling. It also requires that I have a broad understanding of neuroscience. I have to know about perception, attention, memory, and decision-making so I can talk to clients about any questions they might have. Academia tends to force you to be an expert in a very specific area, but I was a jack of all trades and preferred to know a little about a lot of projects.

And what do you like least about your work?

I don't like that the field (consumer insights) is full of snake oil. I was very happy to join NIQ because I saw the science and feel confident in our data quality. I can't say the same about a lot of our competitors who are selling tools based on bad science. There's a lot of BS out there (and I don't mean behavioural science). There are some big name academics that have built a platform on ideas that just aren't true, and it's so difficult to change the mindsets of people when these ideas are seen as foundational by marketers. More annoyingly, some clients acknowledge that a competitor is not as good as us but still go with them because they're cheaper and faster than us. That's sometimes difficult to swallow.

Working in applied science means that you can't be as controlled as you would be in the lab and you have to accept that. Sometimes the perfect answer to a client's question would cost half a million dollars and take us 6 months which just isn't realistic. So I have to propose a smaller scale study with fewer cells that's still ok

but isn't exactly right. The ideal solution sometimes isn't feasible so we have to offer something different in order to make the project sellable. Also, we sometimes can't do projects because of a business/client conflict even though it would be a fascinating and important project for consumers. At the end of the day, it's a business and sometimes we have to put that before the science.

How do you think having a PhD has helped you succeed in your current position?

You often think that the most important thing you learn in a PhD is your topic area (i.e. becoming a cerebellar or brain imaging expert), but actually there are so many transferable skills you pick up to do with presentation and writing skills. These skills are crucial to every job I've had, especially presentation skills that you develop by giving posters and talks. Being able to craft a clear story about complex data is what I do every day and I love it.

I'd go so far as to say that my PhD shaped the way I think and solve problems. Regardless of the topic you go on to study for your PhD, you're really developing problem-solving skills. You're learning how to pose clear questions and answer them in the best way possible. Writing papers taught me to think about story structure. How to make sure that someone coming to my work with fresh eyes understood how I did it and why it mattered.

If someone currently finishing their PhD was considering a position similar to yours, how might they decide if it would be a good it?

I think the best thing to do is to talk to someone in the behavioural science field. They'll give you an insight into what the job is really like. It's also helpful to decide what parts of academia you find most interesting. For me that was designing experiments and giving presentations. If you don't like public speaking, then this type of work isn't for you.

The other crucial thing in this line of work is that you're a consultant, you work for the client. This means you have to focus on what the client wants, and that's sometimes different to what you might be interested in or what you think is best. Academics are typically very independent and autonomous, creating their own research tracks and focusing on what interests them. Academics can sometimes struggle to get out of that mindset and focus on someone else's question instead of their own. You also won't be able to dig into problems as deeply as you might like so be prepared to leave projects with questions unanswered.

If someone was interested in pursuing a similar career path, what would you suggest they do to better prepare themselves?

When I started, I wanted to do a deep dive into marketing and business. I think most academics will have that mentality of researching and studying up on a new topic to get good at it. However, all the people on my team told me that I wasn't hired to talk about marketing and business, but I was hired to be a scientist and to provide expertise in psychology and neuroscience. So don't worry too much about getting up to speed on these other areas, it's better to refresh yourself on other aspects of psychology that you're less familiar with. I spend a lot of time talking about attention and the visual system so I had to refresh myself on these areas.

I'd also start reading up on behavioural science so you've got the basics under your belt. Marketers will talk about concepts like System 1 and System 2, which comes from Kahneman's *Thinking Fast and Slow*. The basic idea has been around in psychology for decades – a fast automatic system and slow controlled process system (see Schneider & Schifferin 1977 for example). There are lots of online resources to get you up to speed on behavioural science, and it will largely make sense to someone with a psychology/neuroscience background (different names for ideas you're probably already familiar with). This will also start to give you insights into how academic theory moves into practice and application.

A lot of people like academia because they feel it gives them an opportunity to work on a topic that they deeply care about. Do you think this is also true in your current position?

As I often say to my clients, it depends! Working as a consultant means you don't have control of what you study but that doesn't necessarily mean you won't care deeply about what you're doing. All of my clients and colleagues care about their work, whether it's advertising or pack design (you'd be surprised how excited people can get about supermarket shelves!). We've just had the Super Bowl, which is an important time for advertising as lots of companies spend a lot of money creating content just for this event. The next day we talked more about the ads than the game! We're also able to talk about really important issues such as the role of advertising in promoting positive values. My boss (Dr Temple) gives an amazing talk on effective prosocial messaging in advertising. So even though you may not be able to pursue exactly what you want, I believe you can still deeply care about what you're doing.

Another reason many like academia is that they feel it provides them with more freedom than they think they would get in other positions. How much freedom do you feel you have to work on what you think is interesting?

I actually think there are similar levels of freedom but for different reasons. In academia, I had the freedom to study whatever I wanted, but I didn't always have the resources to do so. Equipment or time on equipment, participant costs, and journal fees, all these things cost money; hence, we apply for grants. But grants have priority areas, so academics often have to adapt their ideas to match the criteria of the funding agency. While academics have the freedom to study whatever they want, in reality there are practical obstacles that can limit that freedom. Where I am now I have access to resources but I'm constrained by the client and what they want to do. I can propose what I think is the perfect research plan to answer their question, but if it's going to take too long or too much budget, then I have to scale back. Sometimes we get to explore areas of interest through R&D. Similar to what I said about grants, our R&D questions have to tie into priority areas for the business. I think there's actually greater similarity than people might think. Constraints on funding mean that academia isn't as free as it used to be.

Based on your journey, what advice or suggestions do you want to pass on to someone who's currently finishing their PhD?

First, well done! A PhD is not easy so you've already achieved a lot by completing your thesis. My main message is that you're not on a set path, you have options. Every PhD has ups and downs, but for some people the PhD process may not have been a good one. You shouldn't feel that because you've started down the academic road, that's where you have to continue. Even worse, some people feel guilty about leaving academia. That they'll be seen as a failure for leaving academia or they're letting down their supervisor. These stigmas are horrible and not true. The greatest strength of your PhD isn't your knowledge of a very specific topic area, it's your ability to ask and test questions, work with data, and create a narrative to explain to people what you did and what it means.

Is there anything else you'd like to tell someone reading this interview?

I hope I haven't come across as anti-academia. I loved academia and I wouldn't be where I am now without it. I got to travel the world and make amazing life-long friends, and I'm very proud of the work I did. Academia shaped me as a person and I'm grateful for that. However, I don't think academia is right for everyone. It wasn't for me and I'm ok with that. I don't want academics to feel ashamed about leaving academia. Academics shouldn't feel like they're sell-outs or greedy because they want to be paid more for their time. You haven't failed or disappointed anyone if you choose to leave academia. Commercial work can be just as rewarding as academic work. Hopefully you'll still be able to travel the world, make amazing life-long friends, and do work that you're proud of.

Thank you for sharing your journey with us, Joshua!