“Towards the light”
The Underlying Sense of Threat

It has almost been a year now since Pontus Leander, Associate Professor of Organizational Psychology at the Faculty of Behavioral and Social Sciences, started discussing with a group of graduate students how people’s beliefs about society and social forces influence their personal behavior. When the corona threat grew bigger at that time and suddenly approached all of us, they thought: Why not steer the research into that direction? It wasn’t clear how long the situation would last, what it would do with us and what we would do with it. As corona continued to increasingly control our personal lives, the project “PsyCorona” gained more collaborators and participants, counting around 60,000 participants around the globe today. With the collected data, they hoped to show which individual-level factors predict compliance with containment measures, which could in turn predict differences in virus spread and ultimately the course of this pandemic.
This is how it started. It’s January now, almost a year later. We spoke to Pontus Leander about who did and didn’t follow the WHO guidelines, about finding scapegoats, crushing goals and life after the pandemic.

This project needed to be built up rapidly and on a large scale to collect broad, continuous and immediate responses. How was this organized?

The project was built from the bottom-up. The graduate students formed the nucleus, like an atomic structure, onto which more layers were added over time. Without this nucleus, the project would collapse. One of the most liberating aspects of this project was that it gives a new perspective on how to do research. We have no funding for personnel, so it is just about who has the time and interest to look into a certain research question. Not investing months into getting the grant money also saved us a lot of time. Of course, many forces had to work together to make this happen, unified by the common motivation of taking action in this pandemic. We knew that this needed to be bigger than anything else before, carried out as fast as possible under difficult circumstances.

Who followed the WHO guidelines and who didn’t? And why?
In stage 1, a classic survey was sent to the participants. Here we are trying to gain insight into which factors are determining the attitude towards following the health guidelines. The participants were invited to contribute to follow-up surveys, which thousands agreed to do.

In stage 2, these participants answer subsequent surveys that try to catch the influence of current developments on their attitudes. These included for example the Black Lives Matter movement, anti-corona measurement demonstrations, and, most recently, attitudes towards the vaccine. We definitely saw a reasonable amount of fluctuation in some participants’ attitudes over time.

In stage 3, the “data science phase”, we take many national databases into account and try to find the broader conditions and relationships that may have influenced the participants behavior, guided by AI driven analyses. The aim is to maximize the gain from the data we have. Thanks to open access, data sharing, and anonymization of data, a second generation of researchers can answer more questions on this data set in the future. Because this is for history: Corona is most likely not the last crisis that we will be facing within the next hundred years. There might come a new crisis that calls for similar containment measures and this data will become a historic reference.

What can you already tell us about the data you have collected so far?
One of the fundamental questions that we were trying to tackle was: Who followed the WHO guidelines and who didn’t? And why? The survey entailed many candidate predictors but we didn’t know which ones would turn out to be crucial. What was found throughout the global data was that the strongest predictor was simply norms: If people thought that other people in their community should follow the guidelines, then they were most likely to follow them themselves. This was connected to the second strongest predictor: People likely followed the guidelines if they also supported an extremely strict enforcement, for example a hotline where people could report on potentially infected community members. A scenario which might interfere with a certain sense of liberty. Taken together, this implies that the people who are concerned about protecting the individual’s freedom likely didn’t think the community should necessarily follow the guidelines in place and also likely didn’t follow them themselves. These two predictors were stronger than for example emotions, loneliness, or trust in the government.

The survey also contained several questions addressing the attitude towards immigrants. How might this play a role in the pandemic?
Throughout history, people have been looking for someone to blame when facing a crisis, they look for a scapegoat. Naturally, the more time is spent on blaming other groups, the less time is spent on solving the actual issue. Next to that, some needs and goals become blocked under restrictive measures, which fuels frustration. The question is how people’s reaction to the pandemic might accelerate and enflame ongoing social tensions and divisions. This leads to even more problems down the road and can hinder organized solutions.

Speculatively speaking: Do you think the pandemic might have a lasting influence on people’s optimism, goals and behavior in general, even after the situation relaxes? What may remain after the corona crisis?
I can imagine a couple consequences from this pandemic. Some social inequities will have become accelerated. The businesses we are in alone have created new strong divisions and this just adds to socioeconomic and other factors of social gaps. Another likely scenario seems to be the need to release this built-up motivation for social gatherings, partying, going on vacation, something like a “rebound-effect”. This is especially dangerous if there is a false sense of security about the vaccination program that may not yet be completed then, leading to an increase in infections once again. Next to that, there is this implicit threat that we have been exposed to for quite a while now. If someone coughs in the room, we automatically become alarmed. How do we respond? In this constant state of vigilance, we have to invest cognitive resources to repress those fears and alarms. And the vast majority has been chronically exposed to this underlying, constant

The more time is spent on blaming other groups, the less time is spent on solving the actual issue.
stress and sense of threat. We might react to people differently, have troubles experiencing intimacy, find new excuses on why to avoid people that are different from us or that show signs of illness. These behavioral changes might have become habitual and chronic over a prolonged time. A lingering sense of threat can shape our reactions on an implicit level, unconsciously. Additionally, the sense of loss, crushed goals, and the lack of recovery can stick with us. Especially when it feels as if everyone else has moved on. But these hopes and dreams don’t just go away. They get stifled, they get crushed, they get set aside and other people seem to have been making the decisions. Those who dare to plan again when the situation has calmed down need a system that is conducive of people making plans again.

■ BY ANNIKA SAUTER
■ PHOTO PONTUS BY REYER BOXEM
At the time of writing, we have entered our sixth week of lockdown number two. The curfew has been in effect for some days and the view from our home offices has once again come to replace safely distanced chats with colleagues near the coffee machine. Once again worries about experiments, the closing of labs and research delays consume us.

Against the backdrop of all of this, it is more important than ever to find what energizes us and be mindful of that so as to sustain ourselves through these times. What is at the core of why we went into academia in the first place? All this time on our own, in our own home offices, turning inward, makes this question more pivotal than ever. While most of us under different circumstances appreciate undisturbed time to work on papers, academia is driven by discussions, chats with colleagues, presentations at conferences and informal lab settings, interactions of all kinds. In short, academia is about encounters. Encounters with long-time collaborators, new colleagues, that one enthusiastic Master student that lingers after class to ask a question, encounters among PhD students, within research groups, encounters within your own discipline but most definitely also across the boundaries of your own field. That is where synergy and energy come together. It is very revealing that when forced to turn inside, we feel the need to reach outward and reach out to our colleagues, to experience the team effort that is science. In the middle of the reaccreditation process of BCN as a research school, its importance and very existence as a space where interdisciplinary encounters happen is more poignant than ever before. BCN – for many PhD students and PIs – is a secondary affiliation, but in these times BCN has revealed itself to be an institutional home that is at the very core of what gives us energy as scientists: providing a place where encounters happen. That itself presents a fantastic impetus and starting point for the reaccreditation process.

Perhaps the most life-changing encounters happen at the Master and PhD level: you start collaborations, form networks, and engage in discussions. BCN has been and continues to be an ideal platform for those encounters. The BCN Master and PhD community is a vibrant one but also one that is perhaps most negatively affected in these times. From the board room, we see the good practices on the part of PIs: online lab meetings, conferences and events, virtual writing sessions, informal lunch breaks, Monday morning online coffee meet-ups. But also on the part of PhD candidates themselves: organizing home office days with one colleague or lunch walks, for instance, so that encounters still take place. To all our Master and PhD students: we see you. We know how important these years are and how lost you feel without the encounters. Please use the structures already in place, talk to your supervisors, your PhD peers. Share your work, your wonder, but also your worries. Find each other, find the core, find ways of encountering each other. Connect and reach out. Coming up very soon are two events that necessarily take place online but that do offer the opportunity to connect: the BCN Winter Meeting is scheduled for 4 February and takes place through Gather Town. This is followed by the online BCN retreat on 11 March, specifically aimed at our PhD community. As a board, we sincerely hope that you use these events as a way to connect and that they may energize you.

As BCN Board we wish you lots of strength, energy and (online) encounters to get through these demanding times.

■ BY MEREL KEIJZER
■ PHOTO BY RONALD ZIJLSTRA
In Memoriam
Albertus Antonie (Berry) Wijers (1959 – 2021)

After many active years, as a researcher, mentor and teacher, Berry Wijers passed away on Wednesday January 13th at the age of 61. After obtaining his doctorate with cum laude distinction in 1989 for the thesis “Selective visual attention: an electrophysiological approach” at the University of Groningen, Berry worked in the Experimental Psychology group at this same university until September 2020.

In the early eighties of the last century, biological psychologist Berry Wijers was among the first to explore the application of event-related brain potentials to human information processing, in particular in a series of highly original, elegant and influential studies on mechanisms of visual selective attention. Berry also played an important pioneering role in exploring and addressing the many technical, methodological and statistical challenges posed by then upcoming neuroimaging techniques, such as positron emission tomography and functional magnetic resonance imaging at the BCN neuroimaging centre of the University of Groningen and magnetoencephalography at the University of Twente.

Over time, Berry’s interests expanded to a broad range of cognitive functions such as perception, visual working memory, and language, often occasioned or triggered by collaborative projects with colleagues and students who not only benefitted greatly from his straight conceptual thinking and technical expertise, but also from his generous, unassuming, constructive but always critical attitude.

With him, we lose an outspoken and productive scientist and a loyal, friendly and respected colleague. Many students will remember him for introducing them to the fascinating world of cognitive neuroscience and for his contributions to their theses at the levels of bachelor, master and PhD, in many cases paving the way to a successful scientific career. Berry retired last summer, so that he could fully dedicate himself to some exciting and rewarding new options and perspectives that life had put on his path. We are especially sad that he has been given so little time to do so, but we will remember Berry with great fondness and respect.

By Monicque Lorist, Pieter de Vries, & Ritske de Jong
Department of Experimental Psychology
Planting the seeds for the future of rehabilitation

Johnny Appleseed is an American folk hero. He was a frontiersman, who during the early 19th century planted apples throughout Pennsylvania and Ohio. Some people believe that his behavior was random, but on the contrary, he established nurseries and after these orchards had productive yields, he sold the highly valued land. By the time of his death, it is believed that he owned more than 1,200 acres of land. Like Johnny Appleseed, the Marie S. Curie Innovative Training Networks Grant aims to create nurseries, but this time scientific nurseries; where early-stage researchers will attain the skills and knowledge to innovate and improve patient care.

Last year, two professors from BCN were awarded major European grants. Associate professor Raoul Bongers and his team were awarded the Marie S. Curie Actions ETN grant for the project REPAIRS (RE-learning Perception-Action In Rehabilitation from a Systems perspective, repairs-etn.eu). Meanwhile, Professor Frans Cornelissen and his team were awarded the Marie S. Curie Innovative Training Networks Grant in Translational Vision Sciences for the project OptiVisT (European Training and Research Program in Translational Vision Science to ensure Optimal support of Visually Impaired Individuals through Tests and Tools of Functional Vision, optivist.eu). REPAIRS and OptiVisT are each collaborations that involve over 20 academic centers and partner organizations throughout Europe and the world. Each proposal was awarded a total amount of approximately 4 million euro.

The training network REPAIRS establishes a unique training-through-research school to study the perception-action cycle from a systems perspective and to apply insights to rehabilitation. This training approach incorporates knowledge from the clinical sciences, technological innovation, and philosophical domain. REPAIRS aims to train early-stage researchers with high-level transferrable skills, enabling them to pursue a career in academia, clinical or technical domain. Meanwhile, OptiVisT’s key mission is to enhance the societal participation of individuals with vision impairment through innovative and inclusive care. After participating in the OptiVisT training program ESR scientists will have learnt how to quantify the visual demands of activities of daily living and to use their new insights to design objective, effective and easy-to-use tests and tools of functional vision.

Raoul Bongers from the Department of Human Movement Sciences and Frans Cornelissen from the Visual Neuroscience and Ophthalmology Department at
the UMCG share with us their story of how the study of movement disorders and comparative sensory physiology joined the effort to improve the way rehabilitation is done.

Can you please give us some insight into the ETN grant writing experience?
Writing grants is a tricky business. Some get approved and others do not. There is no real formula to get it approved. All you can do is to find a topic or domain in your field that needs further development. All the proposals that are submitted to these large grants are good enough to get funded and there is certainly a luck component to having one awarded; however, the ideas that you present have to resonate with the reviewers. Training grants have a different objective than traditional research grants. They are meant to stimulate and develop new research venues that the next generations should investigate. Writing training grants, therefore, involves a specific focus and writing perspective; you must convince the reviewers about the urgency to address a problem and how training researchers to solve this problem is important. After reading your proposal the reviewer must be convinced that the young researchers that will be trained under your program will have the skills to solve the problems of the future. This is quite different from other grant proposals because at least 30 to 50 percent of the proposal must focus on the training aspects. This is a different type of mindset because as a researcher you are trained to be a problem solver. However, as a coordinator of a teaching program, you must be a facilitator. To be a good facilitator, you must be able to put on different glasses to observe and solve a research question. This exercise seems easier said than done.

You need to be critical of your field because you need to expand on the current knowledge. All deliverables must be completed but there is also room to change course during your research. The great thing about these types of long projects is that throughout the length of it you have this feeling of curiosity and if you manage to learn something new you are left with this same feeling about something else or even completely new after you conclude the project. The challenge in writing a training proposal is to describe very complex concepts into very short and concrete statements that map a strategy that can yield deliverable products.

Regarding the workload involved with the grant writing process and execution of the plan, a tremendous amount of work, at least a day of work a week, is required. Once the project gets started, the work primarily mounts at the beginning and the end, sometimes in the middle when midterm reviews are due. Although project managers handle a lot of the paperwork, as a coordinator, you are responsible that everything gets done accordingly. As a coordinator, you must balance the content with the administrative part.

Both proposals center on patient care and the improvement of daily life activities. Each proposal is an example of a project that utilizes translational medicine with societal impact. Please tell us how your project is at the cutting-edge of rehabilitation medicine.

The goal of these training projects is to train people to gain skills that can translate to other fields, not just continue in a continuous research trajectory. After three years you expect collaborations to initiate and for certain research ideas to gain steam; however, realistically more
time is needed to see tangible results and impact on the field. If you manage to forge a network of collaborations that work in an interdisciplinary fashion to solve practical problems that patients have, you have achieved success. These projects are meant to plant seeds and develop networks for future research and innovative thinkers in the industry and society.

One of the fundamental principles of BCN is interdisciplinarity. Both proposals incorporate multiple fields of expertise. Could each elaborate on how your project has benefited from a multidisciplinary research environment? Interdisciplinary is the middle name of the Marie Skłodowska-Curie Actions ETN grant. Collaboration with experts from humanities fields is important. Including their perspective gives you a different outlook on a problem in neuroscience. In our proposals, we included the collaboration with artists and philosophers which provides an added depth to our research. If you manage to devise a training program that not only generates knowledge that fills a knowledge-gap in your field, but in addition to that trains students who will innovate in practical ways and incorporate many fields of research to achieve this, you improve your chances of winning an ETN grant.

Besides the training of a new type of translational vision scientist, what are the other goals of this project? How will this impact future research?

To help people in visual rehabilitation we must devise more informative tests that focus on pragmatic solutions. There is a lot of knowledge on how vision guides action but there is less knowledge on how visual impairment affects complex daily life tasks. We propose using new technology like virtual reality, eye tracking, and deep learning to develop new ways to assess visually impaired patients.

Could you tell us how the implementation of the REPAIRS training network strikes a balance between patient care and training innovation?

These training grant proposals force you to take a very broad approach. Just imagine having to come up with 15 Ph.D. research proposals, sounds fun at the beginning but it can easily go sour very fast. First, the research must have some practical applications; in essence, getting bang for your buck. Second, the research must be cutting edge. Third, an interdisciplinary approach to solving the problem must be considered; this allows us to study the interaction between the perceptual, physiological, behavioral, and social components of a disease or condition. All in all, complex problems with complex interactions must be confronted with practical innovative interdisciplinary solutions; one might call this a system’s perspective. Part of the training is to expose the students to multiple disciplines to solve a problem so that in the future they can pick from a variety of skills to decide which is the best way to solve a particular problem.

The implementation of the deliverables is also important. In motor rehabilitation, we also focus on the perception-action coupling. With these training proposals, the beneficiaries are primarily two groups: the trainees and the patients. Striking a balance on the benefits is challenging because both the students and the patients must benefit from the proposed program. To achieve this the proposal must have enough information about the fundamental scientific formation, but also a pragmatic solution to the problems that the patient population has.

■ BY JAIME MONDRAGÓN
■ PHOTO RAOUL BY RUUD VAN DER WEEL
Bits and Pieces: Gatherings

The 13th of December 1997, 12 days before I turned 17, I went to a concert of the metal band the Gathering. The internet was still non-existing in my life. The band sang about strange machines. Twenty-three years later, on the 16th of December 2020, I joined another gathering. No guitars, no grunting, no nice dark venue. This day I met my colleagues for the departmental Christmas drinks in a virtual bar built in an online environment called Gather Town. Thank goodness for computers and the internet. We wouldn’t have been surviving this pandemic without these strange machines.
So now you know I’m old. But I’m still super cool. Check my Gather avatar. It’s true. It really is. It’s a new year, with a lot of hopeful things happening. A new president of the United State of America (note to self: stop the Trump-style argumentation!), the start of the vaccination program, the birth of two beautiful baby boys of two (former) PhD-students in our lab, snow, and a very nice BCN winter meeting on 4 February, also happening in Gather Town. For those of you without the Gather Experience, Gather Town is a virtual meeting environment where you can walk around with your avatar (actually quite 1997 style) and interact with others. And if you’re “ready for another conversation”, you just walk away. Very cool. Almost like in real life.
Gather Town was introduced to me by Martijn Wieling, BCN PI from the faculty of Arts. He was so contagiously enthusiastic about Gather Town that he persuaded the board of the university to pilot using it for teaching. And it is great for that. Because you can build whatever you want. Owing it to Martijn’s flying skills, I could use his drone images to build a virtual aula of the academy building. So, in my teaching I could invite students to have an academic debate in this beautiful aula. It was truly fun. Like in real life. Also, thanks to the efforts of Martijn and the Educational Support and Innovation team of the University of Groningen, we could host a joyful and inspirational BCN Winter meeting in an online conference center. The sky is the limit: Martijn rebuilt his department in Gather Town so people can just virtually drop by in his office. Clearly, Martijn is super cool too. Maybe he can grunt.
But the point is, we need new things, people with the energy to bring in new things, because we need to see the light. We need things to feel enthusiastic about. And we need new ways to interact. To not lose touch. To get energy from teaching and taking classes. This helps. To buffer against suffering from all the waiting in lockdown until we can go back to ‘normal’. After endless months we can still only dream of being physically close to all people we love. If only strange machines could realize these dreams. Maybe in 23 years from now.

Could it be that my dream would come true
Building a machine that would actually do
What I want it to do
- strange machines, the gathering

BY MARIE-JOSÉ VAN TOL
Interview with a BCN board member: Sarthak Misra
You’re the representative from University of Twente on the BCN board. How do you see Twente and yourself contributing to the board and BCN on the whole?

As a BCN board member wearing the University of Twente (UT) hat, one of my main roles within the council is to make the BCN activities visible at UT, and vice versa. Exposing the research activities of UT to BCN members will enable new collaborations and strengthen existing connections between both the universities. By being a BCN board member and also because of my part-time affiliation at UMCG, I can definitely hope to facilitate collaborations between research groups. One of the first initiatives that I am trying to undertake is to invite BCN researchers to UT and visit our labs. A delegation of BCN members had planned to visit UT in March this year. But with the current restrictions, we are having to do this online – but this is definitely a good beginning.

How important do you think collaborative research and translational projects are in perspective of University of Twente? Where does the BCN come into this?

UT has some incredibly smart and brilliant people doing research in both basic sciences and applied sciences/engineering. One of the things BCN can provide UT researchers is access to facilities at UMCG for conducting translational research. This is particularly true in my area of research (Surgical Robotics). Also, BCN provides a forum for the RUG/UMCG community to be aware of the various research activities at UT. There might be cases where researchers at UT are probably not aware of the various applications of their work. And there might be clinicians who are do not know that engineering solutions exist for their specific medical challenges (which UT researchers can assist with). BCN will be the vehicle that facilities these interactions and collaborations. One of the ways to do this would be have joint (UT-BCN) yearly symposiums.

By being a BCN board member and also because of my part-time affiliation at UMCG, I can definitely hope to facilitate collaborations between research groups.
This sounds really promising. What else can the BCN research school initiate for this forward stride in science?

Let me think… other than symposiums that I mentioned earlier, I think one of the things that might be a great initiative would be to have visits from doctoral students from UT to the labs/groups of BCN researchers. I don’t think we have had any student-visits this year coming from UT or even from the University of Groningen. I think even having researchers visit labs or give talks will do the task of making students in the BCN aware of the research at UT. Having joint symposiums between UT and RUG/UMCG in principle can bring a lot of visibility to both the sides, and build a robust network over time.

Are there several parallels that you can draw between the research in the United States and in the Netherlands?

I do not think that research is done differently between the United States (US) and the Netherlands. But that being said, there are some differences in the higher education system between both countries. There is a whole range (several tiers) of universities in the US that have different levels of resources available to them. In the Netherlands, the universities have by-and-large similar resources at their disposal for research. When it comes to the quality of research, it would depend from researcher to researcher anywhere in the world but in my opinion, I think the research here in the Netherlands is of extremely high quality and I think there are many positive things I find here.

You have had a chance to see the research atmosphere in three different countries. Are there things that change between them?

I think my first research experience was quite daunting during my Master’s at McGill University. It was difficult for me to first formulate the problem and then device the appropriate solution. But I think there have been several skills that I have had a chance to learn and pick up throughout my experience working both in Industry (on the International Space program) and then as a doctoral student at the Johns Hopkins University. I have had a chance to use these life-experiences as a graduate student in setting-up my lab and mentoring my own students. I have tried to build a lab culture by implementing the best out of all my life-experiences.

In your last interview, you had just set up the lab at UMCG. How is that going?

Yes, I had just started my lab then. Since then, we have just finished a big EU project with some collaborators in the UK and Italy. We have also begun to do experiments with micro-robots and a variety of other projects. We have done some experiments with MR-compatible robots with the radiology/nuclear medicine department. We have developed CT-compatible robots as well as done some human cadaver studies at UMCG. So, we have been quite busy with all these studies over the past few years.

I remember reading about some challenges to the applications of using micro-robots you had described in your previous interviews. What new solutions are being developed in your lab about those?

We have come up with some very exciting new solutions to move and image micro-robots. We have developed several robotic magnetic actuation techniques to move these robots inside the body. In addition to using MR for imaging, we have developed advanced ultrasound imaging techniques for real-time feedback. As an alternative to magnetic actuation systems, we are also using sound waves or acoustic signals for actuation. Further, novel fabrication techniques to 3D print bio-inspired micro- and nano-robots is something we are also excited about.
Do you feel that projects involving applied research should involve clinicians right from the beginning of the project while it being developed?
I definitely think that if you have the privilege of having a like-minded clinician on your team to consult with, that would be very helpful in giving the project the right focus. In my field of work most of the projects have a clinical application or challenge to tackle. So, it is imperative to have a clinician who can give insights into the clinical challenges. Having inputs from a single clinician, or even a group of clinicians really helps give the project greater impact.

What would be your advice to students and budding researchers that are apprehensive of taking that step to go out of their comfort zone?
My background and projects may seem quite diverse, but the foundations of all these studies are rooted in applied mechanics and systems theory. My training is in mechanical engineering and robotics, but the application areas I chose are different. So, for students, I think that their fundamentals should be very strong and once you have that, moving out of your comfort zone and taking up a project that is slightly different from something that you are used to doing is beneficial. Internships or short projects are an excellent opportunity to give yourself the exposure to try different things.

To end with, are we going to see more neuroscience integrated projects from you now that you are on the BCN board?
I am definitely interested. The closest I have come so far is developing sensing technology (using optical fibres) for a catheter used during neurosurgery. As a board member I hope to learn more about the exciting research going on in the BCN fraternity and collaborate with other researchers.
Untangling the relationship between sensation and perception:
An interview with VIDI grant awardee Sebastiaan Mathôt

Sebastiaan Mathôt is an Assistant Professor in Experimental Psychology at the Faculty of Behavioural and Social Sciences. He has recently been awarded a VIDI grant, one of the biggest research grants in the Netherlands provided by the Dutch Research Council (NWO). We talked to him about the project he will follow with this new grant, his career milestones, and more generally the process of getting grants and competition in science.

You have recently received the VIDI grant from the Dutch Research Council. This grant enables you to start a new line of research. What topics will you investigate with this grant?
The general topic of the grant is what I refer to as “sensory tuning”. Traditionally, there has been a distinction between sensation and perception. Sensation describes the stimulation of your senses at a very low level, such as stimulation of photoreceptors of your eyes, which has been considered a non-cognitive process; and thus, rather automatic. From the senses, information is transported to the brain which is where perception – which is a cognitive process – happens. While this has been the traditional view, we already know based on common sense, that this is not entirely true. For example, our brain controls the direction of our eyes or what we touch, so in that sense, our brain does have an influence on what sensory information comes in. My proposal is based on this observation and takes it further by saying that, in very subtle ways, we take control of our senses to optimize the incoming information from the sensory systems. To give an example, for the eyes, this would mean that not only do we rotate our eyes to look at the things that are interesting, but we also change the size of our pupil (pupil size is classically considered to be a reflex). Thus, we expand our pupil to take in a lot of light in a situation in which we want to be as vigilant as possible, whereas we constrict our pupil in a situation in which we are calm and detail focused. Essentially, your pupil acts like the lens of a camera in this situation.

You’ve done work into the pupil response before but looking how the auditory modality is influenced by sensory tuning is a new line of research. Have you done any pilot experiments on this yet?
It’s a new area for me. It is important with these kinds of grants to broaden your horizon. I had a VENI grant before, which is for more junior researchers, and this allowed me to focus on pupil size. A VIDI grant is for more senior researchers; here you are supposed to have different lines of research. It would be too narrow to focus only on pupil size, which is why I decided to focus on perception more generally. I will of course rely on my expertise in eye movements and pupil size, but it is also important to branch out to new areas.

These examples illustrate what I mean with “sensory tuning”, and the current grant project will address these questions through various experiments.

Another part of the project is to test the concept of “sensory tuning” in other modalities. The acoustic reflex in the auditory modality controls the tension of muscles in the middle ear, such that if the muscle is tense it filters out low frequency noises. The idea here is that it could be possible for cognitive processes to control this reflex similarly as it was explained before for the pupil response.

Traditionally, there has been a distinction between sensation and perception
Talking about branching out to new areas: I have read that this new grant also gives you the opportunity to work with new technologies in your research, for example, fMRI scanners. How did you go about incorporating a new technology into your research at this stage of your career?

The good thing is that the more senior you are, the less you have to be an expert on everything; I mostly need to know what fMRI can and what it cannot do and have the proper contacts to make sure that the projects are successful. I will be using fMRI to map out a network of brain areas that control the size of the pupil. When I started my grant application for the VIDI I looked for suitable collaborators that can help me with these studies. For example, I had a meeting with a PhD student from the Cognitive Neuroscience Center in the UMCG who explained the idea of functional connectivity in fMRI to me. From there, I can apply the general principles to my research to figure out what I can do.

Getting a big grant like the VIDI is a big achievement. What key milestones in your career helped you to get here? Do you think luck can play a role in science?

Getting a grant is a self-fulfilling prophecy. I have received three major grants, but that is not a coincidence in the sense that once you get that first grant, getting any future grant is more likely. In a way, the fact that you get a grant is perceived as a success and therefore you are more likely to get the next grant as well. This is one of the reasons why there can be such a big gap between people in science. It’s the dynamic of the grant system itself, rather than necessarily reflecting a big difference in the quality of researchers. Of course, that doesn’t mean that science is completely based on luck. I was successful during my PhD, in the sense that I published a lot of papers. This is very important for that first grant, because at that moment the grant dynamics don’t apply yet; no-one has received major grants yet. Another thing that helped me is that I’m good at writing. This is important because writing a grant is much like writing a story. To get a grant you have to tell the reviewer in clear scientific terms what you want to do with this grant. This can already be quite difficult. Additionally, you also have to convince them...
why your research is fascinating and what is novel about it. New ideas will always depend on previous research; thus, it can be quite challenging to bring this point across, and being a good writer certainly helps.

For an aspiring researcher like me this is always an interesting question: When and why in your career did you decide to go into academia? I did a research master at the Vrije Universiteit Amsterdam and was actually the only student in the first year they started the program. I had a lot of close interaction with staff members which provided me the opportunity to go to Vancouver for my master thesis with a supervisor from the VU who was there on sabbatical. After we came back, it was this supervisor who offered me a PhD and this is how I got started in science. So my career is more the result of “things that just happened” than of a well-thought-out plan. When I started out in academia it was a lot less competitive than it is now, so it was not uncommon that people ended up in academia this way.

BCN has a large network of early career researchers, what advice do you have for them? This is a difficult question. I think the first advice I would give to people is to make sure that they like the everyday tasks. Writing is a big part of science, but it seems to be one of the points that students like the least. Science already is very competitive, which can be difficult, and therefore it’s important that you enjoy the everyday tasks. But for those people who are absolutely sure that science is what they want to do, I think my main advice would be: Just go for it! Just give it your all and don’t worry too much about the outcome.

You are also involved in open-source developments such as OpenSesame and your website cogsci.nl. What inspired you to invest time into this? The initial inspiration to start the project of OpenSesame was personal. When I first started programming OpenSesame I did it because I felt that there was a lack of suitable alternatives to program psychological experiments, and therefore I created a program that I could use for my own research. From the beginning, I enjoyed the programming aspect of this (next to a background in psychology, Sebastiaan also has a background in computer science). Then after some time other people started using it too which gave me a feeling of responsibility to keep improving the program and to make it more professional. Nowadays I feel proud that other people use it. It’s that responsibility that I feel towards people to make sure the program is running smoothly as well as the personal enjoyment I still have in programming the software that makes these projects fun.
Interview with Jelte Posthumus

In Jelte Posthumus’ new podcast De Bovenverdieping (eng. Top Floor), created in collaboration with Prof. Iris Sommer, he interviews six brain researchers from the UMCG about their respective fields, ranging from Parkinson’s Disease to Consciousness. In each episode you can also learn about their career paths and inspirations. We talked to Jelte about creating the podcasts series, and discussed what is it about the brain that makes it so fascinating.

I’ve seen that you are a very versatile person, apart from working as a history teacher you also make your own music, present talk shows, run radio programs... I was wondering then, what made you get into making podcasts and what is it about them that makes it a good way to reach out to people?

I’ve been a radio host for a long time, and the podcasts really grew out of a radio show I did called Glasnost which runs on Monday evenings on the OOG-radio, the local radio station here. I started hosting it and sometimes I also created these items where I did interviews on location, and then at home I edited everything into something which was even nicer to listen to than the original recording. Normally interviews are quite long, and answers can be too complicated, so I edited everything into a quick, more enjoyable piece. We also broadcasted these reportages called Namen in Stad (eng. Names in the City), and that I did with a colleague of mine. We put that on Spotify later, so it automatically became a podcast because you could listen to it anytime you wanted. So, it definitely grew out of the radio show, but I have always enjoyed listening to audio even more than watching video, because it’s slower and more intimate. Video is always really busy, loud and overwhelming, while audio is more intimate which is something I really like.

Exactly, you can always listen to it while doing something else, just by putting it on in the background.

Yes, I’ve been listening to podcasts for years now and actually a couple of years ago they started becoming really popular – nowadays, podcasts seem to be everywhere. But most of them are just conversations – people just press the record button and then they start talking. Then there’s no difference between that and just a live interview, and for that to work the guest and the interviewer have to be really good. The value of podcast making is precisely in that you can edit it, put in extra
sounds and music, and make it something more than just a simple conversation. I used to listen a lot to Radiolab which is a podcast from New York and they do that all the time. They put these beautiful audio extras in, and I was really inspired by that.

Before “De Bovenverdieping” you already did a science-focused podcast Ruggespraak, about science from the RUG. How did you end up choosing the brain as the main theme this time?

Well, I already got the idea of doing something with the UMCG a few years ago, because I think the secret to a good podcast is a good story. And hospitals are filled with good stories – miracles happen there, sad things happen there, very joyful things happen there, so I thought this is a good place to start something. And then recently, a colleague of mine told me that Iris Sommer wanted to do a podcast and she was actually already working on another one, which is still continuing, De Genezers (eng. Healers). I went to her and I said that I wanted to make a podcast and she said it was a great idea, and then she came up with a line-up of some great and fascinating researchers. Then there was still the question of how we were going to finance everything, and we actually wrote for a subsidy, so partially this podcast was paid for by the province.

How was making these podcasts different from making the previous ones?

The main difference is that with this one we had some money and the other ones were all voluntary. Now I could really spend some extra time on it and make them into something more professional than the other ones. I really spent hours and hours editing every episode, but I really enjoyed doing it.

I was also wondering, who did you have in mind as your target audience. Was the goal to bring these neuroscience developments of the UMCG closer to the public?

Yes, that was the main point, but I think anyone can enjoy it. If you like listening to podcasts, this one can be interesting for anyone, because I’m not a professional neurologist so my questions would never be very detailed, and I think that makes it easier for the audience to listen to. But also for the patients and the caregivers, people who are involved with the diseases we talked about. I heard from some of the interviewees, e.g. Marie-Jose van Tol who talked about reoccurring depression, that people who suffered from it had listened to the podcast and they really recognized it and enjoyed listening to it, so I was very glad to hear that.

How have you prepared for these interviews?

Like you said, you are not a professional neuroscientist, and these areas are so big, so how did you make sure that you knew which questions to ask and how to go about making the topics interesting?

I did pre-interviews with almost all of them, and they also sent me articles and other things they thought were interesting for the interview. This also included really scientific stuff, in-depth articles published in journals, so I tried to read that as well. For example, with Andre Aleman, I also read his book “Je brein de baas” (eng. “Your brain – the boss”). I also watched a lot of documentaries and YouTube videos – anything I could get a hold on which I thought was necessary to know.

Was there any topic that was especially challenging?

The value of podcast making is precisely in that you can edit it, put in extra sounds and music, and make it something more than just a simple conversation.

The one with Andre Aleman was a bit challenging because he wrote a complete book on the topic and then I tried to bring it back to the podcast of 25 minutes. And everything in the book was interesting, so it was
quite difficult to pick the specific topics. The general subject itself was also a bit challenging – it was about consciousness and how you can use it to control and steer your behaviour. Although to be honest, all of them were challenging in a way – during the one with Joukje van der Naalt about brain damage, I realised that I hadn’t prepared it well enough. Suddenly we talked about her going to the Dutch parliament and pushing for a law about wearing helmets on scooters, and I didn’t even know about that! So, then I thought ‘oh I missed something here’ and then she also started talking about brain damage in sports, and I really wasn’t prepared for that so that was kind of challenging. Mostly in terms of the editing and trying to get everything together afterwards. And actually, during that recording session we also came up with the final name for the series.

You start every episode with a little question that all the scientists answer, which I thought was a really cool idea. During the last one you asked them about their favourite facts about the brain, so I was wondering, after making these six episodes, what is a fact that really stuck with you or made a big impression?

The size of the brain really surprised me – what I learned is that it is more or less like holding the two fists together, but then if you pull it apart, it is actually huge. These neurons, if tied together, they can go to the moon and back, that’s crazy! But that’s more of a fun fact – the thing that really struck me the most was that 75% of people with Down Syndrome eventually get dementia, it was the episode with Alain Dekker. I also think many people do not realise the severity of Down Syndrome, partly because of the television programs that portray them in a specific way, but it is in fact quite serious. And dementia is terrible and really hard to diagnose as well. But many other facts actually, the vulnerability of the brain, but also how flexible it can be. You can really train your brain through meditation, sports or mindfulness. Previously I would have never thought this was so important, but you can actually train your brain with them, so that’s something people should know. I also have a baby now and the development of the brain is another crazy thing, all of the connections that are being made, and then lost again.

If you could add 2/3 extra episodes, what are the topics that you would still like to go into?

I was really fascinated by the connection between the brain and the gut, and I talked about it a little bit with Teus van Laar in the context of Parkinson’s Disease. And that’s also a new topic, which is still evolving, so I’d love to know more about that. Iris Sommer has also just written a book called “Het Vrouwenbrein” (eng. Women’s Brain), where she compares women’s and men’s brains, and there really are differences. This is really fascinating, also because we have to be very precise when it comes to biological differences between men and women. And one more thing I would really love to do a podcast on are hallucinations, especially auditory ones, so you can have the audience listen to examples.

That sounds great. Do you think there is any chance to hear some of these extra topics come to life, or was the podcast just a one-off series?

Well the money was for six episodes, but I already talked with Iris about it and she is very enthusiastic, although it is really hard to find money for extra episodes. I would of course love to do some more but if not, then it’s ok, those six episodes were really enjoyable to do.

Jelte’s Podcast ‘De Bovenverdieping’ is available on his page (www.jelteposthumus.com), Spotify and Soundcloud: with voice over by Leonieke Toering, music by Ruurd-Jan de Meulder, and logo by Roy Rolleman.

— BY ALEKSANDRA CYWINSKA
Mindwise: Inspiration is not a luxury

‘Inspiration’ is a word many creativity researchers hate. Not because we don’t believe in it, or because we begrudge others the inspiration we lack. No, it’s because (much to our chagrin) creativity is still often thought to be elusive, mysterious, possibly supernatural, and generally beyond the pale of scientific inquiry – and the continuing emphasis on ‘inspiration’ is probably to blame. If there’s one thing creativity researchers have been trying to do for the past seventy years, it’s showing that there’s nothing mysterious (let alone supernatural) about creativity (Guilford, 1950). We may not always know where our ideas come from, but the same is true for emotions, opinions, or thoughts. Moreover, many creativity researchers have been tirelessly explaining that creativity is as much a matter of hard work and effort as anything else (e.g., Baas, Koch, Nijstad, & De Dreu, 2015). So who cares about inspiration? Inspiration is a luxury!

Inspiration is extraordinary

Actually, there really does seem to be something special about inspiration. As we all know, many kinds of behavior can be elicited fairly easily in psychological research, people can recall all sorts of things simply upon being asked to do so, opinions can be formed and influenced in the lab, and even feelings can be manipulated in experimental settings. But inspiration seems different. For one thing, inspiration is usually spontaneous. It’s something that seems to just happen to us (if it happens at all). Although we’re pretty good at predicting when we will not get inspired (for example, after a long day of online meetings), actually finding those happy moments where the creative juices start flowing seems to be a matter of luck, rather than skill. Another striking aspect of inspiration is that it tends to be overwhelmingly activating. When we’re feeling really inspired, we want nothing more than to act upon it, preferably right now. Although we may enjoy and seek out moments of deep reflection or absorption in our work, these have nothing like the strong push and pull of a real moment of inspiration. And finally – alas – real moments of inspiration tend to be rare. We don’t usually feel inspired every day, and many of us struggle to find moments of inspiration at all. Sometimes we have to search deeply to remember the last time we really felt inspired.

These kinds of characteristics do not exactly make for an easy (or popular) topic of psychological research. In fact, when I was preparing for this piece, I looked up ‘inspiration’ in some of my creativity handbooks, and was surprised (but then again, perhaps not so much) to see that several didn’t even mention it in the index (e.g., Amabile, 1996; Finke, Ward, & Smith, 1992; Kaufman & Sternberg, 2010; Reiter-Palmon, Kennel, & Kaufman, 2018). It’s almost as if inspiration is creativity’s slightly disreputable relative – like an uncle who shows up unexpectedly at parties, embarrasses everybody, and then leaves again and isn’t seen by anyone for years.1 So what are we even talking about here? What is this mysterious and spontaneous thing called ‘inspiration’, and is there nothing we can do to help ourselves get inspired?

The psychological literature on inspiration is scarce, but our current thinking about it has predominantly been shaped by the work of Todd Thrash and Andy Elliot, starting with their (2003; 2004) papers exploring and refining our understanding of the

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1 I’m pretty sure I (unconsciously) stole this analogy from somebody somewhere, but I can’t remember who or where from.
concept. Tracing the meaning of the word ‘inspiration’ through everyday as well as academic usage, they provide a general conceptualization of inspiration as being evoked, approach-oriented, and transcendent. In other words, inspiration is a response to some stimulus or situation, it energizes us towards doing something, and it goes beyond ordinary, everyday preoccupations or problems.

Building upon this conceptualization, Thrash and Elliot then conducted a series of studies to map inspiration’s nomological network, exploring the constructs that it is and isn’t associated with, and aiming to identify some of its antecedents and consequences, both in terms of states and traits. Their results suggest, for example, that you’re more likely to feel inspired if you feel good, if you are interested in exploring new things and receptive to beauty, if you’re highly motivated to get deeply into what you’re doing, and if you’re not concerned with winning a competition or worried about failure. Being inspired, in turn, will help you feel absorbed in your work, feel competent about what you’re doing, and perform creatively.

In other words, this relationship between creativity and inspiration just keeps coming back – the embarrassing

Actually finding those happy moments where the creative juices start flowing seems to be a matter of luck, rather than skill.
uncle won’t stop dropping in (or staying away) whenever he feels like it. So perhaps we should explore this relationship a bit further. Who knows: we might get to see an unexpected side of this embarrassing relative of ours.

**Inspiration is a lightbulb – or is it?**

In the context of creativity, the moment of inspiration is often depicted as the classic lightbulb going on over our heads; the moment when we get the crucial idea, insight, or even epiphany. In fact, creativity itself is often considered to be more or less synonymous to the generation of ideas or solutions. But of course, it’s much more than that: the creative process spans the whole trajectory from problem identification (what are we even working on?), through preparation (how best to go about it?) and idea generation (what options do I see?), to idea validation (is this really such a good idea?) and idea implementation (let’s do it!). Most of us tend to think of creativity in terms of coming up with ideas, and that’s what creativity research has focused on almost exclusively for about half a century. However, over the past two decades, we’ve been beginning to learn that the transition from idea generation to idea implementation is the real bottleneck in the creative process. Coming up with ideas isn’t hard; making sure your best ideas get realized is the difficult part. Creative ideas do not stem from inspiration; inspiration stems from creative ideas!

The ‘lightbulb’ theory of inspiration, like most lay theories of creativity, focuses primarily on idea generation, implying that inspiration is what ‘turns on the light’ and infuses us with creative ideas. However, Thrash, Maruskin, Cassidy, et al. (2010) take a slightly more sophisticated approach. In their view, creative inspiration is an approach-oriented motivational state towards doing something — specifically, it is the inspiration to create. As such, inspiration is not the source of ideas, but a response to creative ideas, a state where realizing the idea becomes our aim. In other words, creative ideas do not stem from inspiration; inspiration stems from creative ideas! When we get inspired by an idea, we want to do something with it.

Across four studies on creative writing, Thrash and colleagues show that inspiration mediates the relationship between the creativity of people’s initial ideas and the creativity of their final written product. In line with Trash and Elliot’s nomological network, people were more likely to get creative ideas when they were more open to beauty and felt more positive, and people were more likely to get inspired by creative ideas when they had a strong approach temperament (that is, when they tended to strive for desired outcomes, as opposed to avoiding undesired outcomes). What’s more, inspiration also predicted the efficiency of people’s writing, suggesting that inspiration really makes us want to capture and communicate our ideas before they get lost. Since this is where things usually go wrong in the creative process, inspiration would seem to be exactly what we need to perform creatively. Inspiration may be rare, but it’s not a luxury.

**Now what?**

So what does all this teach us about inspiration, other than that it would be fantastically useful to us if only we knew where to find it? Unfortunately, although we have a general idea of what predicts inspiration, we don’t really know how to evoke it. The best we can do, is make sure to seek out conducive states, to avoid inhibitory factors, and to respond to inspiration as soon as it occurs. So here are four general pointers that may turn out to be helpful.

* Do things that make you feel good! Carve out the time and space to work on what motivates and attracts you. But besides work, you’ll need to actively restore your energy by pursuing fun leisure activities, and avoid mentally closing down. You’re never going to get inspired by sitting in front of a screen all day. The better you feel, the better your chances of getting inspired.

* Try to work on maintaining (or building up) your receptiveness: seek out beauty wherever you can. This could be anywhere: literature, music, a museum, a walk in nature – again, these are things you’ll have to actively pursue. Taking the time to seek out and appreciate beauty will make it easier for you get ideas, and to be receptive to the right idea at the right time.

* Avoid competitive pressures (and focus on work mastery instead). Although this may sound like another way of saying ‘get the hell out of academia’, things need not be as bad as that. In the end, what matters is not to avoid competition, but not to think of your work as a competition, and not to get distracted by it. Allow yourself to do the best job you can, in your own way. A bit of competition can be energizing, and may bring the
focus to keep working on a task, but it won’t bring you the inspiration you need to do your best work.

• Seek out collaborations that make you happy and make you feel competent. In academia, you have a lot of room to choose your collaborations (perhaps more than you think); make the most of it, because these are what will keep you going, especially if things get lonely during a lockdown. Avoid coworkers or supervisors who feed your fear of failure. It sometimes seems like these people are attracted to academia like flies to a carcass, but that doesn’t mean you’re destined to work with them.

There is no recipe for inspiration; if there was, the world (and the office) would be a different place. And, to be fair, inspiration can be a distraction. A lot of the work we need to do simply requires us to hunker down and keep going, mind-numbing or soul-destroying as it may sometimes feel. You can’t – and shouldn’t – expect to feel inspired every day. What you can do is prepare, and be ready when the moment comes. Actually, Thrash, Moldovan, Oleynick, and Maruskin (2014) put it most inspiringly of all:

“Be vigilant for fleeting glimpses of truth, beauty, goodness, and holiness. Once you have an idea worth writing, write; once you have a goal worth pursuing, pursue it, before the light goes dim.”

References

Eric Rietzschel is an assistant professor in Organizational Psychology. He is interested in (and so does research on) creativity. Some of his research questions are: does it help to generate a lot of ideas (for example in a brainstorming session), or is this a waste of time? Why is it that people often reject creative ideas in favour of boring ones? Does creativity benefit from total freedom, or do people perform better when they receive a bit of structure? Is there ‘one best way’ to stimulate creativity, or does it depend on the characteristics of the person you’re dealing with? And what does it even mean for somebody to call an idea ‘creative’?
For more information on Eric’s research, please visit here.
Decoding the brain for a more sustainable future

As I discovered my interest in neuroscience during the course of my bachelor program back home in India, little did I understand the vastness of this field. I was drawn to the BCN research master program here at RUG primarily because of its interdisciplinarity. The molecular, cognitive and behavioral tracks gave me the opportunity to explore different areas of neuroscience and find what I like best about this field. I explored the fascinating area of neurogenomics in my minor thesis with the department of molecular pharmacology. However, I wanted to focus on human behaviour research for my major thesis as this is also the path I would like to continue on in my career ahead. With this in mind, during my first year at RUG I kept myself informed about all that neuroscience has to offer and this is when I stumbled upon neuromarketing and consumer neuroscience. I found it all the more interesting when I did an online course on consumer neuroscience to better comprehend the realm of applied neuroscience.

Consumer neuroscience (academic in nature) and neuromarketing (commercial in nature) are branches of applied neuroscience that study the brain of the consumer when exposed to various advertising/marketing stimuli. In this way, brands can specifically invest in marketing techniques based on scientific research. This kind of research commonly uses techniques such as fMRI, EEG, eye-tracking and behavioural tests. With great success in the recent past, neuromarketing is no longer a pseudoscience as once debated (Dooley, 2015). Although this shouldn’t come as a surprise considering the fact that its sister fields including neuroeconomics and behavioural economics have successfully been around for much longer. Consumer neuroscience in a way is an extension of these fields.
focusing specifically on driving traditional market research towards a more successful neuroscientific approach.

While the results of neuromarketing are fascinating and are proven to subconsciously drive consumer behaviour, it is largely adopted by global brands whose products and services are mostly unsustainable and have a negative impact on the planet. These include among others the large scale plastic packaging, unethically sourced raw materials and long distance shipping of these products which contributes to high carbon emissions. With depleting resources, loss of biodiversity and rapid climate change, there is an immediate need to work towards a sustainable future for all. One of the ways to achieve this is by promoting sustainable consumer behaviour. This drove me towards making an attempt to connect science and society using the resources within my masters program. Some of the questions I asked were - how can we ensure that we as consumers are more sustainable? While there are sustainable alternatives to most of our daily needs, why is it that we still largely prefer unsustainable options? How much of this is rooted in human behaviour? To what extent can we use neuromarketing and consumer neuroscience to specifically promote sustainable brands and campaigns and how powerful would it be?

We know that the cause of climate change and the ability to engage in sustainable, pro-environmental actions is partly rooted in human behaviour (Steeg et al., 2014). As I looked for ways to do my part in being more sustainable as a university student, I joined the team of the Green Office Sustainability Ambassadors where we design projects to make our university a more sustainable place. I also studied Environmental Psychology (study of human behaviour, its impacts on the environment and vice versa) as an elective in my master program where I learnt that this field has continually worked on finding new ways to promote pro-environmental behaviour, including a portion of these studies focusing specifically on pro-environmental actions in consumers. However, with only questionnaire data in this area of research, there remains a need to find other (robust) ways to effectively promote sustainable consumer behaviour. I chose to address this issue in the major thesis of my master program and so I have collaborated with the Green office and the faculty of behavioural and social sciences to combine theories from environmental psychology (value-action gap) as well as behavioural psychology (conditioning effects) to assess if we can better influence pro-environmental behaviour in consumers using this combined approach. As I visualise my ultimate goal to use neuroscientific approaches in bringing out human behaviour change with respect to sustainability, I intend to use this thesis as my first step towards understanding pro-environmental behaviour, consumer behaviour and the psychology behind it.

The interdisciplinary nature of the BCN master program has allowed me to explore neuroscience beyond the contents of this course and to find different ways of contributing to science and society. As unusual as it was for me to shift from a fairly molecular biology background to a more psychological and applied neurosciences field, it truly goes to show the power of collaborative research and the flexibility that exists within sciences. As I embark on this exciting, collaborative journey, I realise that having an open mind to all that science has to offer is the best thing we can do for ourselves as students stepping out into a world full of incredible possibilities!

**References**


The 2021 BCN Winter Meeting

This year’s winter meeting was quite different than any of the previous ones. Due to the pandemic, the meeting was shifted to a virtual space. Thanks to the BCN office and much additional work by board member Marie-José van Tol who also chaired the day, the meeting started off by gathering in a virtual space called “Gather town” on the fourth of February. Here, we could create an avatar that could access the virtual space across several rooms. We could also have video conversations with people that were in close proximity. The day started with a short summary of events within BCN. Whereas the number of new BCN students dropped somewhat because of the corona crisis, BCN’s chair Elkan Akyürek showed quite an increase in the number of PhD defenses since 2019. The BCN council subsequently shared their activities for the coming weeks which included a Pub quiz, Yoga events and BCN Lunch meetings. This was followed by a short lecture given by Joana Carvalho, who received the best

Doctors for doctors: here we could post questions about our projects in an open forum. These questions could be related to the thesis, career options, methods or just miscellaneous questions.

Pitch your project: here we could find PIs to discuss projects.

Face your future: A fun fortune telling experience by Emile Angremont from the PhD council!
dissertation award 2019/2020 for her dissertation on “Plasticity of visual field representations”. We then had to gather around the virtual poster boards for the traditional BCN poster presentations. Some fellow PhD students initially felt a bit lost at the main entrance hall, but thanks to Diana, they were able to find their posters quickly.

This was quite fun and the organization much resembled that of previous poster presentation sessions, even though we had to stand virtually near our posters and present. The fun aspect was definitely brought on by our virtual avatars that could move around. This way, we could meet our colleagues that are working from home from distant places and reconnect with them after the sessions were completed. At the alliteration alley, we were given several options to connect with fellow BCN people. We could share our story or even pitch our projects to PIs and to gain new insights.

Towards the end, the session concluded with virtual (bring-your-own real!) drinks at the lounge. Our avatar characters were able to dance and interact with one another while disco music played, and you could also participate in fun games like pictionary and chess. Overall, the virtual setting was a lot of fun and led to much interaction. Gather town was a very nice platform to connect during these challenging times, and participants also felt the setting to be close to that of a real-life experience.

BY KAVYA PRASAD
SCREEN CAPTURES BY KAVYA PRASAD AND SANDER MARTENS
> BCN ALUMNUS COLUMN

From Sweden with love

A topic that we’ve discussed a number of times in our years as a PhD researcher is “life after PhD”. We always feel that we may land in a bed of nettles. However, what we all need to keep in mind is that there is no such thing as “failure” in whatever job we take after getting our degree. Ideally one year before graduating, researchers are able to exchange ideas with HR professionals and start identifying themselves with career paths that match their attention.

Upon asking a former BCN alumnus about this situation, I learnt that he was in a similar situation just as any final year PhD student. He had obtained his PhD from the department of Nuclear Medicine and Molecular Imaging in the year 2019.

**Name:** Bruno Lima Giacobbo  
**Current position:** PostDoc at the Department of Integrative Medical Biology (IMB), Umeå, Sweden.

“When I was around 6 months away from finishing my PhD thesis (and contract), I started applying for several positions both in academia and in the industry. That was around the time I was finishing the drafts of final chapters of the thesis. It took me almost four months of sending my CV to companies and getting interviewed before I landed a job. The number of rejections I received was incredibly high. However, receiving a rejection letter was far better than being completely ignored and never being replied to. On the bright side, I received
several invitations for interviews. Although I received a lot of negative replies, it felt like I was getting more and more confident on “being interviewed”. All the interviews that I was invited to were for academic jobs – to work as a post-doc or as a research assistant. In the industry field, they just sent e-mails with an apology and a rejection. I assume that that is mainly due to them not counting the years spent in PhD research as experience, which makes you less attractive to their eyes. So, after all experience gained from all those interviews, when my current boss – after a virtual meeting – asked me if I were available for a personal interview here at Umeå University, I was pretty confident I could present myself as the best option for the job, and indeed I got hired.

Truth be told, I do not think there was a huge difference from my PhD to the next step as a post-doc. I assume it is mainly because my PhD supervisor was always driving me to a certain independence, which is probably the most important feature people look for in a post-doc: someone that can be in charge of things, and does not need to be looked after all the time. My current job has more responsibilities as expected, but it is also more challenging and interactive, as the mind-set changes a bit. You are expected to know your skillset, but you are also expected to be ready for new challenges and learning new techniques that you can use in the future when you become an independent researcher.

■ BY KAVYA PRASAD
Dear reader,
As the PhD student council we are continuously trying to improve and adapt. Of course, we are very eager to organize events where we can see each other in real-life again. In the meantime, we are happy to say that the online BCN lunch lectures/meetings are a great success! If you haven’t already, come join us every Thursday between 12:00-13:00 h. We offer interesting lectures and social meetings. The online platform GatherTown is as close as we can get to a real-life experience.

In the previous Newsletter, we announced that we were looking for new members. Now, we can announce that we have since welcomed four(!) new members to the council! We would like to take the opportunity to introduce each of them here.

Nad’ka Majernikova
Hi everyone, my name is Naďk and I am a first year PhD student at the Department of Pathology and Medical Biology and the Department of Molecular Pharmacology (GRIP) at the UMCG. After graduating from the Behavioral and Cognitive Neuroscience Research Master (BCN) at the University of Groningen, I was awarded a 3-year PhD funding from the UMCG-Graduate School of Medical Sciences. I am interested in studying the role of ferroptosis, an iron-related and lipid peroxidation driven type of programmed cell death, in Alzheimer’s disease. I aim to develop a new AD model using a “brain on a chip platform” and induced pluripotent stem cells (iPSCs) from AD patients. Such a model will allow the investigation of new targets for ferroptosis inhibition to treat or slow down the progression of AD. My work truly fulfills me and I hope I will be able to soon share my knowledge about ferroptosis in AD further through teaching and supervising other students. I am very happy to be joining the BCN PhD council, as also during my Master, I represented BCN in the program committee and was the secretary of the BCN student council. Outside of science, I play professional handball, enjoy painting and spending time in nature with animals. My part in the PhD council will be managing the BCN PhD council facebook page, organizing lectures and representing the BCN in the GSMS committee. I also hope to organize jogging and training sessions in the Noorderplantsoen, so if you are interested, do not hesitate to contact me (n.majernikova@rug.nl). I know these next three years will not be easy but I think they will be definitely worth it. I can’t wait to see where this journey takes me. And again thank you to the PhD council for allowing me to join!

Lenny Marapin
My name is Lenny Marapin, I am a 2nd year MD-PhD candidate at the Department of Neurology at the University Medical Center Groningen. I am originally from Aruba and after I finished my high school studies in Aruba, I came to the Netherlands in 2012 to study Medicine in Groningen. For my PhD, I am looking at resting-state networks in patients with movement disorders, which I do in collaboration with the Cognitive Neuroscience Center. Besides medicine and research, my other interests include health economics, public health, and data science. In my free time, I like to work out, play the guitar and piano, and I occasionally collaborate with others to produce music. In the past, I have served numerous functions in committees, ranging from roles focused on educational activities to more advisory roles. As a newly installed member of the BCN PhD Council, I hope to contribute to the quality of the educational program, as well as represent and promote the diverse interests within the BCN.

Theresa Marschall
Hi there! My name is Theresa Marschall and I started out as one of the many Germans studying psychology here in Groningen. I was happy to encounter BCN, which combined my love for behavior, research and the brain, so it was no surprise that I chose to do the BCN research master and also stayed in our lovely research school for my PhD. By now I am in the third year of my PhD trying to unravel brain activity during auditory hallucinations in several patient groups, but also healthy individuals. After a year as educational manager of Gopher I decided to stay involved in the PhD community by joining the BCN council. Hopefully, we can soon see each other for workshops and events again!

Sterre van der Veen
The brain, a most fascinating thing. I remember giving a short lecture on this topic in primary school at the age of 12, being excited to show the other
children the pink painted cauliflower I had brought. And now, I’m a MD-PhD student at the department of neurology, studying diseases of the brain that lead to movement disorders in children and adults. Over the years, my fascination for the brain has only increased. For a huge part that is due to the great discussions with the other members of the research group, positive working atmosphere and the large amount of opportunities to share my research with national and international researchers. As a new member of the BCN PhD Council, I would like to help create the best work environment for all PhD students and make sure that everybody’s fascination for their topic only increases over the course of their project.

The BCN PhD Student Council
phdcouncil-bcn@umcg.nl
bcnphdcouncil1@gmail.com

Emile d’Angremont
Mayra Bittencourt Villalpando
Hermine Berberyen
Alejandro Marmolejo Garza
Tiago Medeiros Furquim Mendonça
Magdalini Ioannou
Nad’ka Majernikova
Lenny Marapin
Theresa Marschall
Sterre van der Veen

From left to right: Nad’ka, Alejandro, Emile, Lenny, Magda, Hermine, Theresa, Mayra, Tiago and Sterre
BCN Winter meeting

On February 4, 2021 we met in Gather Town for the BCN Winter Meeting. We enjoyed it very much! 44 PhD Students and 24 Research Master Students presented their posters. Read more details of this event in this edition of the Newsletter.

BCN Lunch Lectures
Preview next BCN lectures

We managed to attract interesting speakers for the coming months! For more details: check the emails you will receive.

> March 4, 12:00 hrs:
BCN Lecture Pieter R. Roelfsema (Netherlands Institute for Neuroscience, Amsterdam): "Fundamental insights into visual perception... and applying this knowledge for the blind"

> April 1, 12:00 hrs:
BCN Lecture Prof. Andrea Maier (University of Melbourne, University of Amsterdam, National University of Singapore)

> May 6, 12:00 hrs:
BCN Lecture Prof. Tim Czopka (Technical University of Munich, University of Edinburgh)

> June 3, 12:00 hrs.:
BCN Lecture Prof. Marc Landry (Université de Bordeaux)

BCN Lunch Lectures
Preview next BCN Alumnus Lectures

> February 11:
Jonathan Mall (alumnus Experimental Psychology) – “Can you become Elon Musk?”

> March 11:
Erin van Buel (alumna Biological Psychiatry)

> April 8:
Claire Kos (alumna Cognitive Neuroscience Center)

Competence Model

Please check the Competence Model. This is the PhD Development Training, which offers PhD students a clear and concretely framed learning trajectory comprising a variety of courses, workshops, and other activities, thereby focusing on seven core competences. https://myuniversity.rug.nl/infonet/medewerkers/organisatie/graduate-schools/facultaire-gradschools/gsms/phd-students/phd-development-training/new-dto/

The GSMS has made an overview of courses and activities offered to PhD students, by the GSMS, UG and UMCG. This overview is useful for all BCN PhD students.
Extra Budget and Digital reimbursement

Please submit your reimbursement form for conferences and external courses online. By sending reimbursement documents (the reimbursement form + photos/scans of invoices and proof of payment in one file, 1st page being the reimbursements form) to d.h.koopmans@umcg.nl

You will find the reimbursement forms on the BCN website (https://www.rug.nl/research/behavioural-cognitive-neurosciences/education/phd/funding) Please check the conditions on the forms and add all proofs of your visit and payment! Incomplete forms will delay the reimbursement. Please send this after you have taken the course/conference!!

BCN Symposium - Update

Nothing but the Truth!, the BCN symposium will probably take place on November 1 & 2, 2021.

Agenda BCN Activities

> March 11, 2021:
BCN Retreat, online edition (more retreats will be organized this year)

> Every Thursday:
Lunch Lectures series: 12:00 – 13:00 hrs.

Course application: https://cursus1.webhosting.rug.nl/gsms/courses/bcn-courses/
Please check the website for more detailed information.

BY DIANA KOOPMANS
Cool links

> TestMyBrain: Contribute to science while learning more about your own unique brain. They are a not-for-profit initiative dedicated to collaborating with citizen scientists throughout the world by providing measurement tools that allow people to engage in science and learn about themselves. https://testmybrain.org/index.php

> Virtual Neurons: Virtual Neurons software can be used to construct neural circuits and visualize how messages travel through the circuits. http://brainu.org/lesson/virtual-neurons

> How the timing of a memory is encoded in the hippocampus: https://www.sciencedaily.com/releases/2021/01/210111190139.htm

> Brain Activity Seen In Patient Ten Minutes After Death: https://www.iflscience.com/brain/brain-activity-seen-in-patients-ten-minutes-after-death/?fbclid=IwAR3pQLw5wWyrASQCpy2kZtPlgKJM_ykM3NNHf4gvz-XW6dhea4kWBlThw

> Designer Cytokine Makes Paralyzed Mice Walk Again: https://neurosciencenews.com/paralysis-designer-cytokine-17578/

BY KAVYA PRASAD
BCN poster prizes
On February 4th, the 2021 BCN winter meeting took place (see page 28). The BCN poster prize was awarded to three PhD students: Astrid Alsema, Joëlle Jagersma, and Saskia Nijman. Noa Schwensfeier won the BCN master student poster award. Congratulations!
**BCN dissertation prize**

This year’s three nominated dissertations were written by Daniel Reijntjes, Anne Richter, and Joana Carvalho. The jury’s chair, Branislava Ćurčić-Blake, revealed during the winter meeting that Joana was the proud winner of the 2021 BCN dissertation prize.

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**Dr. Joost Heutink appointed Professor by Special Appointment**

As of 1 November, Dr. Joost Heutink has been appointed as Professor by Special Appointment at the Faculty of Behavioural and Social Sciences of the University of Groningen. The special chair “Visual Disorders of Acquired Brain Injury” was established in collaboration with Visio, a centre of expertise for people with vision problems.


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**Sebastiaan Mathôt receives VIDI grant for research into complex collaboration between brain and senses**

Sebastiaan Mathôt, researcher at experimental psychology, has received an NWO VIDI grant for his research proposal ‘Turning the senses: How cognition shapes sensation at the gate’. The project is about the complex collaboration between the brain and the senses. Mathôt is one of the five RUG researchers to receive the prestigious VIDI grant. He will receive 800,000 to further investigate this topic. See our interview with him on [page 16](https://www.rug.nl/news/2020/11/sebastiaan-mathot-receives-vidi-grant-for-research-into-complex-collaboration-between-brain-and-senses).

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**Grant for research into ‘atlas of brain damage’ after radiotherapy**

The UMCG is participating in an international study into the effect of radiotherapy on the development of the brains of young children. The study is funded by Stand Up to Cancer (SU2C) and Cancer Research UK (CRUK) with $1 million. The aim of the study is to develop an “atlas of the brain” to locate areas of the brain most susceptible to damage from radiotherapy. This international project will bring together researchers from the University of Manchester in England, St. Jude Children’s Research Hospital in the US and the UMCG in the Netherlands and will last two years.

Radiotherapy is an essential part of the treatment of brain tumors in children. More than 70% of this group of children survive long-term. Despite its success in treating brain tumors, radiotherapy can also negatively impact the overall quality of life of these children. This is especially the case for cognitive and hormonal problems that are known to profoundly affect academic performance, employability and independent living. The UMCG team led by Lara Barazzuol will investigate how radiotherapy with X-rays or protons damages the developing brain.
studying damage in both the structure of the brain and at the unicellular level. This knowledge could lead to major improvements in the clinical practice of radiotherapy which can improve the quality of life of many children.

Jeanette Gelauff awarded with the Dr. Jan Meerman Prize 2020

Jeanette Gelauff has won the Dr. Jan Meerman prize with her thesis entitled “Functional Movement Disorders: mechanism, prognosis, and treatment”. This biannual prize is awarded for the best thesis written by a neurologist (in training) younger than 40 years old. On October 28, 2020, Dr. Gelauff defended her thesis cum laude.

Here you can read more about Gelauff’s thesis:

Winner Innovation Prize Research

Hiske van Duinen developed an app with which all data from practicals can be stored and with which the data can also be analyzed online. This makes it much easier to compare the data from the practicals. For this she received the Innovation Prize for Education.
https://youtu.be/YfMO8t1IQPo

Roald Lambrechts received Mandema Stipendium

In his doctoral research into the rare North Sea disease, Roald Lambrechts discovered that it is not the Neurons but the Glia cells that are responsible for the increasingly worsening disease. Glia cells support the nerve cells.
https://youtu.be/oxhkHSEiBPE

ERC grant to advance robotic surgery with novel magnetic system

Prof. Sarthak Misra of the University of Twente and University Medical Center Groningen has been awarded an ERC Proof of Concept grant titled – RAMSES (Robust Actuation through Magnetism for Safe Endovascular Surgery). It is Misra’s fourth ERC grant. RAMSES follows from the results of his ERC Starting grant ROBOTAR. Within RAMSES, the researchers from the Surgical Robotics Laboratory (SRL) will develop a system for magnetically-actuated robotic surgery.

Sarthak Misra is with the Department of Biomechanical Engineering at UT and leads SRL. He is also a professor at the Department of Biomedical Engineering at the University of Groningen and University Medical Center Groningen. Prof. Misra is also a board member of BCN. SRL receives generous financial support from NWO, TTW, ZonMW, Dutch Ministry of Economic Affairs, and EU Commission (Horizon 2020). Prof. Misra is also the recipient of several prestigious personal grants – NWO VENI (2010) and VIDI (2015) awards, and ERC Starting (2014), Proof of Concept (2017), and Consolidator (2019) grants. RAMSES is Prof. Misra’s second ERC Proof of Concept grant. Additional information regarding RAMSES is available here.
With virtual reality (VR) glasses, you can enter a completely different world within seconds. Computer-generated VR simulations of real-like environments can trigger psychological and physical reactions, such as anxiety, sweating or joy, similar to the reactions in real life. This characteristic of VR simulations - feeling real- makes VR a powerful tool for assessment, therapies and research in mental healthcare. With this thesis, we experimentally investigated how people behave in VR environments. We found that people with and without a vulnerability for psychosis maintain similar interpersonal distance to other visitors in a virtual café. Further, we found that emotion recognition in faces of VR simulated people and real people is very similar. This finding supports that virtual emotional stimuli - i.e., emotions on virtual faces – are suitable for research and training of emotion recognition skills.

Next, the effects of a novel VR cognitive behavioral therapy (VR-CBT) were investigated in patients with a psychotic disorder and patients with a generalized anxiety disorder. During VR-CBT patients practice within virtual environments which they tend to avoid in the real world. They could practice in a VR bar, street, bus and supermarket environment. VR environments were personalized by the therapist to fit the specific needs of the patient. The VR-CBT intervention was effective in reducing paranoia as well as social anxiety in everyday life. Currently, several mental health care institutes in the Netherlands are offering VR-CBT as a treatment.

Chris Geraets (1989) studied Psychology and Biomedical Sciences at the University of Groningen. Her doctoral research took place at the Psychiatry department and the Institute Brain and Cognition of the University Medical Center Groningen. She now works as a postdoc at the Regional Forensic Psychiatric Clinic in Växjö and the University of Göteborg, Sweden. She defended her thesis on October 27, 2020.
Objective and subjective movement symptoms in (functional) tremor: The influence of stress

PHD STUDENT
G. Kramer
THESIS
Objective and subjective movement symptoms in (functional) tremor: The influence of stress
PROMOTORS
Prof.dr. M.A.J. de Koning-Tijssen
Prof.dr. J.G.M. Rosmalen
FACULTY
Medical Sciences

Functional movement disorders are among the most prevalent neurological movement disorders. They are characterized by an impairment in explicit movement control, leading to symptoms like tremor and myoclonus. Previously, these disorders were thought to be largely a problem of perception and were of psychogenic origin. Diagnosis of this disorder depended mainly on excluding other forms of neurological movement disorders and treatment concerned addressing potential stressors in patients’ life. This research focused mainly on functional tremor, a subtype of functional movement disorders, as this symptom can be studied both subjectively and objectively. Wavelet coherence analysis of electrical muscle activity was shown to aid in the discrimination between functional tremor and other tremor types (i.e., organic tremor types). This adds to the recent tendency to diagnose functional movement disorders using positive criteria. In a 30-day study period, patients with a functional tremor had a considerable level of objectively measured tremor and they had a similar level of objective tremor symptoms to patients with an organic tremor. Furthermore, the association between subjective and objective tremor symptoms was similar between patients with a functional or organic tremor. Finally, the influence of fluctuations in daily stress on tremor symptoms were similar between patients with a functional or organic tremor.

Concluding, in accordance with other recent literature, this thesis provided evidence against the hypothesis of an exclusive psychological explanation for all FMD symptoms and therefore, this view should be abandoned, both in clinical care as well as in research.


Functional motor disorders: mechanism, prognosis and treatment

PHD STUDENT
J.M. Gelauff
THESIS
Functional motor disorders: mechanism, prognosis and treatment
PROMOTORS
Prof.dr. M.A.J. de Koning-Tijssen
Prof.dr. J.G.M. Rosmalen
Prof.dr. J. Stone
FACULTY
Medical Sciences

Functional motor disorders (FMD) consist of tremor, jerky movements, altered posturing or weakness. They are
characterized by specific factors in the history and neurological examination, pointing at their functional nature, like the influence of attention and distraction or incongruency with the anatomy. They are highly prevalent and often significantly impairing. This thesis discusses the pathophysiology, prognosis and treatment of FMD.

Part 1 describes that we found many similarities between groups of different functional motor symptoms. Many patients report severe fatigue, which correlates with impaired quality of life and subjective health ratings. This calls for more attention in clinical practice. A comparison between cortical myoclonus and functional jerky movements showed comparable percentages of depressive and anxiety symptoms. Pain is more prevalent in functional jerky movements. Two chapters investigating fMRI in FMS, confirm existing theories on the role of altered attentional processes, perception of body scheme and sense of agency.

Part 2 contains a review and a case-control study on the prognosis of FMS. It turns out symptoms did not resolve in a large part of the studied patients and misdiagnosis was low.

Part 3 summarized the literature on the treatment on FMD and contains a RCT to the effect of education and self-help on the internet compared to usual care. We did not find differences between groups on clinically relevant outcome measures. Patients did report high satisfaction with the intervention.


Context matters: memories of prior times

PHD STUDENT
S.C. Maass
THESIS
Context matters: memories of prior times
PROMOTORS
Prof.dr. D.H. van Rijn
Prof.dr. T. Wolbers
COPROMOTOR
Dr. L. van Maanen

FACULTY
Behavioural and Social Sciences

It’s not just the answer to the question Do you love me? that determines the fate of two people. When the answer takes too long, even a positive response can induce negative emotions. This highlights our ability to track, and the importance...
of tracking the passage of time. In this thesis, I demonstrate that the perception of a duration is influenced by previous experiences (the “Typing…” message in a WhatsApp group with one’s parents just takes an eternity after just having chatted with friends) and that this finding is a highly robust phenomenon. To counter a number of implausible assumptions in existing mathematical models of how memory is involved in the perception of time, I propose an extension to these mathematical Bayesian models of timing that implements a more realistic memory representation. Additionally, in a series of experiments in healthy aged populations and patients diagnosed with amnestic mild cognitive impairment (aMCI), I show that the temporal memory effects are directly linked to memory proficiency: the more memory is clinically affected – for example due to the early stages of Alzheimer’s – the more one relies on earlier experiences instead of on the currently perceived duration. This paradoxical finding could potentially be used as an indirect yet sensitive measure to track declining memory before aMCI, a precursor to Alzheimer’s, is officially diagnosed.


Spatio-temporal integration properties of the human visual system: Theoretical models and clinical applications

P H D S T U D E N T
A. Grillini
T H E S I S
Spatio-temporal integration properties of the human visual system: Theoretical models and clinical applications
P R O M O T O R S
Prof.dr. F.W. Cornelissen
Prof.dr. N.M. Jansonius
C O P R O M O T O R
Dr. R.J. Renken
F A C U L T Y
Medical Sciences

Visual perception has a fundamental role in supporting our interactions with the environment, yet not all visual information that reaches the eye is needed for this purpose. In order to be able to efficiently process the tremendous amount of continuously incoming visual information, our visual system needs to compress this stream both spatially and temporally. It does this in a way that is somewhat analogous to how computers compress videos in MPEG format: only the relevant information is retained, but it now requires a fraction of the memory to be stored. The quantification of this human compression process, called spatio-temporal integration, can provide useful insights into the structural and functional integrity of the central nervous system. However, quantitative models of spatio-temporal integration are relatively rare, and existing ones are mostly confined to theoretical or experimental contexts. In my studies, I have attempted to bridge the gap between our scientific understanding of integration and the use of this knowledge in actual clinical practice. I have used eye movements to
investigate this phenomenon and I built a mathematical framework that quantifies their spatio-temporal properties. I showed how the spatio-temporal integration of visual information performed by the oculomotor system in order to track continuously moving stimuli can be used to perform neuro-ophthalmic screening assessments. Specifically, I developed time-efficient, patient-friendly techniques to measure the visual field and to detect oculomotor abnormalities associated with neurodegenerative conditions such as Parkinson’s Disease and Multiple Sclerosis.

**Alessandro Grillini** (1990) studied Neurosciences and Neuropsychologic rehabilitation at the University of Padua, Italy. He did his doctoral research at the Ophthalmology department and the BRAIN and Cognition institute of the University Medical Center Groningen. He now works as a managing director of Reperio B.V. He defended his thesis on November 11, 2020.

**Individual behavioural patterns and neural underpinnings of verb processing in aphasia**

**PHD STUDENT**

Y. Akinina  
**THESIS**

Individual behavioural patterns and neural underpinnings of verb processing in aphasia  
**PROMOTORS**  
Prof.dr. Y.R.M. Bastiaanse  
**COPROMOTORS**  
Dr. O. Dragoy  
**FACULTY**  
Arts

In this dissertation, we investigated aspects of verb and sentence processing in aphasia – a language impairment that occurs after brain damage in adults (a stroke is one of the common causes). We worked with Russian-speaking population, so we first created and made available a database of research materials for the Russian language – verbs, corresponding action pictures, and various parameters that affect processing (e.g. word frequency, subjective picture complexity etc.). Using these materials, we conducted an experiment which aimed to reveal brain regions responsible for verb processing. A large group of stroke survivors participated in an action naming experiment, in which we investigated how their results corresponded to the lesion location in their brain. We found that various left-hemisphere cortical regions, subcortical grey matter structures, and white-matter pathways are involved in action naming, and placed our results in the context of contemporary picture naming, action semantics processing, and semantic control models. Finally, we moved beyond the single verb to the sentence level. We adapted a linguistic diagnostic battery from Dutch to Russian that was designed to assess deficits in verb and sentence processing in production and comprehension. We then tested a large group of individuals with aphasia to see if there were repeatable patterns of linguistic impairment, and if yes, how they corresponded to the type of aphasia. In our study, we did not find clear repeatable individual patterns, although verb and sentence impairments were prevalent irrespective of the aphasia type.


**Gene-environment interactions in disruptive behaviors**

**PHD STUDENT**

I.H. Ruisch  
**THESIS**

Gene-environment interactions in disruptive behaviors  
**PROMOTORS**  
Prof.dr. P.J. Hoekstra  
Prof.dr. J.K. Buitelaar  
**COPROMOTORS**  
Dr. A. Dietrich  
Dr. G. Poelmans  
**FACULTY**  
Medical Sciences

Behavioral problems are common in children and adolescents and often have a substantial impact, both on the affected child and the social environment.
During my Ph.D.-research I investigated the role of genetics, environment and the interplay between genetics and environment in relation to behavioral problems. To this end, I used data from existing large, international studies in which both biologically informed and behavioral data is being collected. Results from my research point to a variety of environmental risk factors for behavioral problems, including factors very early in life – even before birth – and during childhood. Among other things, maternal stress during pregnancy and stress affecting the child while growing up appear to play a role, both directly and in the interplay with genetic factors. In addition, I found evidence for a possible link between genetic vulnerability for behavioral problems and the connections in the brain. To summarize, the results of my Ph.D.-research indicate that a complex interplay between genetic and environmental factors is related to behavioral problems in children and these results help in improving our understanding of possible underlying causes.

Hyun Ruisch (1988) studied Medicine at the University of Groningen. He did his doctoral research at the Psychiatry department and the BRAIN and Cognition Institute of the University Medical Center Groningen. He now works as a postdoc at Accare and Drug Target ID B.V. He defended his thesis on November 17, 2020.

Tyrosinemia type 1: Remaining challenges after introduction of NTBC

PHD STUDENT
W.G. van Ginkel

THESIS
Tyrosinemia type 1: Remaining challenges after introduction of NTBC

PROMOTORS
Prof.dr. F.J. van Spronsen
Prof.dr. E.A. van der Zee

COPROMOTOR
Dr. S.C.J. Huijbregts

FACULTY
Medical Sciences

Tyrosinemia type 1 is an inherited metabolic disorder of tyrosine metabolism. Due to an enzymatic defect, the amino acid tyrosine cannot be catabolized properly. As tyrosine is an amino acid – a building block of proteins – dietary intake of protein results in the accumulation of tyrosine associated metabolites in patients with Tyrosinemia type 1. Untreated, these metabolites cause severe liver, renal and neurological problems at a very young age. This changed after introduction of NTBC. This herbicide blocks the metabolic pathway upstream from the original enzymatic defect. Thus, by preventing the accumulation of toxic metabolites, NTBC diminishes the clinical problems that characterize the disease. However, several challenges still remain and some of these challenges are addressed in this thesis. Firstly, despite treatment with NTBC, patients still have an increased risk for developing liver cancer. This risk can be reduced by early and continuous treatment with NTBC and diet, stressing the importance of neonatal screening and adequate treatment monitoring afterwards. The second challenge concerns the neuropsychological
problems that have recently been reported. Our research showed a non-optimal neuropsychological and behavioural functioning, which was most likely associated with metabolic control (high tyrosine and low phenylalanine concentrations). Because of the possible association between metabolic control and cognitive-behavioural outcome, monitoring and improving metabolic control is of utmost importance and therefore the third investigated challenge. We showed that phenylalanine concentrations could be improved with supplementation and that metabolic control can be assessed at home as long as blood sampling is done at the right hour.

Wiggert van Ginkel (1992) studied Medicine at the University of Groningen. He combined the last part of his study with doctoral research, which took place at the department of Metabolic Diseases of the Beatrix Childrens Hospital at the University Medical Center Groningen (UMCG). Since spring 2020 he works as a physician’s assistant in pediatrics at the Martini Ziekenhuis and in the upcoming year he will start with his education to become a pediatrician at the UMCG. He defended his thesis on November 18, 2020.

Measurement quality of the Strengths and Difficulties Questionnaire for assessing psychosocial behaviour among Dutch adolescents

PHD STUDENT
J. Vugteveen

THESIS
Measurement quality of the Strengths and Difficulties Questionnaire for assessing psychosocial behaviour among Dutch adolescents

PROMOTOR
Prof.dr. M.E. Timmerman

COPROMOTOR
Dr. A. de Bildt

FACULTY
Behavioural and Social Sciences

Approximately 15 to 25 percent of all adolescents experience psychosocial problems. The Strengths and Difficulties Questionnaire (SDQ) is widely used to screen for such problems. The studies in this dissertation provide insight into how useful the self-reported and parent-reported SDQ versions are among Dutch 12- to 17-year-olds in child and adolescent (mental) healthcare (Dutch: Jeugdgezondheidszorg, Jeugd Geestelijke Gezondheidszorg).

Measurement quality of the Strengths and Difficulties Questionnaire for assessing psychosocial behaviour among Dutch adolescents

PHD STUDENT
J. Vugteveen

THESIS
Measurement quality of the Strengths and Difficulties Questionnaire for assessing psychosocial behaviour among Dutch adolescents

PROMOTOR
Prof.dr. M.E. Timmerman

COPROMOTOR
Dr. A. de Bildt

FACULTY
Behavioural and Social Sciences

In summary: The findings support the use of the SDQ among Dutch adolescents. Up until now, healthcare professional did not know if, and if so which, SDQ scales could be used for the benefit of adolescents. To inform them about the possibilities, and to help them interpret SDQ scale scores, a summary of the findings from this dissertation and new Dutch SDQ norms are presented in a manual that has been distributed among users of the SDQ.

Motivation, reward and stress: individual difference and neural basis

PHD STUDENT
Y. Xin
THESIS
Motivation, reward and stress: individual difference and neural basis
PROMOTOR
Prof.dr. A. Aleman
COPROMOTOR
Dr. K.S. Görlich
FACULTY
Medical Sciences

Stress is ubiquitous in our daily life. A normal response to stress signifies that an individual is able to meet both external and internal demands flexibly, whereas exaggerated or blunted stress responses are an indication of increased vulnerability to psychosomatic diseases. Therefore, it is important to explore factors related to different stress responses and interactions between stress and emotional or cognitive processes. The present thesis focuses on two aspects: vulnerability and protective factors related to acute stress responses; and the possible neural mechanisms underlying altered reward-motivation processing during stress. Results in this thesis showed that personality traits, recent life events and cognitive capability influence the intensity of individual acute stress responses. In addition, acute stress and intrinsic motivation were found to play a role in reward processing. Acute stress increases reward anticipation and decreases reward consumption in the brain. The trait motivation has an impact on reward intertemporal decision making, mediated by the intrinsic prefrontal functional coupling. These results suggest that an interactive and integrative process including motivation-reward function, emotion processing and cognitive control may be the underlying mechanism for individual difference in stress vulnerability and resilience. Studies in this thesis may help to elucidate the fundamental psychological and neural mechanisms of stress vulnerability and resilience beyond various phenotypic factors related to different stress responses, and further guide efforts towards prevention, management and treatment of stress disorders.

Yuanyuan Xin (1990) studied Applied Psychology at the Shaanxi Normal University in Xian, China and received her Masters in Cognitive Psychology at Southwest University in El Paso, United States of America. Her doctoral research took place at the Cognitive Neuroscience Center of the University Medical Center Groningen. She defended her thesis on November 11, 2020.

The role of small conductance calcium-activated potassium channels in mitochondrial dysfunction: Targeting metabolic reprogramming and calcium homeostasis

PHD STUDENT
I.E. Krabbendam
THESIS
The role of small conductance calcium-activated potassium channels in mitochondrial dysfunction: Targeting metabolic reprogramming and calcium homeostasis
PROMOTORS
Prof.dr. A.M. Dolga
Prof.dr. M. Schmidt
FACULTY
Science and Engineering

Neurodegenerative diseases are characterized by progressive cell death, often attributed to mitochondrial dysfunction, inflammation and oxidative stress. The main aim of the thesis of Inge Krabbendam was to investigate the role of SK channels on calcium homeostasis, reactive oxygen species (ROS) and mitochondrial metabolism, in neurodegenerative conditions, inflammation and brain cancer. Inge Krabbendam: ‘We showed that pharmacologically modulating mitochondrial KCa channels mediates cellular protection against oxidative stress through mitochondrial preconditioning in neurodegenerative conditions. Investigating the role of mitochondrial calcium in oxidative stress, we demonstrated that an enhanced endoplasmic reticulum – mitochondrial interface induced mitochondrial calcium overload in conditions of oxidative stress, and impaired mitochondrial bioenergetics, events that were prevented by SK channel activator CyPPA. Further, we showed that attenuation of mitochondrial calcium uptake using mitoxantrone and ruthenium red preserved cell viability in ferroptosis. Thus, attenuation of mitochondrial calcium, in particular via activation of SK channels, plays a crucial role in cellular protection against oxidative stress. Neuroprotective effects of SK channel activation against ferroptosis also involve adaptations in cellular metabolism. CyPPA induced an initial metabolic shift towards glycolysis, followed by a small reduction in mitochondrial complex activity and a
mild induction of mitochondrial ROS. In vivo, CyPPA increased lactate production, median lifespan and mitochondrial stress resistance. Besides, CyPPA attenuated LPS-induced macrophage activation, even in conditions potentiated by succinate, possibly via reducing reverse electron transfer. Finally, we reported that SK channel activation can promote anti-tumour capacities of the classical anti-cancer agent auranofin in brain cancer cells, due to enhancing ROS levels and mitochondrial dysfunction.‘


Positron emission tomography in infections associated with immune dysfunction

PHD STUDENT
A.O. Ankrah

THESIS
Positron emission tomography in infections associated with immune dysfunction

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FACULTY
Medical Sciences

This thesis explores the role of Positron Emission Tomography (PET) in infections associated with immune dysfunction. PET is a medical imaging technique that images biological processes in the body. Whole body PET provides 3-dimensional images which allows it to display infections from various regions and deep within the body cavity. The thesis examined three infections: Human immunodeficiency virus (HIV), tuberculosis (TB) and invasive fungal infections (IFIs). All three infections require treatment over long periods of time and usually require monitoring of the efficacy of the treatment or the side effects of some drugs. In HIV, PET can evaluate and follow-up infections and malignancies associated with HIV. The metabolic uptake in the lymph nodes reflects viral replication and allows staging of HIV. In TB and IFIs, PET provides detection of early sites of infection and all sites of disease in the body in a single examination, and allows monitoring of treatment of these infections. Monitoring of infections is useful in complex IFIs and TB, where traditional methods of monitoring are often suboptimal. PET was found to have a predictive value in both TB and IFIs, which can help clinicians consider different treatment options early in the course of infection. PET imaging is done with different tracers which allow evaluation of different biochemical processes in the body. In the thesis, the advantages of imaging TB with different tracers and the potential role of imaging hypoxia in TB were explored.

Alfred Otoe Ankrah (1974) studied Medicine at the University of Ghana and did a study to become a nuclear physician at the University of Pretoria and the Steve Biko Academic Hospital in South Africa. He now works as unit head and nuclear physician at the Korle Bu
Teaching Hospital in Accra, Ghana. He did his doctoral research at the University of Pretoria, under supervision of Prof. Dr. Mike Sathekge, as well as the department of Nuclear Medicine and Molecular Imaging at the University Medical Center Groningen, under supervision of Prof. Dr. Andor Glaudemans and Prof. Dr. Rudi Dierckx. He defended his thesis on November 30, 2020.

Adaptive timing

PHD STUDENT
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THESIS
Adaptive timing

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Behavioural and Social Sciences

Four minutes at the bus stop can feel like an eternity, while time flies when we are watching an enjoyable movie. Our sense of time is very elastic. In this thesis, we investigate how people use previous experiences to predict how long something will last and when something will happen. We show that experiences in memory have a direct influence on the way we experience time. When participants estimated a duration, we observed a faster build-up of brain activity if they had just estimated shorter durations. The brain does not seem to work like a static stopwatch, but instead creates active expectations based on previous experiences. Does this mechanism of expectations still work when we are doing something else, for example, when we are listening to music while working? Our results show that people perceive drum rhythms in a musical way, even when they are performing another task. We observed that the size of the pupil increased when a beat was omitted from the rhythm. And the more important the beat, the larger the pupil. Thus, our eyes reveal how musical we subconsciously are. All in all, this thesis shows that time can be seen as an inherent part of brain processes that adapt to a dynamically changing world.

Understanding aggression and treating forensic psychiatric inpatients with Virtual Reality

PHD STUDENT
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THESIS
Understanding aggression and treating forensic psychiatric inpatients with Virtual Reality

PROMOTORS
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Medical Sciences

Many forensic psychiatric inpatients (in Dutch: TBS-patients) have difficulty controlling their aggression. For example, aggression can be aimed at fellow patients, staff, and/or objects. This not only has negative consequences for emotional and physical well-being, but also influences the progress of the treatment and the living environment in a TBS-clinic. The aim of the research in this dissertation was to investigate the effectiveness of a new treatment, but also to improve knowledge about aggressive behavior. TBS-patients relatively often have poor impulse control, and easily misinterpret social situations as hostile. Our systematic literature review showed that this tendency to interpret ambiguous social situations as hostile also occurs in non-aggressive TBS-patients and individuals in the general population. We also found that physical aggression from TBS-patients to staff or belongings is often preceded by non-physical aggression, so that structured monitoring of aggression can contribute to the reduction of incidents. Currently, there are few effective treatments for aggression problems. That is why we have developed a Virtual Reality aggression prevention therapy (VRAPT). This dissertation shows that the assessment, framing, monitoring and treatment of aggressive behavior in TBS-patients is a challenge, even with an innovative VR treatment. Unfortunately, the number of aggressive incidents did not decrease after VRAPT. However, the intervention studied was an important first step in the development of VR-treatments in forensic psychiatry. This dissertation shows that further steps are needed, fortunately the assessment of patients and therapists shows that there is support for this.


Electrically induced neuroplasticity: Exploring the effects of electroconvulsive therapy for depression using high field MRI

PHD STUDENT
J.O. Nuninga

THESIS
Electrically induced neuroplasticity: Exploring the effects of electroconvulsive therapy for depression using high field MRI

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FACULTY
Medical Sciences

Electroconvulsive therapy (ECT) is an effective treatment for severe depression. Unfortunately, ECT has cognitive side
effects. In addition, the exact effects of ECT on the brain remain not entirely understood. In this thesis the cognitive abilities of people before ECT, after the tenth session and at 6 months follow-up will be investigated. In addition, the change in brain structure after ten ECT sessions will be quantified. By making use of an MRI scanner with high magnetic field strength, we were able to accurately image the dentate gyrus (DG) of the hippocampus. The DG is, together with the subventricular zone (SVZ), the only region of the brain capable of neurogenesis (formation of new neurons) in adulthood. Interestingly, we found that the DG grew in size after 10 ECT sessions, which seems to reflect neuroplasticity (such as neurogenesis and the reorganization neuronal connections). Using several different MRI scans, we studied whether the increase in volume of the DG was due to edema (retention of fluid) or new blood vessels. This was not the case. Furthermore, we did not find clues for neurogenesis in the SVZ after ECT. In addition, we found that ECT caused cognitive impairment at the short term (after ten sessions), yet these impairments, on average, subside after six months. The findings from this thesis could be used in future research directed at getting a better picture of the effects of ECT, and to investigate if we could design therapies achieving similar efficacy without the associated side effects.

Jasper Nuninga (1994) studied Psychology at the University of Leiden and Neurosciences at the University of Utrecht. During his doctoral research he was connected with the department Biomedical Sciences of Cells and Systems and the BRAIN and Cognition Institute of the University Medical Center Groningen (UMCG). He now works as postdoc at the UMCG and psychologist at FortaGroep. He defended his thesis on January 4, 2021.

Tinnitus & cochlear implants

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Medical Sciences

A cochlear implant is an electronic device that can help to restore hearing in patients who have severe bilateral sensorineural hearing loss. This thesis aims to obtain more insight into the number of patients that might benefit from cochlear implantation concerning tinnitus. We did two questionnaire studies, which showed that the prevalence of tinnitus in cochlear implant patients is 51–66%. The tinnitus severity is generally mild to moderate. Cochlear implantation reduces tinnitus in an important part of the patients (56–75%), but in a small part of the patients (0–28%) cochlear implantation has a negative influence on tinnitus. However, in the patients who show tinnitus deterioration, the tinnitus handicap does not increase and in the patients who show tinnitus onset after implantation, the tinnitus handicap is mild. Based on the questionnaire studies we created a prognostic model that showed that the lower the preoperative tinnitus handicap and the preoperative hearing handicap, the higher the chance that cochlear implantation will worsen tinnitus. This result suggests that preoperative screening with tinnitus- and
hearing handicap questionnaires could be meaningful. Further, we performed a study in which we explored single electrode stimulation to reduce tinnitus perception. We found that the effect of single-electrode stimulation on tinnitus is relatively small in comparison to the effect of full-array stimulation, but in some cases sustained single electrode stimulation may be beneficial for tinnitus management.

Francka Kloostra (1985) studied Medicine at the University of Groningen. Her doctoral research took place at the department Otorhinolaryngology of the University Medical Center Groningen. She now works as Otorhinolaryngologist at the Ommelander Ziekenhuis Groningen. She defended her thesis on January 25, 2021.

Distinguishing a phonological encoding disorder from Apraxia of Speech in individuals with aphasia by using EEG

PHD STUDENT J.V. den Hollander
THESIS Distinguishing a phonological encoding disorder from Apraxia of Speech in individuals with aphasia by using EEG

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FACULTY
Arts

As we speak, various processes take place in our brains. We find the word, find and organize the speech sounds and program the movements for speech. A stroke may cause impairment at any of these processes. Usually, multiple processes are affected. Existing methods to distinguish a disorder in finding and organizing speech sounds (phonological encoding) from an impairment in programming the articulation (Apraxia of Speech) are not optimal. In this thesis, it was studied whether EEG, measuring small changes in electric brain activity with electrodes that are placed on the scalp, can be used for this purpose. A protocol was developed to trace the processes of speech production, which was successfully tested in a group of younger and one of older neurologically healthy adults. In the younger and older adults, the processes were registered at the same electrodes on the scalp, but the time window and the waveform of the processes differed. In individuals with a phonological encoding disorder and those with Apraxia of Speech the disordered processes could not be identified, because the severity of the impairment in the groups varied. Their impaired processes differed from those in neurologically healthy individuals. Also, because of their disorder in the previous stage, the programming of the articulation was different in individuals with a phonological encoding disorder. The protocol can distinguish a phonological encoding disorder from Apraxia of Speech due to differences in the EEG data (relative to neurologically healthy participants) that only were observed during programming movements for speech.


EVELYN KUIPER-DRENTH, ON THE BASIS OF PRESS REPORTS OF THE UNIVERSITY OF GRONINGEN

COVER BY ARNE BLANKERTS
“Er is meer moed voor nodig om de ander te begrijpen, dan om deze te veroordelen.” [It takes more courage to understand the other than to judge them]
> Jeannette Gelauff

“Thinking before answering can ruin the answer.”
> Sarah Maass

“It is better to be vaguely right than exactly wrong.” - Carveth Read; ‘Logic: Deductive and Inductive’.
> Yulia Akinina

‘There is no such thing as too much backup.’ (common knowledge & personal experience).
> Yulia Akinina

“Doing a PhD is like running a (half) marathon; including the enthusiastic start, trying to do more than you actually can, the hardest part in the end, but euphoria when finished.”
> Inge Krabbendam

“Everything will be okay in the end. If it’s not okay, it’s not the end.”
> John Lennon.
> Stéphanie Klein Tuente

“Winnaars zijn niet de mensen die nooit falen, maar de mensen die nooit opgeven.” [Winners are not the people who never fail, but the people who never give up]
> Francka Kloostra

“If the road is easy, you’re likely going the wrong way. - Terry Goodkind.
> Jakolien den Hollander
New staff writers wanted!

Do you enjoy reading the Newsletter? If so, why not join our enthusiastic editorial team and make it even better? Regardless of whether you’re a master student or PhD student, it’s a great way to expand your network, improve your English writing skills, and be actively involved in BCN. Interested? Send an e-mail to Sander Martens, sander.martens@gmail.com!
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