

Talking with Dr. van den Heuvel: Part I

With psychophysiological tools in hand, scientists are charting new territory in our understanding of the brain during its most rapid period of transformation – from conception to adolescence. Meet Dr. Marion van den Heuvel, Assistant Professor at Tilburg University, one scientist who is making waves in the world of developmental neuroscience. Her path into this new and exciting field provides lessons to both young and seasoned scientists about how to navigate this area in a time of immense technological and social change and emphasizes the importance of leveraging the internet to better scientific communication and training. Associate Web Editors Aislinn Sandre and Kaylin Hill had the pleasure of sitting down with Dr. van den Heuvel to talk about her scientific career, the research coming out of her lab, and how she shares her expertise and research to broader audiences through her Youtube channel.

Aislinn: Could you walk us through the journey of how you became an assistant professor?

Dr. van den Heuvel: It's not a straightforward path. I guess it began after finishing high school. I was really interested in a lot of things and didn't know what topic I wanted to study in university. I picked something really broad -- a health sciences program at Maastricht University, in the Netherlands. It was there where I got into research, and worked on my first research project that examined children's social competence. This project immediately had me hooked. I had a moment where I realized, 'huh, research is cool!'. After that, I decided to do a research masters. While I was doing my masters, I got in contact with Bea van den Bergh – who became my promotor. She was doing research on babies and focusing on the neuro aspect and stress during pregnancy – it was really the clinical aspect that I liked. I ended up doing this type of research for my PhD, and years later, I am still in the same field! After my PhD, I wanted to stay in academia and the best way to do that is to get a really cool, fancy post-doc. I looked for a post-doc everywhere. In the end, I got a tip that the best thing to do is to be bold. I had a talk at the Society for Research in Child Development (SRCD), which is a big conference where like five thousand people attend. Someone had told me that my final slide in my presentation should say something like, 'I am looking for a post-doc'. That's what worked for me. People came to talk to me about post-doc opportunities, including Mariah Thompson, who eventually became my post-doc supervisor. During this time, I worked partly at Wayne State University and partly in the neonatology research branch of the NIH. At the time, I had done a lot of work with EEG and during my time in Detroit, I had the opportunity to learn about fetal functional magnetic resonance imaging (fMRI).

Then I began looking for an assistant professor job (tenure track), which are really hard to come by. Someone told me that Tilburg University in the Netherlands, where I did my PhD, was looking to hire someone. It was really coincidental because at the time when I was in the Netherlands, they were looking to hire someone in Developmental Neuroscience with electroencephalogram (EEG) experience – it sounded like the perfect fit for me. I interviewed, and in the end, I was hired. It was really nice to be back in the Netherlands, and I hope to stay here for a long time because I really like it.

Aislinn: It sounds like you've had a combination of luck, and opportunities that you paved along the way on your own by being, as you said, bold.

Dr. van den Heuvel: Yes -- you've got to put yourself out there.

Aislinn: Could you describe the kinds of research you conduct in your lab and the methods that you commonly use?

Dr. van den Heuvel: My research line is with babies, and young children. I have a cohort that I inherited from my promotor that I worked with during my PhD. The children in my cohort are eight years old now. I published on that cohort when the kids were two months old, four months old, nine months old, and four years old. Following this group of children has led to a lot of ideas. For example, I am now really interested in collecting baby teeth from this cohort. You can get a lot of information about prenatal exposures from baby teeth. So, I will be collecting these children's teeth and look at prenatal exposures like lead and other heavy metals, and how these things affect neurodevelopmental outcomes.

My work really follows two research lines. One line of research examines how the brain develops in typical conditions. It takes a more general, developmental cognitive neuroscience approach. The second research line examines early adversity, and mostly prenatal adversity, and how it affects the brain of the fetus and baby. A new method that we're also going to start working with is hyper-scanning. In hyper-scanning, you have two EEG systems that are linked, which allows you to measure EEG in mom and baby at the same time, and then compute neural synchrony. I am interested in examining neural synchrony between mom's and their babies, and how this synchrony may differ depending on whether the mom is anxious or not.

Aislinn: It sounds like your lab is using a number of interesting methods and technologies. I've never heard about teeth being used to examine prenatal exposures – that so cool! How did you become specifically interested in your line of research and working with young populations?

Dr. van den Heuvel: Well it really clicked when I met my promoter and mentor. I was already very interested in developmental science at the time, and whenever I would pick a research topic, it always gravitated towards the children and babies. I think it was a longstanding interest that grew, especially after my promotor introduced me to the topic. Additionally, this research area can allow you to study everything. I was always interested in psychology, biology, and medicine, and with this topic, all these fields come together. I can study teeth if I want to! Or look at cortisol in breast milk. So, this area allows me the space to exercise all my interests. That is what I really like about it. I can learn all these new techniques, which allows me to collaborate really easily.

Aislinn: Were there any surprises when you started in this type of research or anything that surprised you about this field?

Dr. van den Heuvel: Yes – it was surprising how many women there were in the field, which was a very pleasant surprise. Although it is changing, in the EEG world, there are a lot of men, and male professors. I don't have a problem with this, but I do notice that there are a lot of girls that are afraid of neuroscience. They think, 'oh my god, all the programming... I can't do that, it's too technical'. But programming isn't that scary!

Aislinn: I agree – the field is changing. I think things will look different in the next couple years. There are more women in the field now.

Dr. van den Heuvel: Yeah. I think so too. But for some reason, the women don't end up in the next level. I think we lose a lot of female researchers in the post-doc phase because it involves moving. And there are a lot of people who are like, 'I don't want to move', or they can't move, or their partner does not want to move. So, I think, you lose a lot of women in the post-doc phase. Then, in the next professor phase, you usually have to move again – it's pretty unusual to get a tenure track at the same place where you did your post-doc.

Aislinn: It is a career that involves a lot of moving, which I guess can be both good and bad.

Dr. van den Heuvel: Yes – there is good. When I moved to do my post-doc, I realized how much I liked EEG. That experience was definitely an eye-opener. I especially like it because it is so non-invasive for babies. We've used fMRI studies with babies as well. But I don't know what I would do if I was a mom in that situation– I'm not sure if I would put my baby in the scanner. It is so noisy. When we did these studies, sometimes that babies would wake up while they were in the scanner, and they would cry, and it would be a sad cry. I worked with so many babies I can recognize cries, and this was definitely a sad cry. Anyways, there are more and more advances with EEG that are so exciting. But as a technology, I think it is still undervalued.

Kaylin: How did you come up with the idea to start a YouTube channel?

Dr. van den Heuvel: I have a friend who is a YouTuber. [Her videos] are very different, but I really enjoy watching her. And I was like, 'Well, I could do that, too.' Since I'm now teaching a lot, I thought videos would actually make a lot of sense. I noticed before that I have had to explain the same training to over 50 students over the years. So at some point, the videos are more efficient. I still really like teaching, but I keep saying the same thing over and over again. So, I thought this is a way to support myself. I have people see the video before they start working in the lab and it has been great for time management. I also just want to share the techniques I have learned, because when people get interested in EEG with babies I get excited. I think EEG is a really great technique that's still undervalued. I have recently got more and more consulting questions, because I think my papers are starting to get more out there, and I thought with videos I can speak to everyone. So, I created videos that answer basic things and some tips and tricks, just to share them. I am all for sharing and open research. For me, I just figured these tricks out myself, from just testing babies over time. So for me, it's just very normal to share and I don't mind sharing. I really enjoy making the videos and I'm glad that people are watching them. The most difficult part about it is finding the time to make the videos and post them. I have so many ideas for videos but not enough time.

Kaylin: I really appreciate the database that you're building, and your excitement in sharing it. It's such a great idea. With you saying it has helped with teaching your own students, I am already thinking how the videos could be resources for new research assistants in our lab. Maybe I'll have them watch the videos before we do the hands on training, that way they already have an idea even before the first day.

Dr. van den Heuvel: Yeah, you should use them! The channel is really to help not only me but other developmental scientists. I've said that in one of my videos, 'these are to make the life of a developmental scientist a little bit easier,' because we're doing pretty difficult work. Other people with EEG, they just have perfect data sets or participants that sit still and they're just concerned about things like 'Oh, you blinked a lot,' and then the participant says, 'Oh sorry,' and then they don't blink anymore. We have to deal with the baby, and a mom, and sometimes also a dad who are looking from the sidelines. Maybe I should have another video session on that.

Kaylin: That would be great!

Dr. van den Heuvel: I have had a couple of dads who call me on the phone. Angry. And I am taken aback, like 'Woah.' I don't know if you had that before. They complain about things like, "My baby doesn't sleep anymore, what did you do to him?"

Kaylin: Oh really? They thought sleep changed after the assessment?

Dr. van den Heuvel: Yes, and that is only one example. There was one dad that called me and he started with, "How do you sleep at night" He said, "Yeah, you put electricity in baby brains."

Kaylin: Those sound like very difficult conversations to manage.

Dr. van den Heuvel: Yes. It seems like they completely misread the articles. I guess it is part of the job.

Kaylin: Sounds like you have another tutorial topic: how do you manage participants who are concerned or misinformed.

Dr. van den Heuvel: Yes, it can be scary.

Kaylin: What other topics are you hoping to share with your YouTube audience?

Dr. van den Heuvel: One idea that I have is to reproduce some of the figures in my papers. Just right on the screen. I will reproduce the figures and explain how I make this figure like this and this, and just show the program and then share the link to the program. I definitely have at least one paper where I do this like cool brain thing. Once I figured it out I was like ‘Oh, this is not too hard.’ So, I would like to share this as well. I plan to have the article there and be like this figure I made like this, and then reproduce it. So that's an idea.

Kaylin: I love it, I love it.

Dr. van den Heuvel: Yeah, it would be really nice. And then also: Brainvision Analyzer. I would explain how to use it. Start simple, with how to open it and how to navigate everything. But, Brainvision Analyzer is not free. There's not a lot of free programs.

I am also thinking of inviting other people to teach me something. We would just sit together and then I ask questions and get information and then they teach me, and I just record it. That could be fun, too.

Kaylin: That would be really cool, to have a “Collaborator Spotlight” or something.

Dr. van den Heuvel: Yes, that's kind of also the inspiration from my friend's YouTube where she sometimes invites someone who is an expert on some game and then that person plays the game and she's the commentator. I would like to do something similar.

Kaylin: Something that people talk about quite often with scale development, and seems like it may apply here, is the debate for when the researcher asks for commercial reimbursement for a product versus when it's like openly available for research. I'm wondering if you have thoughts about that with the YouTube channel or the sort of sponsorships you are suggesting.

Dr. van den Heuvel: Yes, well at this point, I am just for sharing. I don't have any financial ideas or ideology behind this. I am really just sharing for now, but I know my friend makes money. For her, it's really her job: YouTubing. Obviously if it ever happens for me, it would be great. But, it is not what I am interested in as a main purpose. I'm not interested in having a YouTube channel that makes a lot of money or where I have sponsorship, maybe if it gets there I will rethink it. I also would be really weary about it, for example if someone approached me and asked me to highlight their product. First, I would have to investigate if I really like it. My main purpose is sharing and pushing for quality research. For example, it would also be nice if everyone was doing the same thing and not reinventing the wheel. I would really like to get emails soliciting specific videos. That would be great!

Kaylin: YouTube is such a useful platform, and you have been so helpful in setting up these preliminary videos. I am really excited to see what's next!

Dr. van den Heuvel: I hope! I definitely want to start teaching more. I have a course in social neuroscience that I will teach this January. I will probably have more videos from this class, because I can use my teaching time to make videos.

I want to be integrated with my teaching and lab. I'm part of the International Prenatal Brain and Behavioral Network, and I have been asked to be the new director. The Network started about ten years ago and it started to slow down since the people that originally set it up are retiring. However, all of my videos are connecting the Network with the YouTube channel. Grad students are approaching me about it at conferences, I really like that.

Kaylin: How exciting that the impact of your channel is spreading. The videos seem to be especially great for someone who is just going into this field. Thank you for freely sharing your experiences, we are excited to see more.

To learn more about the work Dr. van den Heuvel is conducting, as well as some of her tips on methodology and the day-to-day challenges of developmental neuroscience, check out Part II of this series. Check out her Youtube channel [here](#).