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Down the rabbit hole



university of
 groningen



How I won a VENI: An interview with Anouk van der Hoorn

First of all, congratulations for winning a prestigious VENI grant! Looking at your profile, what struck me immediately is that you graduated with MD/PhD in the department of Neurology, then became a radiology resident and later went ahead to be appointed as a post-doctoral researcher at the University of Cambridge during the radiology training. Could you tell us the process from applying and receiving the acceptance from Cambridge?

I was looking for a topic that was close to my heart and was very interested in: Neuro-oncology and Brain Imaging. In Cambridge, there was an institute that performed such kind of research. I saw Dr. Stephen Price's articles on PubMed related to tumor imaging and was interested to work in his lab on such topics. I sent him a mail describing my current research and interest in his specific work. It was a very concise email to which I received a response from him. I believe that if a person does not ask for availability for certain positions, he/she may not receive a reply. Later, when I went to Cambridge, they informed me that they tended to agree on long-term visits (at least for a year). However, since I had stated my requirements very clearly in my mail, they agreed on my stay for 6 months. They felt I knew exactly what I needed.

How did you settle on Radiology?

I always wanted to do Radiology or Neurology. During my MD/PhD, I had not done a clinical internship in Neurology yet. In my PhD, which I did at the department of Neurology, I worked on MRI data. After my clinical internships in Radiology, I already knew that I liked Radiology. However, since I did not yet know how clinical internships were in Neurology, I also did one in Neurology. In the end, I liked the theory behind Neurology. However, what particularly interested me in Radiology is that it is much like a puzzle. That is, it is almost as if we need to solve a puzzle to know and understand what we are working on. Additionally, I liked the technical background of radiology.

What were the major factors in your application that contributed to obtaining a VENI grant?

We never know what is in the minds of the people involved in the decision committee. For the grant itself, I feel, we need to write it down in such a way that everyone understands the proposal. The proposal may need to bring in the feeling of urgency of the problem that needs to be solved. A pre-proposal round was newly introduced for the year when I applied. In the pre-proposal round, we were asked to write 50 words about the research we were

going to perform. We also had to describe the current studies we were working on in our respective fields and whether we were leading a particular group and so on. In the pre-proposal round, it was mostly concerning the description of the individual researcher which I found a bit challenging to write about. I always describe working on projects as a "we" [as it's always a team effort] and to just write about myself during the proposal round was quite new. They wanted to know how you have contributed to the particular field as an individual and to show much enthusiasm. The people from the research office at the UMCG tend to give good advice on such applications. My topic for the application was on radiotherapy damage to the healthy brain. If you give radiotherapy, you of course want to kill the tumor. But to reach the tumor, you need to pass healthy tissues, also in the case of brain tumors and head-and-neck tumors. My research topic thus involved radiotherapy damage to the healthy brain with a focus on innovating imaging techniques.

You need to have a consistent research profile in order to be a suitable candidate for the selection criteria. They expect to see how you have grown after your PhD, whether you have always worked independently during

your PhD, and how you have set up your research after the PhD. It does not always have to be about how many articles you have published. The focus was especially on how relevant it may be for a group of patients or other groups of researchers. My project will start from the first of September this year.

A few pivotal moments that shaped your work during its early stages?

The support from the department, including close colleagues and the head of the department, encouraging me to build a new research line, as well as brainstorming sessions and discussion of the equipment that would be needed to support such research. Especially when you are early in career, this kind of support really helped me to grow. Also, unofficial moments during coffee breaks or during official year evaluations helped me understand that people really believed in me. It allowed me to do what I wanted to do: both research and clinical work.

What does your research team look like? What does a typical day look like for a radiologist?

I supervise a few PhD students and in September I have a new post-doc researcher starting. I basically have two types of days: clinical days and research days. During my clinical days, I'm busy with MRI or CT scans myself or supervise radiology trainees, looking at neuro-radiology scans together (mostly MRI). Or it could be scans based on head and neck, spine and neuro-oncology. I also have multi-disciplinary meetings with other clinicians to discuss patients. During my research days, it is quite different. I have meetings with PhD students to discuss particular stages in their studies. Sometimes I have

students for internships as well. I also block a few hours to read papers and write METC applications. I typically have 2.5 days for research and 2.5 days for clinical work. I am also a coordinator for neuro/ Head and Neck at the UMCG. So I try to balance these various fields throughout the week. I really enjoy the variety, working in both research and clinical settings.

- BY KAVYA PRASAD
- PHOTO FROM UMCG WEBSITE

"My research topic thus involved radiotherapy damage to the healthy brain with a focus on innovating imaging techniques"





BCN METc survey follow-up



Over two years ago, the BCN Education Committee received several indications that PhD students whose studies involve human participants, may receive considerable delays in their projects during the process of ethical evaluation. After talking to the METc secretary and BCN board, we organized a survey in 2019 to obtain an overview of the issue. The general outcomes were well in line with an earlier questionnaire by the GSMS. The main outcomes of the BCN survey were:

1. 3.7 month average METc proposal writing time (range 0.5-10 month)
2. 4.5 month average evaluation turn-around time (range 1-12 month)
3. (1) + (2) gives an average delay of 8 months (range 1.5-18 month) for many BCN PhD projects. Such a delay seems unacceptably long for a 2.5- (MD/PhD) to 4-year PhD project!
4. METc proposal turnaround time did not seem to differ between faculties within the university.
5. Proposal preparation time and METc evaluation time did NOT depend on supervision, PhD student authored, or METc/BROK course followed. Moreover, the questionnaire data indicated a trend that more supervision delayed the process even further.

Further inventory among different BCN PhD students further indicated that they had major difficulties with the many forms often requiring redundant information, re-asking already stated and explained items, redundancy in the METc responses, too many issues with the scientific validity, re-iteration of previously settled issues, and general inconsistency of METc responses both within and between proposals.

Two BCN Education Committee members discussed these outcomes with the chair and secretary of the METc in an open discussion. The METc saw the problem of project delays, but according to them the quality of the proposals was the main reason for delays, questions, and inconsistencies. The law required these many forms with sometimes redundant information, and no clear option was identified to speed up this process to obtain METc approval.

What was identified is that communication between METc members and PhD students and supervisors may be a good way forward to generate mutual understanding and to maintain attention to this matter. This may indeed be an important strategy since the population of PhD students is continuously changing and new students need to be aware of the processes around METc proposals. To enable such interactions, the METc

had already initiated a meet & greet in the past, and BCN Education Committee has followed up on this with a general information presentation from the METc. The first such meeting took place in March 2021, which was well attended by BCN PhDs and was found very useful by them. Further, the BCN Education Committee saw an opportunity to invite METc members as part of a course to make it easier to write an METc proposal.

Although we have a feeling that the problem could not be entirely solved, also because of legal requirements, we do sincerely hope that the new initiatives of the BCN Education Committee and METc will further facilitate the process of obtaining METc approval for the projects proposed by BCN PhD students and researchers.

■ BY DENIZ BAŞKENT & ROELOF HUT



> FROM THE BOARD COLUMN

Is there a female brain?

When I was a teenager I read the Simone de Beauveoir's book "the second sex". She wrote that no one is born as a woman, but society makes us into (men and) women. I had no doubts then that this was indeed the case. Girls and women were treated very differently in my eyes. They were given different chances, asked different duties. Even though I knew she was a novelist and not a scientist, I somehow remembered from her work that there are no differences in brain and behavior at birth.

How wrong I was! When I studied the brain as a PhD student, I found out that there are a myriad of differences between men and women and between girls and boys, many of them already present at birth. Let me name a few. The physiological response to social stress (i.e. Trier test) in women is very different from that of men, especially during the high estrogen phase of the

menstrual cycle. The increase in cortisol, blood pressure and heart rate are much lower in women, showing almost no overlap with men. The immune system is also different, with a generally more effective response to infections in women, but also a much higher prevalence of atopic and auto-immune diseases. The brain itself is also different: larger volumes and more neurons in men, but higher metabolism and more cortical folding in women. Receptors, transporters and enzymes for many neurotransmitters are differently expressed in men and women. Uptake of medication from the gastro-intestinal tract, liver metabolism, renal excretion, all very different between the sexes.

When we go from sex differences to gender differences, women, on a group level, have different personality profiles, scoring higher on neuroticism and



agreeableness. There is a strong tendency among women to underestimate the own capacities. For example, we now know that women and men do not differ in mean IQ, given similar education. Yet, when women are asked to estimate their own IQ, they score lower than average. Men being asked the same thing, generally tend to overestimate their IQ, leading to a difference of 20 estimated IQ points between the genders.



The interest for objects, like buildings, vehicles, stars and space etc is generally higher in men, which is partly related to prenatal testosterone. Another in part testosterone-related characteristic is the tendency to reach for a high social status. In our society this is often expressed in money. Might this be related to the large gap in income we see between men and women in the Netherlands?

There are also different coping styles, with men seeking distraction from stressors and women tending to talk about their stressors to friends. The latter style may lead to rumination, increasing the risk for burn-out, anxiety and depression. All three are double as common in women as in men.

So at 50, I have to conclude that Ms de Beauvoir, my teenage hero, was wrong in the point that we are not born a woman. In fact we are. Different treatment of men and women is still a fact anno 2021, as it was when she wrote her bestseller in 1949. In meetings attended by both genders, men are given (or demand?) more speaking time. Women are (are agree to be?) interrupted more often. For leading positions, women are often

overlooked. When presenting themselves, women may underestimate themselves, but the same tendency to underestimate women as compared to men is ubiquitous, even in our 2021 Dutch society.

Despite the many sex and gender differences, men and women of course have the same rights and duties but, and this is worrisome, largely receive the same medical care. We know diagnoses to be gender-specific, serum levels of many medications to be twofold higher in women when given the same dose as men. We are working on that. Associations like [Alliantie Gender en GGZ](#), and Vereniging [Gender en Gezondheid](#), strive for gender sensitive psychiatric and medical treatment respectively. But what about neuroscience?

Historically, we used to deal with the presence of sex and gender differences in brain and behavior by simply excluding women from participating in studies. Men do not have menstrual cycles with bothersome hormonal fluctuations changing so many of our outcomes. Also, men do not run the risk for becoming pregnant during a trial. So we found our perfect study participants: men. Problematic is that we then applied findings on men-

only or men-predominantly studies to both sexes. But the wind of changes is blowing. Some top journals, like Lancet, ask for sex-specific analyses of findings. Some funding agencies, like ZonMw, now begin to ask for a minimum of 40% female participants. An important and dearly needed trend. And what about basic neuroscience? Should we mind whether the donor of brain tissue or stem cells was male or female? Do we need to perform sex analyses for animal studies as well? My answers are: yes and yes. The influence of an extra X chromosome, of female imprinting and the influence of estrogens is high. Female mice, much like humans, also have differences in immune and stress response and even sex differences in the dopaminergic system are evolutionary well conserved. So my dear colleagues, let us all mind the sex and gender differences at all levels of neuroscience, from cells to systems and help to provide gender specific care and treatment for both sexes.

■ BY IRIS SOMMER

Nothing but the Truth

There is a growing debate on trust and truth in science, both within the scientific community and in the broader public arena. Within science, researchers are more aware of problems in the way science is organized. Controversial issues include poor reproducibility of findings, the role of the funding system and the influence of commercial interests. On a societal level, people have become more skeptical of scientific facts. Politicians, opinion makers and the general public may have trouble recognizing fact from fiction, and 'alternative facts' are used to support different agendas.

The BCN symposium 'Nothing but the Truth' will be devoted to truth and trust in science, both within the scientific community and among the general public. During a one-day symposium, we will discuss several important topics in plenary lectures and interactive workshops by renowned experts. Confirmed speakers include John Ioannidis, Eric-Jan Wagenmakers and more.

We especially invite researchers who are in early stages of their careers, and we hope that the discussions during our symposium can help form basis for values and opinions carried throughout their academic path. More details and registration form can be found on www.nothingbutthetruth.nl.





Bits and Pieces: Black Mirror

I was in a meeting with three fourth year PhD-students. All from different disciplines. All with different supervisors. I asked whether they considered pursuing a career in science. They all started laughing. They all said that an academic career wasn't very appealing to them. It turned out, that's because of us, supervisors. We give the wrong example. What they see is: PIs working on grants and admin, for long hours. And probably sighing and complaining a lot about that. Clearly, that doesn't look exciting. I'm guilty too.

So, dear BCN PIs, I need you to take a look in the mirror with me. The future of Behavioural and Cognitive Neuroscience needs your help. Otherwise, we lose the brightest, fun, and creative people. Because they fear to end up like us. But don't panic. I have a plan.

This is what you can do: 1) Make a list of all things you do; 2) Rank all items on your list twice: once for importance, once for how much fun you have in doing them; 3)

Erase the non-important / non-fun things (maybe find a solution, or do them secretly when no-one sees it); 4) Tadaaa: You are ready to present your new refreshed self to your students. Set an exciting, energizing example. It's not difficult. Just don't forget to tell and show your students what you love about your job.

Tell about the fun you have (clearly internally) when you write a grant proposal. The joy you feel when you're on to something. The pleasure of fixing a paper. The amusing interactions you have with these crazy colleagues. The love you have for your students. How victorious you feel when you arranged a contract for someone or outsmarted HR. How fantastic it feels that a bright master student wishes to spend a large part of his or her study in your lab. How proud you feel when they finish, despite substantial methodologic or personal hiccups. The gratefulness you feel because being surrounded by young people saves you from severe cynicism and turning into a conservative bastard. How happy you

feel that you get to spend your working life on the core questions that still make you feel excited.

Show it. Smile. Laugh. Maybe not every day, but regularly. Take 'snipperdagen' when you need it. You have that freedom. Academia is about freedom. Of thinking. Of topics. Of picking collaborators. Of choosing ways to do you work. Of changing the system. Of course, it's not the perfect job. Neither the perfect system. But could you really think of a better job for you? I guess not.

Thanks for helping out in keeping all these beautiful people in. I'm counting on you.

■ BY MARIE-JOSÉ VAN TOL

P.s. If you don't find time to execute step 1 – 3 of my plan, just make sure you don't forget to mention the good things.

Now what? Life after defence

A Conversation with Rodrigo Moraga Amaro and Débora Elisa Peretti

Rodrigo Moraga Amaro (Post-doctoral Researcher at Medizinische Hochschule Hannover) and Débora Elisa Peretti (Post-doctoral researcher at UMCG) recently obtained their PhD and discuss what's next.

RODRIGO: I always wondered how the process was between finishing your PhD and getting a post-doc position.

DÉBORA: Since I stayed in the UMCG right after, it was a smooth transition. I sometimes feel that I am doing a PhD and in parallel, helping people a bit more. This helps me understand other researchers' projects and understand the topic in greater depth. Other than starting with a new dataset, it was changing from one type of work to another that feels different. This will also be the case when I move to Switzerland for a new position.

RODRIGO: Tell me more, how did you receive this new job?

DÉBORA: I searched for jobs on LinkedIn and applied to one that I came across that was located in Switzerland. Nine days later, I received a call from the team. I am

finishing my work earlier than I expected at UMCG. And how about you? How long did you look for a job?

RODRIGO: I tried to have some free time right after my PhD. However, reality was different. Since I was a scholarship student during my PhD, I did not have any payment or unemployment fee and thus had to be quick to find something new. I started looking for a job 3-4 months before the end of my 4-year PhD contract. I applied to a lot of positions, not restricting myself to the topic of my PhD. I not only looked at the imaging field, but also for molecular biology positions. I adapted all my motivation letters to the job preferences. I had also applied to companies, although, they didn't reply. I received 2-3 rejections since they were looking for certain skills that I thought were extremely specific (such as electrophysiology in hippocampus sections), while my expertise involved behavioural measurements, molecular biology and imaging. However, I ended up with two

job offers and decided to take up a job in the Nuclear medicine department in Hannover, Germany. We perform neuroimaging and autoradiography here. Did you have to learn to use new software for the subsequent job positions?

DÉBORA: I had to learn both R and Python. I have seen a lot of labs asking for R or Python and that is the queue to pick up and learn these languages when you have the time. Indeed one has to write motivation letters customised for each and every job, making it very specific for each project. I have also received rejections before accepting the position at the UMCG. I applied to the Neurology department as well. However, they wanted someone with more project management skills such as patient overview and data handling skills.

RODRIGO: I agree, my current job also requires a lot of planning and managing since my current boss and I are the only people performing and handling everything. It is quite a lot. However, I do have some students. Right now, I have a lot of challenges in validating various techniques. Autoradiography and cluster based analysis are things



that I gained experience with here. This is something you should talk about in any job interview. To know what additional experience is needed after joining the lab.

DÉBORA: For example, when I was offered this position in Geneva, they asked me if I had experience in MATLAB. I said yes, although I performed a lot of analysis in SPM. So even though I had worked in MATLAB, it looks like I have to learn a little bit more concerning the coding part of MATLAB. My experience is PIB tracers and they are working with [18F] tracers and for sure not PIB. But I gave them a sense of trust that I would be able to handle the project. It is actually also quite difficult for them to be very specific in what they are looking for. As long as the match is close enough so that any knowledge that is still lacking can be quickly gained, I guess you are ok. Reading some papers before the interviews is helpful.

RODRIGO: Do you have some tips for upcoming PhD students for planning?

DÉBORA: Well-organised files are crucial. I started planning in the sense that I knew it always takes longer





than you think to write things up. We also have to plan for courses in time. Making time in your schedule for this is essential.

RODRIGO: Especially in the first year. We can take as many courses as we can during the first year. And even look at external courses along with conferences. But also learn to keep in balance without getting a burn-out.

DÉBORA: Conferences are also good to see and be seen. When we went to EANM in 2019, Barcelona, I was actually offered a post-doc. However, it was too soon for me. I still collaborate with them though.

RODRIGO: Looks like a career requires both a lot of planning and different experiences. I wish you the best for the new job position in Switzerland.

DÉBORA: It was great talking to you and I wish you the same in Germany.

■ BY KAVYA PRASAD

■ PHOTO RODRIGO BY FELIPE

■ PHOTO DÉBORA BY ISADORA LOPES ALVES



> ALUMNUS STUDENT COLUMN

Virtual Realities

Could I work on my major thesis in a place of below -20 degrees and prevent my brain from freezing? Wearing two hats at once, I was eager to find out. Trondheim in Norway, considered central by Norwegians but far north by me, is an isolated place. In the circumference of five driving hours, you won't encounter any other city of considerate size and life. Given the times of a pandemic and closed borders, this isolation seemed even more absolute. It took 10 days of quarantine, isolated in a room within this isolated city, to be able to officially enter this secluded reality. I had found a bubble full of peculiar norms, where the changing sky alone seemed worth a visit and tacos and skiing took center stage.

What was I doing up north? I wasn't here just to find my way through snowy forests on cross-country skis. I had to exit this bubble six months later with a thesis. For this, I needed to create another reality on a computer. A virtual reality task that would help figure out the peculiarities of navigation in preclinical Alzheimer's patients. I started to think about navigation and our inner maps that keep us from getting lost, whether we talk in Norwegian or program in C++ and whether the temperature is minus 20 or plus 20 degrees. Something that allows us to stay oriented in new surroundings and to keep track of changing realities. How do we choose our reference points? The sky turned from dark to green and then the days got longer than the night, which was a constant reminder that time flies while one tries to understand how realities are made up.

I am not sure if six months later I ended up with a different coordinate system or if I got used to the brightness or the darkness of the seasons. Nevertheless, after this time, I have found my reference points in this bubble and suddenly it seems scarier to leave it than it was to enter it. But I have finished the task that brought me here and now it's time to update my position again and face the reality of a post-BCN and master life.

■ BY ANNIKA SAUTER





> MASTER STUDENT COLUMN

Completely online = completely offline? Doing the first year of BCN online

When I was asked to write this text for the master column I did not hesitate and agreed on doing so right away. I thought that it would be an easy task to reflect on my first year as a student that came to Groningen during a global pandemic, but I was quickly convinced otherwise. To me, especially the first semester had many challenges, however I could not pinpoint which of them was the greatest. I came to realize that this is not what this is about, but rather acknowledging that me and my fellow first years made it through this year of difficulties, uncertainties, and challenges.

From the beginning it was clear that this academic year was one that has never taken place in this form before. Most of us were aware that this was not only a new situation for us students but also for the staff/professors. Early on, it was clear that one of the most important things that constitute the spirit of the BCN Research Master Program is interdisciplinarity, as well as closeness to everyone involved in and related to BCN. Incorporating this spirit into the situation, namely online lectures, online practicals and very few in person meet-ups, was challenging for all of us.

When the first course began in September I knew a few of my track mates from the introduction day, but connecting to them felt difficult as you are not sitting together in lectures everyday but instead stare at the screen with everyone's camera disabled. I soon found that this also had its perks; snacking mid-lecture, yawning without feeling caught or sometimes just getting up and stretching for a bit. However, I was missing the socializing part of studying and especially of the small cohort that usually comes along with in person education. Now, lectures end with a "Bye!" in the chat, whereas in person you are able to talk a bit more about what is going on. It was difficult to create a similar environment online despite combined efforts from the student council and staff.

Eventually, this led to the creation of a GatherTown space, a location-based video conferencing tool. It is of course a bit awkward to join a game night in GatherTown when you have only seen the others in person once or twice, but at least it gave us an opportunity to interact with each other outside of lectures. This space was later also used for the BCN Summer Symposium and in my opinion we as students as well as the staff managed the situation

fairly well. Of course, you can always find a hair in the soup for example by saying that some lectures might have been less organized or not yet adapted to the online environment. Some situations may indeed have been handled better, but who is to blame? We were all new to this and I believe that all of us did their best to make this situation and experience worthwhile during these challenging times.

It was, frankly, quite easy to get us students excited. I remember for example when we had our first in person practical in December, I was stoked about going to the Linnaeusborg for the first time, see some of my classmates and be in the lab again and awaited these days with great excitement. Later on, I was lucky that my minor project took place on campus from February on and that I got a glimpse into what on-campus education could look like in Groningen. However, I cannot wait to be back on campus this fall to full on-site education, to socialize and drink coffee with others (and maybe listen to some lectures, even though I will have to take care not to think I am muted and have my camera turned off in Blackboard). Online education sure has its advantages but despite all efforts taken from students and staff cannot replace the in person experience.

■ BY KARINA KÖPKE



Mindwise: COVID-19 and well-being at work

How to create control around your work, help yourself and others

“Unprecedented times”, “Stay safe”– inboxes have been overflowing with such messages this year. Indeed, COVID-19 has affected our life in numerous ways. It’s transformed the way we move, the things we buy, the way we meet people, and redefined happiness. It has also left traces on the workplace, and maybe even reinvented work forever. While before you might have dreaded getting ready for a meeting or commuting to work, you may now dream about physically seeing and sharing a coffee with your colleagues. You might miss your office, photos on your desk, the smell of freshly printed paper and maybe even your supervisor. You may be one of the many employees whose well-being was affected by this crisis. How can you help yourself, colleagues and friends during these times? How can you avoid making it even worse? Such questions bear asking.

What helps?

As with every crisis, the first soldier to fall is our sense of control. We become more anxious, more stressed and tend to hold on to the “normal”, convincing ourselves it shall soon pass (Chong et al., 2020). After a while, this becomes difficult, as we see no light at the end of the tunnel. This in turn hinders our well-being and performance at work (Trougakos et al., 2020). Luckily, researchers have devised some solutions on how to create control around your work.

1. Engage in job crafting

Working from home has limited the amount of control you have over your tasks and environments, with increased levels of workload and hampered work-life balance (Trougakos et al., 2020). But it also gave you the opportunity to reassess the role of work in your life and to reflect on your work. Kniffin et al. (2020) recommend that job crafting can be helpful during crises, as it can help individuals regain a sense of control in face of demanding work tasks. Here’s how you do it:

Job crafting means actively changing one’s work or perceptions about work (Wrzesniewski & Dutton, 2001). For example, you might want to change the scope of your task by taking on a new project from which you can develop certain skills. Alternatively, you can organize your work so that your daily work tasks do not feel overwhelming or by redefining nasty work tasks and aligning them with your goals (for example, redefining going through that immense excel sheet into an exercise of patience). Further, you can create meaning around your work. I’ll give you a quote that helped me personally during these times: “The one that has a why, can bear any how” (Frankl, 1946). It might be helpful to reflect on what gives you purpose at work, why are you doing the job you chose. When a nasty task or a boring meeting comes your way, keep your “why” in the back of your mind.

2. Create a routine

This cannot be stressed enough. Evolutionarily, we prefer routines because we know what is coming, so our cognition does not need to be alert for something unexpected, i.e., a danger. Therefore, routines can put you in a good mood, and create a sense of safety (Avni-

Babad, 2011). Moreover, incorporating routines in your daily life can boost your energy at work (McClellan et al., 2020). Because routine behaviors are automatic, they do not require executive functioning. Therefore, your energy is conserved for other, more important tasks. For example, you might create a specific morning routine that makes you feel good like stretching after you wake up, having a hearty breakfast or meditating. Or you may want to incorporate a lunch routine and go outside for a walk during your break. Finally, routines can help you get through hard times when performed in a group. Family routines like having dinner together, going for a walk after work, etc. can increase your sense of belonging and help you experience emotional support, so you can also provide it to your loved ones.

3. Check on colleagues

The benefits of social support also cross family boundaries and impact the workplace. Ruiz-Frutos et al. (2020) found that 85% of their respondents believed that psychological support at work should be provided to employees especially during COVID-19. Research also shows that remote workers perform better when they experience social support from colleagues via task assistance or emotional encouragement (Kirkman et al., 2002). Informal meetings, even virtually, can increase the experience of social support, because they combat feelings of loneliness and create a sense of togetherness (Wang et al., 2020). In difficult times, it's important to know that you're not alone. Thus, don't forget to check on your colleagues and see how they are doing. You never know what a small conversation can change for another person's mental health.



What hampers?

Sometimes we can create difficulties for our own well-being. This becomes especially important during a crisis, when we might try solutions that we believe to be beneficial. But this can prove otherwise. Research shows that certain behaviors hamper our well-being at work; while they might create the illusion of high performance, they only promote burnout and exhaustion in the long run.

1. Always being available

Are you one of those people who answers an e-mail immediately, even after 8pm? Maybe you too are providing extended availability at work. Like many others, you may think: “the more I work, the better I perform”. However, in the long-run extended availability decreases well-being and increases the risk of burnout (Detmerr et al., 2016). Thus, it is important to know when to stop, especially if you’re working from home. When your dinner table becomes your working desk and your home becomes your office, creating boundaries between non-work and work is essential for detaching after work. This way, you can dedicate your time and attention to other life matters and –most importantly– allow yourself to recover (Mellner, 2016). Research suggests that creating working hours and completely reducing availability of work-related cues like your laptop or your email can help with creating a boundary between work and home (Mellner, 2016). Next time, consider turning off notifications from your work e-mail until the next day, shutting off your computer and closing “the office” for the day. You might feel more energized and less grumpy, and may create more balance in your life.

2. Suppressing your emotions

We’ve all had to deal with some bad stuff this year, and it has inevitably generated a bunch of negative emotions. Better said, a lot of negative emotions. From fear to sadness, each of us has had to choose how to deal with and control these emotions. Interestingly, the way we cope with negative emotions can impact work, but also personal relationships. For example, Trougakos et al. (2020) investigated how workers from diverse fields cope emotionally with COVID-19. They found that one recipe for disaster is to engage in emotional suppression, an emotion-focused coping strategy whereby people hide their emotions. People who engaged in emotion suppression were more likely to be less effective at work, have more health complaints and worse family engagement. In contrast, they found that problem-focused coping, i.e., managing the problem causing the distress rather than emotion-focused coping, was more effective in combatting anxiety caused by COVID-19. For example, the researchers found that hand-washing –a very relevant problem-focused coping during COVID-19– can be effective in helping people regain a sense of control and mitigating the anxiety caused by COVID-19. Effective coping is essential for your mental health, thus, being aware of your emotions and focusing on the problem can help you get by during a crisis and preserve your well-being.

3. Doing it all on your own

There are many reasons why employees don’t ask for help at work. For example, they might not seek help because it may seem to imply incompetence or dependability (Lee, 1997). However, it is important that you ask for help when

things get tough. This can take many forms such as asking for feedback, seeking help about a work task or asking for social support. All in all, seeking help can increase your performance by facilitating learning and decreasing uncertainty (Bamberger, 2009). Willingness to seek help can also protect your well-being by increasing your stress-coping skills (Bamberger, 2019). Moreover, Kniffin et al. (2020) suggest that during crises such as COVID-19, people are also more willing to give help and its quality is higher. All in all, helping behaviors are beneficial for both the help-seeker and the help-giver, as they can create a space of hope and certainty. Therefore, do not neglect the power of help: seek it and give it to others when needed.

Concluding thoughts

The strongest weapon of a crisis is uncertainty. And while this uncertainty seems daunting, you can create some control around your work and life with these evidence-based know-hows. Every crisis is bound to end, and this one will too. But before we reach that, take care of your mind and body, check on others and safeguard your well-being.

■ BY IUSTINA ARMASU

■ IMAGE BY TARYN ELLIOTT FROM PEXELS

Originally published by [Mindwise](#)

Last fall, Mindwise organized a Science Communication Workshop for BSS ReMa and RUG PhD students. Participants in this workshop learned to communicate

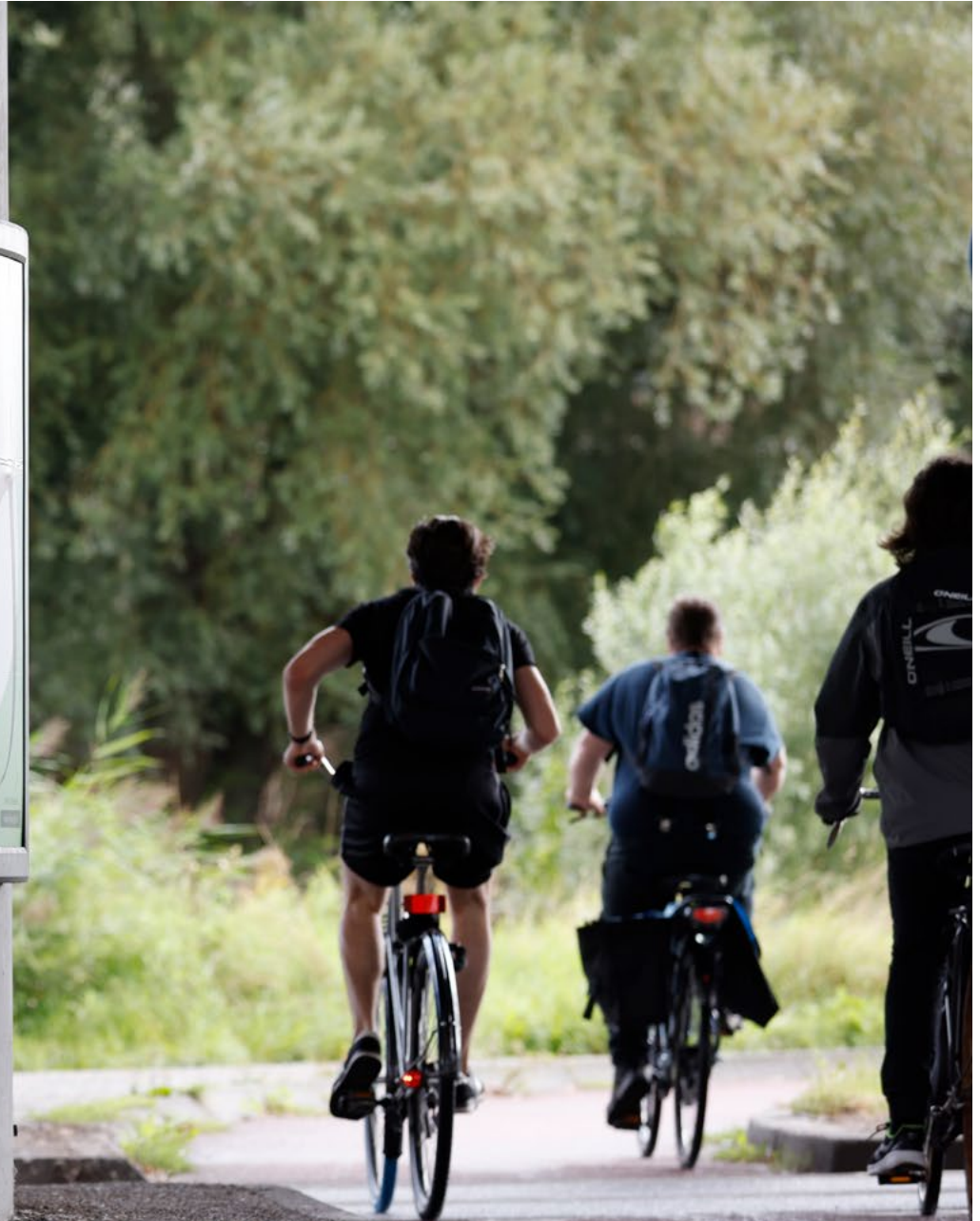
science to the general public by means of informing, giving an opinion, and relating science to issues in society. A selection of these blog posts was published on Mindwise, including this one.

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Iustina Armasu is a prospective PhD candidate, currently enrolled as a Research Master student. She specialises in Organizational Psychology. Her research interests are habits at work, self-regulation, leadership, creativity and well-being at work. She also has a passion for (tech) start-ups and entrepreneurship.



Mindwise: How do children experience the pandemic?

The Corona (COVID-19) pandemic affects all of us. However, while most things will get back to normal when the pandemic comes to an end, children are confronted with extreme lockdowns in early and formative lifetime phases, which are crucial for their development. Therefore, and due to the unpredictability and upheavals of the pandemic, it is important to investigate its effects on children. This article aims to describe both the impact on child development and what can be helpful for parents and families.

From a medical perspective, COVID-19 is not a big threat for children, who rarely occupy hospitals due to an infection (Dong et al., 2020), and they are less likely to spread the virus than adults are (Rajmil, 2020). Children are therefore not as relevant to fueling the pandemic compared to the rest of us. Nevertheless, children of all ages are affected by the measures that come with a pandemic. However, the adverse effects of Covid on children, concern mostly their psychological health.

The closure of kindergarten classrooms and schools can represent a problem for children, who need to stay at home for long periods of time during the lockdowns (UNICEF, 2021). As a large British survey from 2020 shows, especially those from low-income households were struggling with a lack of private outdoor space

(6% without any form of outside space), as well as not having enough desk space for making working and studying from home comfortable (37.5%) (Gilhooly, 2020). Additionally, some parents might not be able to compensate for the lack of a 'natural' routine that comes with going to a kindergarten or school, and which is important for preventing chaos. Besides this stressful situation for everyone involved, parents might be having a hard time coping with the pandemic themselves, creating a tense atmosphere. For some parents, it is therefore hardly possible to carry on a 'like normal' environment during lockdowns and to prevent passing on their own stress to their children.

Further, it appears that many school-age children and young adolescents are struggling with online education.

I observe this not only in my 15-year-old brother and his classmates, but it seems to be a widely spread problem, especially for children from low-income households (Gerber & Leong, 2021; Hoffman & Secord, 2021). Students struggle with hardware problems (difficulties with technology or lack of a computer), not being able to bring up the discipline of studying by oneself (something one is normally only expected to do at university age to this extent), difficulties with concentration, and difficulties understanding the materials through online education. Combined with the struggles of schools to provide high-quality education during the pandemic -since teachers can only provide a fraction of their crucial pedagogical skills through a screen-, students can be left frustrated and unmotivated.

Understandably, many children also struggle with the overwhelming variety of different reactions to the

Understandably, many children also struggle with the overwhelming variety of different reactions to the coronavirus.



coronavirus. We know that children need consistency and stability for healthy psychological development (Landry et al., 2021); however, the different opinions on Covid-19 coming from all directions might not be consistent enough. This can concern questions, for instance, about whether to wear a mask or not, but also how dangerous the virus is in general. Additionally, quickly changing measures and waves of lockdowns make this crucial stability hard to maintain.

Although our knowledge of the effects of the pandemic on children and adolescents is limited, some studies already show a general decline in mental health. For instance, an Austrian study showed that 55% of 14 to 20-year-olds have depressive symptoms, a prevalence of repeated suicidal ideation of 16%, next to high levels of anxiety, sleep disorders, and symptoms of eating disorders (Pieh et al., 2021). Overall, they found a significant decline in mental well-being compared to 2018. While struggles to cope with the pandemic can manifest themselves in psychological disorders in adolescents, psychological struggles of younger children manifest in increasing somatized, physical symptoms, such as stomach pain and headaches. Children's quality of life worsened throughout the pandemic, and especially those from households with low socio-economic status are affected. Possible explanations are that due to restrictions, many could not do any sports anymore, and healthy relationships with friends and family members could barely be established or maintained, therefore factors buffering psychological problems were diminished as well (Ravens-Sieberer et al., 2021a; 2021b).

To what extent children are adversely affected, however, seems to depend on the stability within their family, with more stability being related to more resilience and fewer difficulties with handling the pandemic (Ravens-Sieberer et al., 2021a). This includes an emotionally stable relationship with parents, social stability through regular contact with friends, a relaxed environment, a generally optimistic atmosphere, and a stable routine. According to pediatricians, parents can make a great difference by providing their children with clear strategies of how to handle the situation, such as washing hands regularly, by buffering their fear through reassurance that nothing bad will happen to them, or their loved ones, and by ensuring a reliable routine.

This time takes a toll on all of us, especially children, and although there are trends (Ravens-Sieberer et al., 2021a; 2021b), we cannot yet be certain about general changes in children's mental health to the present moment. As Dr. Kroll, head of the Department of Child and Adolescent Psychiatry at the Asklepios clinic Stadtroda in Germany, emphasizes, those changes might become visible only in the coming years, with the further development of those living through the pandemic in an early stage of their lives.

Parents can make a great difference by providing their children with clear strategies of how to handle the situation.

For now, it is relevant that public policies keep in mind the psychological effects of pandemic-related decisions on our youngest. Most of all, however, I have my deepest respect for all the parents out there, trying to buffer the effects of the pandemic on their children.

■ BY MALIN SPIEGELSBERGER

■ IMAGE BY [CREATIVE COMMONS LICENSE](#)

Originally published by [Mindwise](#)

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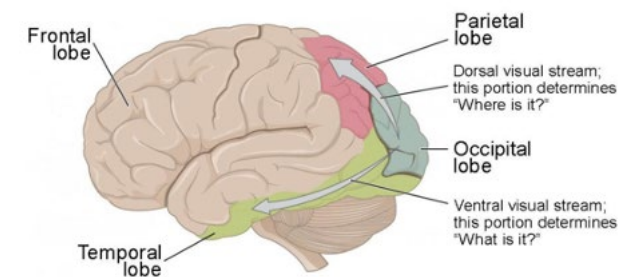
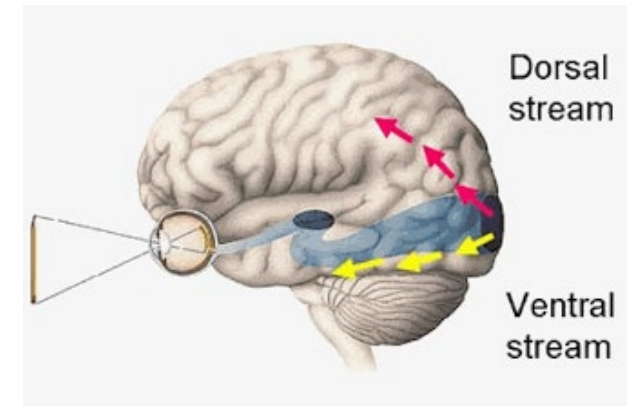
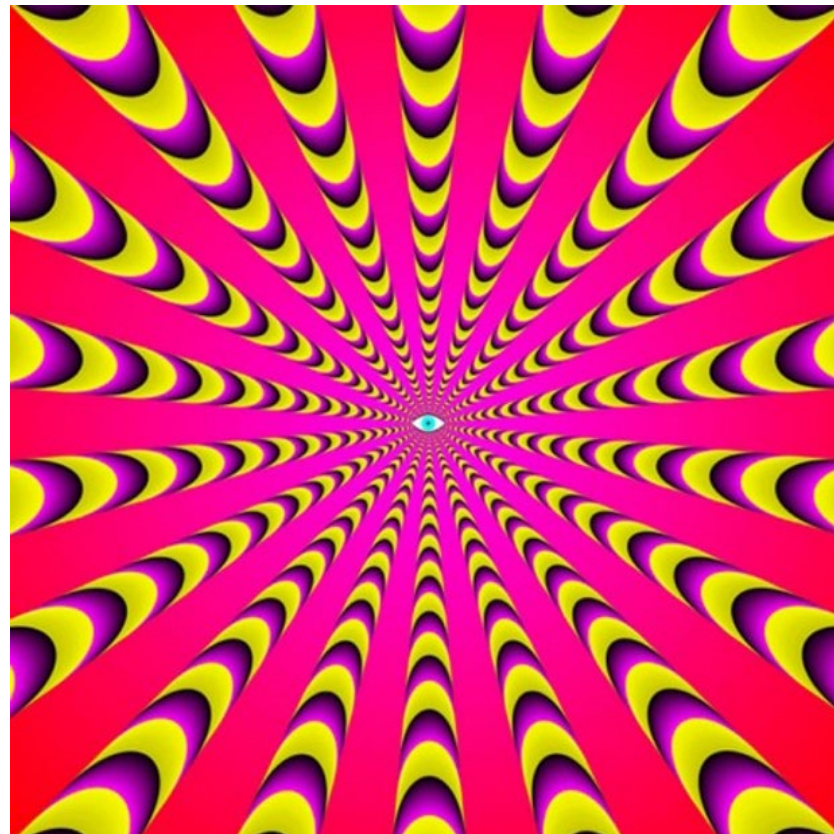
Malin Spiegelsberger is a second-year Psychology student from Germany, who is mostly interested in clinical psychology. She is fascinated by the different aspects influencing the human psyche and by how mental disorders develop and can be treated. After studying and teaching at the University of Groningen, she is planning on doing a master's in clinical psychology, in order to become a psychotherapist with a holistic approach in the future. In her free time, you can see her playing Volleyball, both inside and in the sand, and hanging out with her friends. She wrote this blog post in the context of the Honours Students Workshop Blogging in Science.

> PHD COLUMN

Is “Reality” constructed by your brain? The evolution game theory

While neuroscientists are struggling to understand the concept behind first-person reality, quantum physicists are struggling to understand the concept of how there can be anything but a first person reality. They believe that we are all seeing a story that’s being created for us.

Our brains unconsciously blend the perception of reality to meet certain desires and expectations. Visual illusions such as the picture can represent the extent of our brain’s perceptions.



About a third of the brain's cortex is engaged in vision. The eye itself is like a 130-megapixel camera that takes snapshots of reality. However, there are billions of neurons and trillions of synapses that are engaged in vision. They are actually constructing the shapes, colours and object that we see. We do not construct the whole world at once, but, we construct what we want to see.

Cognitive psychologist Donald D. Hoffman argues that evolution most certainly shaped us not to see any of the objective reality. As a metaphor, he asks us to consider a blue rectangular mail icon in the right corner of your computer screen. Does this mean the mail itself is blue and rectangular? Obviously not. It is a culmination of circuits, diodes, resistors and algorithms that represent an actual email. Evolution has given us an interface.

Did evolution by natural selection help us see the actual reality or not? Hoffman explains with an example of nature, the Australian jewel beetle, which is dimpled, glossy and brown. The female is flightless whereas the males fly and try to mate with the glossy female beetles. Thus, they are often confused by beer bottles and almost went extinct due to this. According to the males, anything glossy and brown,



are females. In order to survive, they had a few tips and tricks to live up to several million years. However, since they see reality as it is, evolution did not really favor their survival.

How can seeing false reality be beneficial to the survival of an organism? Fitness,

and not reality, actually figures the equations of evolution. Hundreds of evolutionary mathematical simulations using genetic algorithms in a Bayesian framework point to a fact that we are not seeing reality as it is and that fitness actually favors survival. Perceptions are turned to "fitness" and not to truth.

In simple terms, when we spot a cliff, we would not jump off one. The cliff we see is a description created by the sensory system to inform us of the fittest consequence of our actions.

■ BY KAVYA PRASAD

> PHD COUNCIL NEWS

Hello friend!

During the month of June we, the BCN PhD council, organized two fun events. First on the list was the BCN speed dating. During this event we had the chance to finally meet about fifteen of you in person and get to know you better. We were lucky as the good weather allowed us to do this event outdoors in the beautiful park in the heart of the city, the Noorderplantsoen. After walking and talking in pairs (which were always changing) we enjoyed pizza and drinks together.

The second event that we organized was the outdoor Yoga. The weather was great which made doing yoga on the grass in front of the Nieuwe Kerk really enjoyable. Thank you for coming to the events and we hope we will see you again after the summer break. Many more real-life activities will be organized and we can't wait for you to join us!

Be kind and enjoy summer!

Yours faithfully,
The BCN PhD council



> PHD AND OTHER NEWS

BCN Nothing but the Truth! 2020 - Update

Save the date! For the BCN symposium on November 1, 2021. More information will be sent to you by email. It is already possible to register by the GSMS course registration system! If you do, we will make a reservation for you, places are limited. Note however that you will also need to register on the website of the symposium, <https://www.nothingbutthetruth.nl/registration>, to actually get your free entrance ticket!

BCN Human Neuroanatomy course

This course will start in November, application is only possible by writing a motivation email to me.

Extra Budget for courses and conferences

In 2021 there is 300 euro extra available for external courses or conferences. It is up to you which budget you would like to raise. Please use the reimbursement forms from the BCN website (<https://www.rug.nl/research/behavioural-cognitive-neurosciences/education/phd/funding>). 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 Lunch Lectures

The Lunch Lectures we organized were very successful. We will continue to offer these on Thursdays, between 12:00 and 13:00 hrs, consisting of interesting lectures and discussion meetings. We will also continue the network meeting in Gather Town (last Thursday of the month). We are open to suggestions for speakers!!!

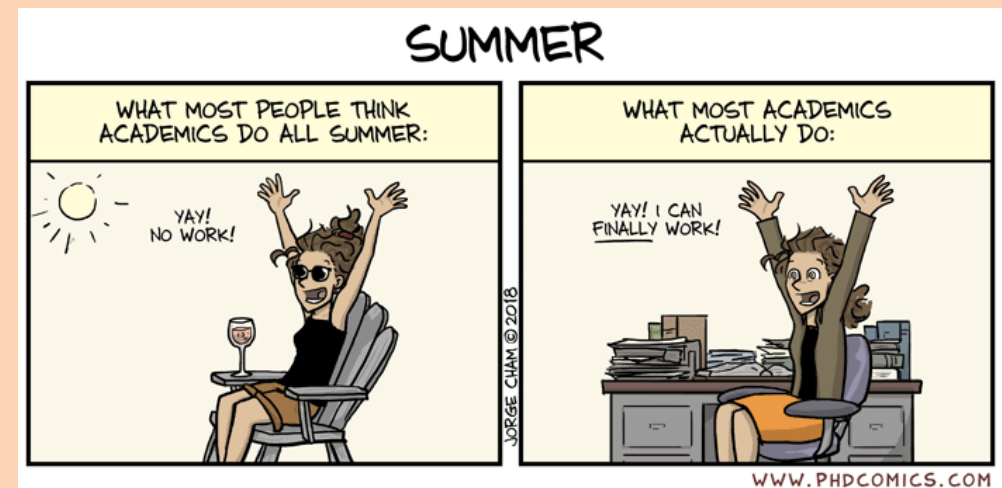
All kinds of courses, the competence model

I sometimes get asked where to find courses offered by the UG. In my email signature you will find the sentence "Take also a look at the broad training offer" If you click the link you will find the competence model which will lead you to the broad course offer of the UG. <https://myuniversity.rug.nl/infonet/medewerkers/organisatie/graduate-schools/facultaire-gradschools/gsms/phd-students/phd-development-training/new-dto/>

Agenda BCN Activities

September 9, 2021: start **BCN Functional Neuroscience**, EEG course
 September 17, 2021: start **BCN Orientation course**, during 9 consecutive Friday afternoons
 November 1, 2021: **BCN Symposium Nothing but the Truth!**
 November 15, 2021: start **BCN Philosophy of Neuroscience course**
 November 23, 2021: start **BCN Human Neuroanatomy course**
 Every Thursday: **BCN Lunch Lectures series**: 12:00 – 13:00 hrs.

■ DIANA KOOPMANS,
 D.H.KOOPMANS@UMCG.NL



> GRAND STUFF

Recovery of long-term psychotic patients often better than thought

If you suffer from psychosis for a long time, the chance of a full recovery and a 'normal' life is slim. Or, that was the opinion until recently. However, recently published [research](#) by Stynke Castelein, Marieke Timmerman and fellow researchers shows that about 40% of patients recover above expectations. For more info: <https://www.rug.nl/news/2021/06/recovery-of-long-term-psychotic-patients-often-better-than-thought>

Young Talent Prize for Hanna van Loo

On June 10, Hanna van Loo, psychiatrist and assistant professor at the University Center for Psychiatry, received the Dutch Neuroscience Meeting Young Talent Prize 2020 worth €500. The award is for her research into the causes of depression.

Martien Kas coordinates consortium that obtained € 7.9 M

Prof. Martien Kas (GELIFES) is the coordinator of a consortium that has received a grant of no less than € 7.9 million from the Innovative Medicines Initiative (IMI), the world's biggest public-industry drug development partnership. The grant is for the PRISM2 project, a new project that builds on the success of the PRISM project (Psychiatric Ratings using Intermediate Stratified Markers) on mental health. PRISM focuses on Alzheimer's disease, schizophrenia and major depressive disorder. A total of fourteen research institutes and companies are working together in this project. As



■ PHOTO BY RUG WEBSITE

coordinator, Kas will receive EUR 1.6 million for his part in the project. Kas was also coordinator of the successful PRISM project.

For more info: <https://www.rug.nl/news/2021/06/prof-kas-coordinator-of-prism2-project-with-grant-of-eur-7-9-million>

Quarter of a million for MS research in the Northern Netherlands

The MS Center North Netherlands, located in the UMCG, will receive a quarter of a million Euros for research, including researchers Jan Meilof and Bart Eggen (on the right of the photo). Three other MS research centers in the Netherlands will also receive this amount.



■ PHOTO BY INTRANET UMCG

Robbert Havekes receives grant from American Airforce

Robbert Havekes of the Groningen Institute for Evolutionary Life Sciences ([GELIFES](https://www.rug.nl/fse/)), together with Dr. Steve Ramirez of Boston University received a grant from the American Airforce worth a total of \$ 750,000. The grant comes from the Department of Defense – Airforce Office of Scientific Research and is for the project ‘Restoring access to memories “lost” as a result of sleep deprivation’. Havekes will receive \$ 300,000 for his part in the research project.

For more info: <https://www.rug.nl/fse/news/prof-havekes-receives-grant-from-american-airforce>

ZonMw Grant for research into understanding and improving daily life acoustic and linguistic environments of children with hearing loss

The [dB SPL Lab](#) of Audiology group at UMCG has received [a grant](#) from ZonMw, in collaboration with NSDSK and Pento, for a new project, Audiolistic. The consortium partners will make use of new technology, such as data logging in hearing devices and small recorders (LENA, language environment analysis), to make this assessment regarding home, school, daycare environments. The results will be used to help parents and caregivers increase access to spoken language for moderately hard-of-hearing children. Consortium partners are Deniz Başkent, Annerenée Meijer, Aline Hoeve (UMCG), Evelien Dirks (NSDSK), and Ruben Benard (Pento).

New consortium project CoSySpeech funded by ERA-NET NEURON to investigate hidden hearing loss

Deniz Başkent and Etienne Gaudrain from [dB SPL Lab](#), Audiology group, received a new grant from ERA-NET NEURON as consortium partners with prof. Sarah Verhulst (Belgium), dr Jérôme Bourien (France), prof. Manuel S. Malmierca (Spain), and prof. Marlies Knipper (Germany). The new project, [CoSySpeech](#), will investigate a relatively less understood form of hearing loss, namely, cochlear

synaptopathy, also commonly known as hidden hearing loss. The project brings together consortium partners with expert knowledge from different brain structures (periphery, brainstem, cortex) and spans various research modalities (histology, physiology, behavior, computational, behavior). The ultimate goal of the project is to develop a unique, comprehensive framework for the functional aftermath of synaptopathy for speech coding in the brain, leading to development of sensitive hearing screening methods and therapeutic interventions.



Cool links

- > Mice may 'catch' each other's pain — and pain relief:
<https://www.sciencenews.org/article/neuroscience-mice-may-catch-each-others-pain-relief-contagious>
- > Stunning neuroscience images: QBI researchers produce beautiful images in the process of studying the brain. Here are just a few of them:
<https://qbi.uq.edu.au/blog/2017/07/stunning-neuroscience-images>
- > The great brain experiment: Be a part of a unique scientific experiment by playing games on your phone:
<http://www.thegreatbrainexperiment.com/>
- > TestMyBrain aims to engage and collaborate with citizen scientists like you, by providing tools to help you learn about yourself. When you test yourself, you contribute to brain research.
<https://testmybrain.org/index.php>
- > The mind project: Over 30 interactive curriculum modules in a wide range of disciplinary areas in the cognitive sciences -- from cognitive psychology to neuroscience, from AI & robotics to anthropology and philosophy of mind.
<https://mind.ilstu.edu/index.html>

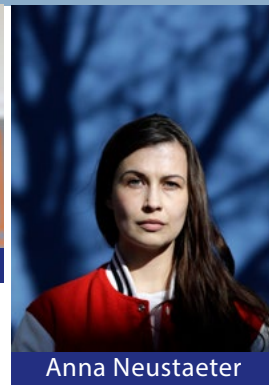
■ BY KAVYA PRASAD



Kavya Prasad



Abigail Toth



Anna Neustaeter



Michiel Hooiveld



Aleksandra Cywinska



Evelyn Kuiper-Drenth



Sander Martens

New staff writers **wanted!**

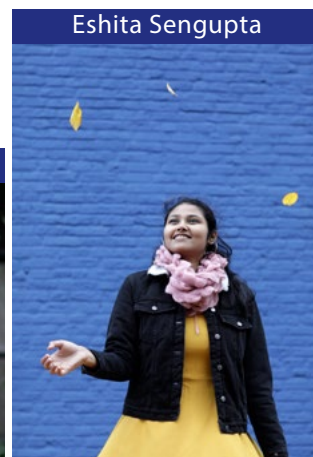
Do you enjoy reading the Newsletter? If so, why not join our enthusiastic editorial team and make it even better? Regardless of whether you're a master student or PhD student, it's a great way to expand your network, improve your English writing skills, and be actively involved in BCN. Interested? Send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



Jaime Mondragon



Marlijn Besten



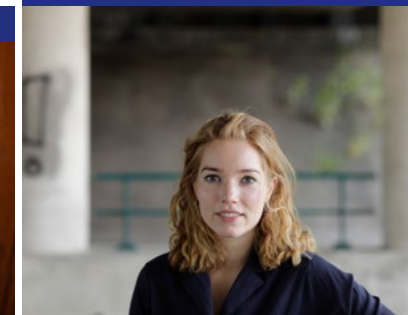
Eshita Sengupta



Sophia Wilhelm



Lauren Hansen-Manguikian



Annika Sauter



> BCN THESIS DEFENSES

Computer programming skills: a cognitive perspective

P H D S T U D E N T

I.L. Graafsma

T H E S I S

Computer programming skills: a cognitive perspective

P R O M O T O R S

Prof.dr. Y.R.M. Bastiaanse

Prof.dr. L. Nickels

C O P R O M O T O R S

Dr. S. Popov

Dr. E. Marinus

Dr. S. Robidou

F A C U L T Y

Arts

The studies in the current thesis examine programming skills from a broad cognitive perspective. The first study aims to validate two short versions of an existing programming test. The second and third studies ask whether cognitive skills and autistic traits predict programming performance in an undergraduate course. The results show that logical reasoning is the most reliable predictor of programming skill and that autistic traits do not predict programming performance. In the final study, brain activity is measured in an EEG experiment. The results show that a programming



■ PHOTO BY HEINZ GRAAFSMA

language may be processed similarly in the brain to natural languages. The results of current thesis, together with future research in this field will shape our understanding of programming as a skill and will thereby help inform better teaching methods.

Irene Graafsma (1993) defended her thesis on April 29, 2021.

Towards understanding infants' early motor repertoire: The exploration of a diagnostic and prognostic tool

P H D S T U D E N T

S. Salavati

T H E S I S

Towards understanding infants' early motor repertoire: The exploration of a diagnostic and prognostic tool

P R O M O T O R S

Prof.dr. A.F. Bos

Prof.dr. C. Einspieler

C O P R O M O T O R

Dr. H.J. ter Horst

F A C U L T Y

Medical Sciences

The assessment of the early motor repertoire is a widely used method to determine an infant's neurological status and to predict its neurodevelopmental outcome. It is based on observations of an infant's spontaneous movements and postures which can be observed from (preterm) birth until 5 months' corrected age. These observations can be described as normal or abnormal and expressed in an optimality score. Frequently, this method is used for prediction of motor development in vulnerable infants such as those born preterm. In this thesis

we demonstrated that the optimality scores of preterm born infants were lower compared with scores of healthy term born infants. Furthermore, our findings contributed to the existing knowledge that the assessment of the early motor repertoire can be used in prediction of neurodevelopment in a broader sense. This concerns not only motor development of vulnerable infants such as those born preterm, but also cognitive development of both preterm and healthy term born infants. Finally, we found that the assessment of the early motor repertoire is of clinical relevance for children that suffered from an infection in utero and children with hereditary metabolic disorders. The studies of this thesis have increased our understanding of the assessment of the early motor repertoire as a diagnostic and prognostic tool. Clinical care may be improved by implementation of this assessment method as it enables the triage of children who may benefit from early interventions.

Sahar Salavati (1994) studied Medicine at the University of Groningen. She did her doctoral research at the Pediatrics department (Neonatology) of the University Medical Center Groningen. Sahar now works as a Senior House

Officer (ANIOS) in pediatrics at the Martini Hospital. She defended her thesis on May 3, 2021.

Idioms in the aging brain

P H D S T U D E N T

A. la Roi

T H E S I S

Idioms in the aging brain

P R O M O T O R

Prof.dr. P. Hendriks

C O P R O M O T O R

Dr. S.A. Sprenger

F A C U L T Y

Arts

With the world's population getting older and older, gaining more insight into the cognitive consequences of aging is an urgent matter. Many studies have investigated the effects of aging on general cognitive abilities, such as memory. However, much less is known about the effects of aging on language abilities. This thesis investigates how cognitive aging affects healthy elderly adults' processing of Dutch expressions that can have multiple interpretations, such as the idiom tegen de lamp lopen (literally: 'to walk against the lamp', figuratively: 'to get caught'). Studying

idioms is interesting, as idiom knowledge has been shown to keep increasing until old age. Idiom processing, in contrast, partly depends on cognitive functions that become increasingly vulnerable with age. Comparing young and elderly adults, we found that both use contextual information to facilitate the processing of idioms and that this ability remains stable over several years. However, older adults, but not younger adults, need additional contextual information to process

sentences word by word. Also, we found that the suppression of an idiom's literal meaning, which is necessary to select its figurative meaning, slows down from the age of 40. Additionally, elderly adults were found to be slower than young adults to activate an idiom's figurative meaning. Taken together, we have demonstrated that linguistic processing changes slowly across the lifespan, but stays remarkably efficient until old age. These findings on language abilities in healthy elderly



■ PHOTO BY ANNA DE KOSTER

adults form an important baseline for research on cognitive decline due to neurodegenerative diseases such as dementia.

Amélie la Roi (1989) defended her thesis on May 3, 2021

The impact of genotoxic stress on protein homeostasis

P H D S T U D E N T

W. Huiting

T H E S I S

The impact of genotoxic stress on protein homeostasis

P R O M O T O R

Prof.dr. H.H. Kampinga

C O P R O M O T O R

Dr. S. Bergink

F A C U L T Y

Medical Sciences

The consequences of improper DNA-maintenance overlap – at least partially – with those of a disrupted protein homeostasis. Indeed, both are associated with neurodegeneration, and both are thought to play an important role in ageing. In our research we therefore investigated whether improper DNA-maintenance challenges protein



■ PHOTO BY ELS KUIPER

homeostasis. We found that distinct defects in DNA-maintenance indeed lead to a disrupted protein homeostasis and widespread protein aggregation. Protein that aggregate are not random proteins, but are intrinsically vulnerable. Normally, such proteins are protected against aggregation by a group of highly specialized guardian proteins, called chaperones. In cells and worms in which we artificially enhanced chaperone capacity, protein aggregation was no longer increased upon improper DNA-maintenance. Moreover, worms with an enhanced chaperone capacity no longer suffered from accelerated age-related degeneration induced by improper

DNA-maintenance. These findings show that upon impaired DNA-maintenance the chaperone capacity in cells is overwhelmed. How this happens exactly is still unclear. Eventually, this leads to a disrupted protein homeostasis and widespread protein aggregation. This process appears to play a key role in the acceleration of age-related degeneration ensuing improper DNA-maintenance. The findings of our study point at a crucial two-stage mechanism: various impairments in DNA-maintenance result in a disrupted protein homeostasis, and this in turn accelerates age-related degeneration. Our data also indicate that DNA-damage itself can trigger this process. Although more research is needed, this knowledge promises to contribute greatly to our understanding of DNA-repair syndromes. It is also highly relevant for the general population. It puts the spotlight on a long underexposed, but potentially very important role of DNA-damage and compromised DNA-repair, both in common neurodegenerative diseases and in normal ageing.

Wouter Huiting (1990) studied Human Movement Sciences and Behavioural and Cognitive Neurosciences at the University of Groningen. During his doctoral research he worked at the department

of Biomedical Sciences of Cells and Systems at the University Medical Center Groningen. This fall he will start as a postdoc at Stanford University. He defended his thesis on May 10, 2021.

An investigation of the leading theories behind glaucoma: a case for looking beyond the eye

P H D S T U D E N T

A.R. Loisel

T H E S I S

An investigation of the leading theories behind glaucoma: a case for looking beyond the eye

P R O M O T O R S

Prof.dr. N.M. Jansonius

Prof.dr. P. van Dijk

C O P R O M O T O R

Dr.ir. E. de Kleine

F A C U L T Y

Medical Sciences

Glaucoma is a collection of eye diseases with a common endpoint. In the context of this thesis, the focus is on what is known as primary open angle glaucoma, or POAG. POAG is a chronic and progressive disease that constitutes both structural changes in the eye, which

include a thinning retina and damaged optic nerve, and actual functional loss in vision, which can be seen in a visual field test. Although high eye pressure is associated with glaucoma, the full mechanism of the disease is not yet understood. This thesis explores the two leading theories behind glaucoma, the mechanical and vascular theories. In the mechanical theory, there is a sub-optimal pressure difference between the eye and the space behind the eye that causes damage to the retina, while in the vascular theory, there is not sufficient blood flow or oxygen to the retina. This thesis confronts glaucoma as a whole-body disease, and explores not only the eye, but the ear, the brain, the blood, and the effect of medications. It is the result of collaborations with ophthalmologists, audiologists, neurologists, geneticists, and molecular biologists.

Allison Loisel (1991) studied Kinesiology at the University of Rhode Island (BSc) and Space Physiology at King's College London (MSc). Thereafter she worked as a research assistant at the US Naval Submarine Medical Research Lab and event-coordinator at The Next Web. She did her doctoral research at the University Medical Center Groningen and defended her thesis on May 10, 2021.

Exploring the VISTA of glial cells: Astrocytes and microglia from development to disease

P H D S T U D E N T

M. Borggrewe

T H E S I S

Exploring the VISTA of glial cells:
Astrocytes and microglia from
development to disease

P R O M O T O R S

Prof.dr. J.D. Laman

Prof.dr. B.J.L. Eggen

C O P R O M O T O R

Dr. S.M. Kooistra

F A C U L T Y

Medical Sciences



■ PHOTO BY MICHEL MEIJER

Multiple sclerosis (MS) is a chronic and often progressive disease of the central nervous system (CNS), which manifests at a young age. In MS, immune cell types including macrophages and lymphocytes enter the CNS and damage the myelin sheath, which acts as an insulation for axons and is crucial for rapid saltatory action potential propagation, and myelin damage also results in axonal loss. Immune checkpoints are receptors that provide a balance between enhancing and limiting the immune response to allow proper protective function without aberrant inflammation or autoimmune

disease. Modulating immune checkpoint activity is a powerful tool to, for example, increase the immune response against cancer, or to reduce the immune response in autoimmune diseases. VISTA is an immune checkpoint that provides inhibitory signals to T cells leading to reduced immunity. Therefore, enhancing VISTA signaling in MS offers a novel treatment strategy to limit autoimmunity and reduce symptoms. In this thesis, the function of VISTA was investigated in CNS-resident cells, to explore the therapeutic

potential of VISTA for MS. VISTA plays a role in the function of microglia, which are CNS-resident immune cells. Microglia have diverse functions in the CNS such as protection from intruders (e.g. bacteria and viruses), support of neurons, and tissue regeneration. In MS, microglia are involved in the anti-myelin immune response, but also in wound healing. VISTA regulates microglia uptake of myelin and microglia homeostasis. In conclusion, modulating VISTA signaling may present a novel strategy to treat MS, which likely affects CNS-resident cells.

Malte Borggrewe (1990) studied Applied Biology and Molecular Biology at the University of Aberdeen (United Kingdom) and the Hochschule Bonn-Rhein-Sieg (Germany), and did a Masters in Biomedical Sciences at the University of Groningen. During his doctoral research he collaborated with the institute of Brain and Cognition of the University Medical Center Groningen. He defended his thesis on May 12, 2021.

Adaptive deep brain stimulation for Parkinson's disease and dystonia

P H D S T U D E N T

D.A.I. Piña Fuentes

T H E S I S

Adaptive deep brain stimulation for
Parkinson's disease and dystonia

P R O M O T O R S

Prof.dr. J.M.C. van Dijk

Prof.dr. M.A.J. de Koning-Tijssen

C O P R O M O T O R

Dr. M. Beudel

F A C U L T Y

Medical Sciences

Deep brain stimulation (DBS) is a neurosurgical treatment, in which electrodes are implanted in deep regions



■ PHOTO BY DAN PINAFUENTES

of the brain. This procedure has been applied for more than 30 years to treat patients with movement disorders, such as Parkinson's disease (PD) and dystonia, especially in patients without a good medication effect. The implanted electrodes deliver electrical pulses, that help to control the main disease symptoms. Until recently, the stimulation was only applied continuously, without taking into account the symptom fluctuations each patient experiences throughout the day.

Adaptive DBS (aDBS) is an innovative upgrade of this treatment. With aDBS, the stimulation is regulated (in real time) based on the symptom severity. To indicate when and how stimulation should be delivered, brain oscillations can be measured through the electrodes implanted in the brain, and used as feedback signal. These oscillations are able to reflect the clinical state of the patients. By dynamically adjusting the stimulation according to the needs of each patient, aDBS might be able to provide a better symptom control. In addition to this, aDBS could prevent the occurrence of side effects caused by excessive stimulation. This thesis investigates the intraoperative efficacy of aDBS in patients with PD and dystonia at the University Medical Center Groningen, The Netherlands. The first part

of this thesis describes the characteristics of the signals that can be used to estimate the severity of symptoms. The second and third part of the thesis evaluate the immediate effects of aDBS in patients with PD and dystonia, respectively.

Dan Piña Fuentes (1989) studied Medicine at the Nationals Autonomie University of Mexico, in Mexico City. During his doctoral research he worked at the department of Neurosurgery at the University Medical Center Groningen. He now works as a researcher at the Amsterdam UMC location AMC. He defended his thesis on May 17, 2021.

Time will tell: sluggish cognitive tempo, attention and timing functioning in adults

P H D S T U D E N T

A.K. Müller

T H E S I S

Time will tell: sluggish cognitive tempo, attention and timing functioning in adults

P R O M O T O R

Prof.dr. J.C.J. Hoeks

C O P R O M O T O R

Dr. Y.P. Ongena

F A C U L T Y

Arts



■ PHOTO BY LINA RINNE PHOTOGRAPHY

The focus of this dissertation project is on Sluggish Cognitive Tempo (SCT), a clinical phenomenon that might be related to objective attentional and timing deficits. By studying it, we aim to learn more about

attention and timing processes in human cognition in general. A literature review on previous studies on SCT showed that SCT is still understudied, and that a consensus on how to measure SCT is

missing. In response to this, we conducted a validation study of previously used SCT items, in non-clinical adults. The thereby obtained SCT scale and subscales were further tested for their likely associations with self-rated attentional and timing functioning, in order to provide evidence for the construct validity of SCT. It was shown that our newly constructed measure of SCT was associated with self-rated everyday attentional and timing functioning. In the final study, both clinical- and non-clinical adults completed the newly validated SCT scale and were also tested with a well validated computerized neurocognitive test battery. Contrary to expectation, we did not find convincing evidence for a relation between SCT scores and cognitive functioning. The fact that SCT symptoms related to self-rated attentional deficits and self-rated deficits in everyday timing behavior but not to objective cognitive performance lets us assume that SCT might solely show its effects on higher order (reflective) processes and not so much on basic cognitive processes.

Kathi Müller (1987) defended her thesis on June 17, 2021.

Detecting mind-wandering with machine learning: Discovering the neural correlates of mind-wandering through generalizable machine learning classifiers with EEG

P H D S T U D E N T

Y. Jin

T H E S I S

Detecting mind-wandering with machine learning: Discovering the neural correlates of mind-wandering through generalizable machine learning classifiers with EEG

P R O M O T O R

Prof.dr. N.A. Taatgen

C O P R O M O T O R S

Dr. M.K. van Vugt

Dr. J.P. Borst

F A C U L T Y

Science and Engineering

Have you ever wondered why during the performance of your job, you end up thinking about something else, for example, holiday plans, novel plots, or life events that have made a strong impression? This disengagement of our mental activity from the external environment is often referred to as 'mind-wandering'. In this thesis, we investigated its origin and neural correlates.



To better understand how mind-wandering arises, it is helpful to know moment-by-moment whether someone

is mind-wandering. To that end, the general goal of this thesis was to develop methods to track mind-wandering using electroencephalography (EEG) data by training machine learning classifiers. Importantly, these classifiers should eventually be able to generalize across tasks (in the same study), participants, and studies (experiments). Three independent studies included in the thesis demonstrated how such classifiers can be developed step by step.

Apart from providing us with a moment-by-moment assessment of the mind-wandering state of an individual, efficiently trained mind-wandering classifiers also give us clues about the brain areas that are crucial for mind-wandering. We found that the P3 evoked potential, together with brain waves in the alpha frequency band were most useful for predicting mind-wandering. However, even the best classifiers reached a limited accuracy during generalization, demonstrating that trying to predict such subjective mental states such as mind-wandering is challenging.

Christine Jin (1989) did her doctoral research at the Artificial Intelligence department of the Bernoulli Institute, financed by a scholarship of the University

of Groningen. She now works as a postdoc at the CEA NeuroSpin - INSERM Cognitive Neuroimaging Unit, Cognition & Brain Dynamics Lab in France. She defended her thesis on June 18, 2021.

Discovering circadian clocks in microbes

P H D S T U D E N T

J. Bosman

T H E S I S

Discovering circadian clocks in microbes

P R O M O T O R S

Prof.dr. J.C. Billeter

Prof.dr. M. Merrow

F A C U L T Y

Science and Engineering

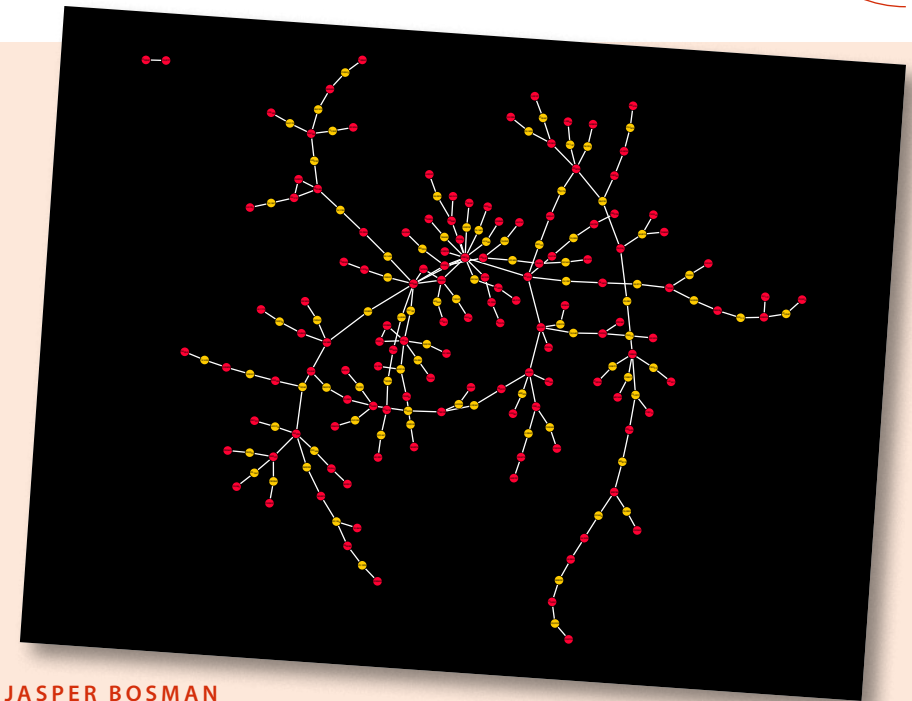
We humans experience the influence of our circadian clock every day. This clock mechanism causes, for example, a jet lag during transatlantic air travel. We now believe that almost all organisms have developed a circadian clock mechanism.

In his thesis Jasper Bosman describes the analysis techniques developed and the newly discovered molecular components of a circadian mechanism in *Saccharomyces cerevisiae* and *Bacillus subtilis*.

Bosman: 'To identify these molecular components, I applied structured zeitgebers, i.e. light and temperature cycling, to yeast and bacillus cultures. All this in conjunction with bioinformatic in-silico approaches in *Bacillus* biofilm populations, we found a free-running rhythm of ytvA and KinC activity of nearly 24 hours after entrainment and release to constant dark and temperature conditions. The free-running oscillations



■ PHOTO BY BYTESNET



■ BY JASPER BOSMAN

are temperature compensated. This is one of the most important features of a circadian clock mechanism, making it very likely that such a system exists in *B. subtilis*.

We found in yeasts that temperature appears to mainly regulate metabolic processes. Light appears to act more indirectly via photo-oxidation of mitochondrial cytochromes.

Finally, I present a hypothetical model for an integrated circadian clock mechanism in unicellular microbes with an emphasis on *S. cerevisiae*. This mechanism involves

several metabolic pathways and the main regulator is the stress sensitive transcriptional activator Msn2p. The model shows that in the circadian clock mechanism in yeast, energy metabolism appears to be an important theme. Other processes that are relevant: metabolic process of nitrogen compounds, oxidation-reduction process and fatty acid metabolism. All could serve as a starting point for further research on the circadian clock in yeast.'

Jasper Bosman (1981) defended his thesis on June 21, 2021.

Agreement processing in Dutch adults with dyslexia

PHD STUDENT

A. Salčić

THESIS

Agreement processing in Dutch adults with dyslexia

PROMOTORS

Prof.dr. Y.R.M. Bastiaanse

Prof.dr. L. Nickels

COPROMOTOR

Dr. S. Popov

FACULTY

Arts

This PhD thesis investigated the processing of agreement violations (e.g., *Dat was een mooi *compliment over haar werk*) in Dutch adults with dyslexia when reading or listening to sentences. We used event-related potentials (ERPs) and self-paced reading (SPR), since we were interested in the temporal aspects of agreement violation processing. Additionally, we examined whether the modality of presentation in ERP studies (listening vs. reading) influences the brain responses to agreement violations in adults with dyslexia. Finally, we explored whether the type of (dis)agreement used (gender and number disagreement and subject-verb disagreement) affects



■ PHOTO BY MARYANNE WOLF

agreement violation processing in adults with dyslexia.

Our results show that, compared to adults without dyslexia, adults with dyslexia are less sensitive to ungrammaticalities in sentences. They also process agreement violations with a delay and/or exhibit different ERP effects in response to agreement violations compared to adults without dyslexia. Furthermore, our ERP experiments indicate that presentation modality seems to play a role in agreement violation processing in dyslexia, since there was a difference in results when sentences were listened to versus read. Finally, we showed that both ERPs and SPR are sensitive methods of investigating agreement processing in adults with dyslexia.

In summary, our findings indicate that adults with dyslexia exhibit atypical processing of agreement violations compared to adults without dyslexia.

Aida Salcic (1988) defended her thesis on June 24, 2021.

Neurolinguistic and psycholinguistic approaches to studying tense, aspect, and unaccusativity

P H D S T U D E N T

N. Cordalija

T H E S I S

Neurolinguistic and psycholinguistic approaches to studying tense, aspect, and unaccusativity

P R O M O T O R

Prof.dr. Y.R.M. Bastiaanse

C O P R O M O T O R

Dr. S. Popov

F A C U L T Y

Arts

The experimental investigation of grammatical aspect was the heart and soul of this PhD project. Nevertheless, since aspect is semantically related to tense as they both convey temporal information in the sentence, we compared the processing of tense and aspect. Furthermore, we experimentally explored the interplay between aspect and unaccusativity for the linguistic literature suggests an inherent link between perfectivity and unaccusativity. In essence, the concepts of tense, aspect, and unaccusativity were described linguistically and studied

experimentally in the four chapters of the thesis. In Chapter 1, we provided a theoretical description of tense, aspect, and unaccusativity. We discussed tense and aspect realization and distribution in Bosnian/Croatian/Serbian (BCS) with cross-linguistic comparisons to English. We defined the syntax and semantics of unaccusative verbs as well as the interplay between perfective aspect and unaccusativity. In the end of the chapter, we formulated three research questions that our three experiments were designed to answer:

1. Do native speakers recognize tense and aspect violations in BCS at the critical word?
2. What are the electrophysiological correlates of aspect violations?
3. What is the relationship between aspect and unaccusativity?

In Chapter 2, we presented the set-up and the results of the behavioral self-paced reading (SPR) experiment on tense and aspect processing as well as the ERP experiment on aspect processing in BCS that attempted to answer research questions 1 and 2. In the self-paced reading experiment, we investigated the processing of tense and aspect violations in BCS. As an answer to the first research question, we showed that tense violations

are not detected online at the critical word where the violation is disambiguated whilst aspect violations are detected at the point of the violation. We argued that aspectual meanings conveyed by the perfective and the imperfective verb forms are rather distinct which made aspect violations salient. For tense violations, the parser did not register the violation of a future time frame of a sentence by a past tense verb on the spot because past tense verbs can have future time reference in restricted contexts. We argued that online, the parser leaves open all possibilities and activates all the meanings of the sentence. After the sentence had been processed, in the offline grammaticality judgment task, the native speakers rejected tense violations because they selected the canonical interpretation of the past tense verb form. In the ERP experiment, we investigated the ERP correlates of aspect processing in BCS. The collected ERPs show a P600 for aspect violations. We summarized the behavioral and the ERP data on aspect processing in BCS claiming that aspect violations in BCS are salient and processed at the critical word. We also made a cross-linguistic comparison with the English time reference system. We argued for a clear difference between BCS and English aspect systems. In BCS, aspectual

meanings are straightforwardly encoded by either perfective or imperfective verb form, whereas in English, one aspectual meaning can be conveyed by different forms which means that English aspect violations are not salient.

In Chapter 3, we presented the set-up and the results of the behavioral cross-modal lexical priming (CMLP) experiment that investigated the interplay between aspect and unaccusativity that was formulated in the third research question of this PhD project. The results of our CMLP experiment show the inextricable link between aspect and unaccusativity and that only subjects of perfective unaccusative verbs forms are base-generated as internal arguments. Finally, we compared the results of our experiment on aspect and unaccusative verbs in BCS to a study in English unaccusatives by Friedmann et al. (2008). We addressed cross-linguistic differences and how they affect processing. We suggested that English unaccusative verbs in their base form express perfective meaning too. Finally, we pointed out that perfectivity might be a universal feature of unaccusativity.

In Chapter 4, we reminded the reader of the current views of tense, aspect and

unaccusativity in the linguistic literature. We outlined the three research questions of the PhD project and explained how our three experiments contributed to answering those research questions. We provided a comprehensive description of the findings of our three experiments and their implications. We also made an observation that is at the core of our experimental results and that is in line with the immensely important finding of Swinney (1979): When a verb form is used to convey more than one meaning, all the meanings are activated and subsequently, in the course of the sentence, the relevant interpretation is selected and other interpretations are discarded. Finally, we acknowledged the limitations of our three studies and provided suggestions for future research.

Nermina Cordalija (1989) defended her thesis on June 29, 2021

The clinical presentation, neurocognition and neural correlates of children with a tic disorder

P H D S T U D E N T

T.J.C. Openneer

T H E S I S

The clinical presentation, neurocognition and neural correlates of children with a tic disorder

P R O M O T O R

Prof.dr. P.J. Hoekstra

C O P R O M O T O R S

Dr. A. Dietrich

Dr. D. van der Meer

Dr. J.B.C. Marsman

F A C U L T Y

Medical Sciences

Tourette syndrome (TS) is a common childhood-onset disorder characterized by the presence of sudden, rapid movements and vocalizations (tics). The goal of this thesis was to gain a better understanding of the clinical presentation and neural correlates of tics in children. I focused on two under-investigated clinical topics in TS: precursors of tics and uncomfortable feelings or sensations preceding tics (premonitory urges). Furthermore, I investigated neurocognition in children with TS, in particular in relation to

attention-deficit/hyperactivity disorder (ADHD). Children with a tic onset had more severe conduct problems and autism spectrum symptoms, compulsions, and emotional problems compared to children without a tic onset. The results appeared sex-specific, with more severe conduct problems and autism spectrum symptoms in boys, and more severe compulsions, oppositional and emotional problems in girls. Premonitory urges appeared in a large number of children, also in very young children. ADHD symptomatology was associated with impaired cognitive control, inhibitory control and working memory. Neural activity related to inhibitory control appeared predominantly in relation to ADHD symptomatology rather than to tics per se. Finally, I observed a different functional brain network organization in children with TS without comorbid ADHD, compared with healthy controls and children with (comorbid) ADHD. Overall, comorbidity plays a substantial role in the clinical presentation, neurocognitive functioning, and neural correlates of children with tics.

Thaira Openneer (1988) studied Behavioral and Cognitive Neuroscience at the University of Groningen. She did her doctoral research at the department

of Child and Adolescent Psychiatry within the institute of Brain and Cognition of the University Medical Center Groningen. She now works as researcher at the municipality Groningen. She defended her thesis on July 6, 2021.

Cognitive pathology in Parkinson's disease: A cholinergic perspective

PHD STUDENT

S. van der Zee

THESIS

Cognitive pathology in Parkinson's disease: A cholinergic perspective

PROMOTORS

Prof.dr. T. van Laar

Prof.dr. J.M. Spikman

COPROMOTORS

Dr. M.J.J. Gerritsen

Dr. M.T. Muller

FACULTY

Medical Sciences

Cognitive impairment is a common non-motor symptom with a debilitating effect on functional capacity and quality of life in people with Parkinson's disease (PD). Mild cognitive impairment in PD already manifests in newly diagnosed patients and approximately 80% of PD patients

eventually develop PD dementia over the course of the disease. The underlying pathology of cognitive impairment in PD is complex and includes the degeneration of multiple neurotransmitter systems, of which the cholinergic system is of particular importance. However, detailed assessment of the regional cortical and subcortical role of the cholinergic system in cognitive impairment across stages of PD is lacking. This dissertation broadens the knowledge

on the cognitive pathology in PD from a cholinergic perspective, by providing new insights on the in vivo assessment of cholinergic imaging, and evaluating the relationship between cholinergic system and cognitive functioning in the early and more advanced stages of the disease. We demonstrated that [18F] FEOBV PET imaging allows for reliable and detailed assessment of the cholinergic system. In addition, we found early involvement of the cholinergic system

in PD, demonstrating both cholinergic denervation as well as increased cholinergic binding in newly diagnosed PD patients. The latter might indicate a cholinergic compensation mechanism related to cognitive functioning in PD. Furthermore we demonstrated the regional cholinergic vulnerability related to cognitive domain functioning in more advanced PD, showing involvement of overlapping cholinergic regions. These findings provide new directions for clinical practice and future studies on the cholinergic pathology of cognitive impairment in PD.

Sygrid van der Zee (1987) studied Behavioral and Cognitive Neuroscience and Clinical Neuropsychology at the University of Groningen. She did her doctoral research at the department of Neurology at the University Medical Center Groningen. She defended her thesis on July 7, 2021.



■ PHOTO BY THIALDA VAN DER ZEE

Grasping light: Mental and physiological responses to illumination

P H D S T U D E N T

R. Lok

T H E S I S

Grasping light: Mental and physiological responses to illumination

P R O M O T O R S

Prof.dr. R.A. Hut

Prof.dr. D.G.M. Beersma

F A C U L T Y

Science and Engineering

In the current 24-hour society, it is important to function at optimal capacity at all times of day. In this thesis, it will be investigated if (1) light can induce daytime alertness, (2) light can affect human thermoregulation, (3) light can alter sleep, and (4) time of day has an effect on physical performance. Results indicate that light effects on human subjective alertness are relatively modest during daytime. However, if one is slightly sleep deprived, bright light exposure might induce subjective alertness. Light effects on human mental performance are relatively profound. Although bright light may not induce feelings of alertness, one will perform better. Light can affect human thermoregulation. Sleep onset



■ PHOTO BY JELMER LOK

is associated with a quick decrease in Core Body Temperature. If one wants to facilitate sleep onset, endogenous melatonin production and the natural drop in CBT should be facilitated. Hence, one should minimize light exposure in the evening. Oral melatonin usage can induce subjective feelings of sleepiness

and decrease Core Body Temperature. Both factors may facilitate shorter sleep onset latency. Time of day affects physical performance, with better results in the early evening as compared to the morning. If one has an important sports competition and needs to perform well, try to schedule this to occur in the early

evening. If this is not possible, one may choose to shift the internal body clock in such a way that the game occurs in the early evening according to internal time of the athlete.

Renske Lok (1991) defended her thesis on July 9, 2021.

Frontal brain functioning and pain: Possible underlying mechanisms of increased pain responses in age- and dementia-related cognitive impairment

P H D S T U D E N T

S.F. Bunk

T H E S I S

Frontal brain functioning and pain: Possible underlying mechanisms of increased pain responses in age- and dementia-related cognitive impairment

P R O M O T O R

Prof.dr. S.U. Zuidema

C O P R O M O T O R

Dr. M. Kunz

F A C U L T Y

Medical Sciences

In this dissertation, I studied pain in dementia. Dementia is characterized by



■ PHOTO BY STEPHAN KEEREWEER

neurodegeneration, the loss of nerve cells in the brain. As a result, people with dementia can for example no longer indicate that they are in pain. Based on previous research, it was hypothesized that people with dementia might even become more sensitive to pain, possibly due to neurodegeneration in the frontal part of the brain (the frontal cortex).

In an experimental pain study I investigated whether people with dementia respond differently to pain stimuli than cognitively healthy elderly people. I specifically investigated the ability to inhibit pain. Because people with dementia can have difficulty reporting pain, pain was measured not only by asking participants how painful the

pain stimuli were, but also by observing facial responses that might indicate the presence of pain. All participants also underwent a structural MRI scan of the brain, which made it possible to assess to whether responses to the pain stimuli are related to brain structure.

The main result of this thesis is that people with dementia had increased pain responses compared to cognitively healthy elderly people. For example, people with dementia showed less pain inhibition. This difference was only seen when pain was measured by facial expressions and not when asked how painful the pain stimuli were.

As hypothesized, the reduced ability to inhibit pain was associated with neurodegeneration in the frontal cortex. Altogether, this study shows that people with dementia may be more sensitive to pain than healthy elderly people due to loss of brain structure.

Steffie Bunk (1991) studied Neurosciences at the Vrije Universiteit Amsterdam. Her doctoral research took place at the department of General Medicine and Geriatrics at the University Medical Center Groningen. She is now working as an Epidemiologist at the GGD Fryslân. She defended her thesis on August 23, 2021.

Neuroimaging correlates of hearing loss, tinnitus, and hyperacusis

P H D S T U D E N T

E.A. Koops

T H E S I S

Neuroimaging correlates of hearing loss, tinnitus, and hyperacusis

P R O M O T O R

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C O P R O M O T O R

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F A C U L T Y

Medical Sciences

Worldwide, hearing loss is the most prevalent and debilitating acquired sensory impairment, affecting a large proportion of the elderly population. The presence of hearing loss increases the chances of developing other auditory domain symptoms such as tinnitus and hyperacusis. Both tinnitus and hyperacusis are debilitating symptoms, and even though several treatment options are available, there is currently no cure for either condition. Since these conditions often co-occur, there is considerable overlap in their reported impact on the brain, which may hinder the development of specific treatments. We used Magnetic Resonance Imaging to show that hearing

loss relates to pronounced changes in the structure of the gray matter, both within and outside of the auditory areas, and changes in the activity of the auditory cortex. In those with additional tinnitus, we observed that these changes were more conservative. Tinnitus is also related to a reduction in the acoustic

radiation near the thalamus, the auditory system's largest white matter fiber tract. In our work we linked hyperacusis to hyperactivity in response to sound, which provides a neural correlate of the perceived increase in loudness that is characteristic of hyperacusis. Our findings show that age has a pronounced impact



■ PHOTO BY MIKE HOGERHUIS



■ COVER BY STUDIO ANNE-MARIJN

Elouise Koops (1988) received a Master of Science in Neuropsychology (Faculty of Behavioural and Social sciences) and finished the Research Master Behavioural and Cognitive Neuroscience (Faculty of Science and Engineering) at the University of Groningen. She did her doctoral research at the Otorhinolaryngology department of the University Medical Center Groningen. Besides she worked as a programme manager for the EU-project TIN-ACT. After finishing her doctoral research she will start working as a postdoc in Boston. She defended her thesis on August 23, 2021.

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

on both the gray and white matter of the brain. This means that older individuals are disadvantaged by the impact of both age and hearing loss on the brain. As a consequence, rehabilitation methods may need to consider the importance of the brain in auditory processing in addition to the conventional hearing aids.

> CHEEKY PROPOSITIONS

"Program or be programmed." (Douglas Rushkoff)

> Irene Graafsma

"Je moet gewoon niet te diep nadenken. Dan klopt alles. (Herman Finkers)." [Just don't think too hard. Things will simply fall into place.]

> Amélie la Roi

Kennisontwikkeling volgt een exponentiele groeicurve, maar ieder nieuw inzicht werpt meerdere nieuwe vragen op. Hieruit volgt dat ons huidig begrip van het universum tot nul nadert." [Knowledge development follows an exponential growth curve, but each new insight raises several new questions. It follows that our present understanding of the universe is approaching zero.]

> Wouter Huiting

"Science is a public good and thus it must be open and free."

> Malte Borggrewe

"A different language is a different vision of life." (Federico Fellini)

> Dan Piña Fuentes

"The poem "Hanns Guck in die Luft" by Heinrich Hoffmann shows that Sluggish Cognitive Tempo was already an issue in the mid-19th century."

> Kathi Müller

"Science [...] is a method for asking awkward questions and subjecting them to a reality check, thus avoiding the human tendency to believe whatever makes us feel good." (Terry Pratchett)

> Aida Salcic

"Revising while generating text is like drinking decaf in the morning: a noble idea, wrong time. It's okay if your first drafts sound like they were hastily translated from Icelandic." (Paul J. Silvia)

> Aida Salcic

"Onderzoek doen is als schaatsen op natuurijs; ondanks de risico's zijn de eerste schaatsstroken op nieuw en onontdekt ijs het mooist." [Doing research is like skating on natural ice; despite the risks, the first skating strokes on new and undiscovered ice are the most beautiful.]

> Sygrid van der Zee

"All that is gold does not glitter." (J.R.R. Tolkien)

> Elouise Koops

"Non scholae, set vitae discimus." [We do not learn for school, but for life]

> Elouise Koops



> COLOPHON

This newsletter is published by the Research School of Behavioural and Cognitive Neurosciences

Frequency

4 x a year

Publishing Office

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Lay-out

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Deadline for the next edition: 18 October 2021



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