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Interview with professor Tom Koole

Interactional research: “How do we deal with cognitive phenomena, given the fact that we have no access to each other’s cognitive processes?”

Just back from his visit to South Africa, I’m meeting professor Tom Koole from the Department of Communication and Information Sciences. Since March 2014, he has been appointed as a visiting professor at the University of Witwatersrand (Wits) in Johannesburg, where he collaborates with his South African colleagues to investigate health communication. As BCN is an internationally orientated community, we were interested in getting to know a researcher like Tom Koole, who can tell us how such collaboration may result in fruitful research.

First of all, could you briefly introduce yourself and give a summary of your research interests?
I’ve been in Groningen for almost two years now. Before that, I worked in a similar department at the University of Utrecht. I’m interested in the way we use language to interact with each other. My research is focused on the way we communicate when face-to-face or over the phone. Basically, what I would like to find out is the way in which we give meaning to the things we say – how communicative meaning is attributed.

You investigate oral health communication. Could you explain in more detail what your research is about?
One of the last things I’ve written about is the way in which we display emotion in talk. For example, we look at how people call the emergency call centers (the 112 help desk) in the Netherlands. We look at how emotion is displayed, and how this display interacts with the purpose of the call, and whether or not those displays disrupt the giving of information. The funny thing is that when you talk to emergency call takers, very often they talk about the problem of emotional callers. But when you actually listen to the recordings of emotional calls, it appears that in 90% of the cases, emotions are not a problem at all. Very recently we established the ‘Kennisplatform Gezondheidscommunicatie’ with the UMCG. This is meant to be a place where health professionals from the UMCG can come to ask about communication research.

From what I’ve heard, you are quite famous for your research on emergency calls. Based on your research, the national 112 help desk changed its opening phrase from ‘Emergency center, with whom would you like to speak?’ to ‘Emergency center, do you need police, firefighter or ambulance?’ Would you characterize this as the highlight of your career?
No (laughs), not so much. That’s something that appeals to people and what people ask quite a lot about. It brought me into the Dagblad van het Noorden last year. The 112 research I always did with masters students. It is research, of course, but it’s actually done very much during my teaching time.

So what is the highlight of your career?
Over the last 15 years I’ve worked a lot on classroom interaction, on the way in which teachers and students deal with issues of understanding and not understanding. What I got interested in, and what I’m still working on, is the issue of two people talking to each other: One person is explaining a problem, but is not capable of looking into the mind of the other to see what the problem is. And the one who gets the explanation is not capable of looking into the mind of the explainer to see what the solution is, so they will have to do some interactional work – first to establish ‘What is the problem?’ and second ‘Do you understand the things that I’m explaining?’.

These are issues that I became interested in through classroom interaction research. From that I got interested in the phenomenon of ‘How do we deal with cognitive phenomena, given the fact that we have no access to each other’s cognitive processes?’ We interpret each other constantly in terms of cognition and cognitive processes, although these processes are the only thing we do not have access to.

Since September 2014 you have been appointed as a visiting professor at the University of Witwatersrand (Wits) in Johannesburg. How was this collaboration established?
The collaboration was originally established in 2003, there was the Sanpad fund from the Dutch Ministry of Education and the Dutch Ministry of Foreign affairs which aimed to de-isolate South African universities after the apartheid regime was abolished. This fund was intended to boost South African academia. South
Africans could apply for research from that fund, on the condition that they collaborated with a Dutch researcher. I’ve been involved as a collaborator in a number of projects now, and I’ve been an advisor for several South African PhD students.

One of your latest publications is a study about multicultural genetic counseling interactions. What is this study about?

The study is about genetic counseling, a profession that we in The Netherlands do not have. The study is based on video recordings of genetic counselors that talk about the possibilities of Down Syndrome and the option of ‘amniocentesis’ to pregnant women of advanced age. The interesting thing is that there is a professional norm among counselors, that it should be entirely the decision of the patient. So a counselor should not influence them in any way. But this is hardly possible, and this is the issue that we are talking about in this study. On the one hand, they leave it all up to the pregnant women to make the decision, but on the other hand, you can see that their response to a negative decision is very different from their response to a positive decision. So they very much display that they are in favor of doing an amniocentesis, and that they think that it is very unwise not to do it.

What was the goal of the study?

The more applied practical goal of the study was to show genetic counselors that you can have this professional norm and aim, but that it is practically impossible to present options as symmetrical options. Simply the fact that you as professionals have developed a certain test already means that you believe that this test is worthwhile to do.

In the study, qualitative methods and interactional research were used to investigate decision making and patient autonomy in genetic counseling interaction. How?

The aim was to find out how people manage this talk and how they show each other how they understand each other, how they want to be understood, how they negotiate these understandings and how they establish mutual understanding. The basic question is what kind of methods we use to do that kind of thing. Once you have a research question, you start to make collections of particular phenomena. In this case, we started to collect occasions of encounters where a genetic counselor responded to a positive or negative decision. Once you have such a collection, you do not so much look at the other parts of the talk anymore, but you start to compare. This allows you to focus on particular issues.

What is especially fruitful about this method?

It always looks at authentic data, so it restricts itself to recordings of talk that would have occurred regardless of the recording process. One of the big advantages, but also the difficulties, of conversation analysis as a method is that you try to start from not too many preconceived theoretical notions: first you look at the data rather blankly and then, when you see certain phenomena that you are interested in, you look at what other persons already have said about these phenomena. This method enables you, or at least forces you, to look at data with a rather fresh look. This enables you to see things that have not been seen before, rather than re-seeing the things that have been seen before, which is what you do when you start from pre-established coding schemes.

Why investigate this in South Africa? What makes South Africa unique?

What is interesting about South Africa is the recent history of the differences between different parts of the population, so the historical and political issues. But there is also the cultural issue, for example the tradition of traditional healers in large African communities. This tradition means that people have to decide ‘Do I go to the hospital or do I go to traditional healer, or do I go to both?’ What does that mean for example, for things like taking your drugs? If the traditional healer says A, and the doctor says B, who do you obey? Most patients do not only go to the hospital but also go to a traditional healer. And there is of course the language issue. How do people who speak an African language and do not speak Afrikaans or English talk with health professionals who mainly speak Afrikaans or English?

How is academic life in South Africa?

Some parts are very comparable. There are parts of South African universities that are just as good, or even better in some respects, than parts of the Dutch academic world. But there are large differences. <

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Rimke Groenewold and Laura Bos (both from the Center for Language & Cognition) talk about the good old times – and also reflect on the more difficult times during their PhD, such as their insecurities and the gullibility they experienced in the first year. Over the course of their PhD, they gained more than enough experience to give an overload of tips to make your PhD a success.

Rimke
What was your project about?

Laura
My research was about time reference expressed by verbs in people with aphasia. Aphasia is an acquired language disorder as a consequence of brain damage. In general, verbs are very difficult for people with aphasia. My research focused specifically on the question whether verbs that refer to the past are more difficult than verbs that refer to the present or future. And what about you?

Rimke
I also did research on aphasia and my project was about the occurrence of direct speech constructions in people with aphasia. A direct speech construction is for example: ‘Jan says: I am hungry’, while an indirect speech construction would be ‘Jan says that he is hungry’. I looked at how often people with aphasia use these constructions and whether they understand direct speech constructions better than indirect speech constructions.

Laura
And what do you do at the moment?

Rimke
I am still working on some data from my PhD project, and I am also working as a study advisor at the Department of Linguistics. And I am...
involved in a project called ‘AfasieNet’, which is a platform in the Netherlands and Belgium for everyone that has something to do with aphasia. And what are you doing currently?

Laura
I am working in Rotterdam as a General Manager for the European Master in Law and Economics. I don’t know anything about law or economics, but I had experience with a similar coordinating function and studied for my master and PhD in similar international programmes. But to be honest, I do miss research a little bit. Eventually, I hope that I will be teaching next year or starting a postdoc. What do you think was most fun about your PhD?

Rimke
Pretty much everything.

Laura
Are you being nostalgic?

Rimke
Yes, maybe. I miss my project a little bit. The fun thing about a PhD is that you learn new things every day. You have a lot of freedom and can direct your project in the way you want. For example, I collected data in Sydney for half a year, which was awesome.

Laura
Yes, I agree. And conferences are also a fun part of a PhD. Do you remember Kaliningrad? That they closed the road to the location of the conference and that a police car guided us to the conference, because ‘all those important scientists need to go to their conference’.

Rimke
(laughs) Indeed, you have a lot of adventures during your PhD.

Laura
Although I think that freedom also has a negative side. Especially in my first year, I was very nervous. It was hard for me to get a good overview of the project. And in my first year, I didn’t have many concrete results. During your masters, you have a project for half a year, then you get a grade and that’s it. With a PhD, you work towards an endpoint that lies four years in the future.

Rimke
I never noticed that you were that nervous in your first year!

Laura
Well, I was! Especially in the first year I felt a bit anxious sometimes. Because of the freedom, I often arrived after 9AM and I pushed myself to stay longer in the evening. And you were the opposite and were always early at work. So when I came to the office and saw you already behind your desk, I always felt immediately unproductive.

Rimke
(laughs) So actually it was my fault.

Laura
Exactly, you were way too disciplined.

Rimke
I recognize what you say about it being very difficult to have an overview of your entire project in the first year. Did you have good tricks to deal with things that didn’t work out the way you wanted?

Laura
The first few times it was difficult when an article was initially rejected and you receive a very long list of comments from the reviewers. One tip I got from a colleague was to read all the comments, then put it away and read it again the next day. Then you will see that the comments are actually not that bad.

Rimke
That is a good tip. And have you learned something during your PhD that you didn’t expect, or maybe something about yourself?

Laura
One thing I didn’t expect was the fact that I was not really nervous for my defense and that I actually liked it. I thought I would be super nervous.

Rimke
One other thing I hear often is that students only read literature the first half year of their PhD, which I think is not a wise thing to do. First, you will forget half of what you read, and second, in the beginning of your PhD you often don’t know what to read because, until you’ve worked on your own data, it is hard to tell which papers are the most relevant.

Laura
And go to conferences, because you will hear new things and you will meet interesting people in the same field as you. And most importantly, conferences are fun.

Some supervisors think your PhD should be your life, but I think it is healthy to have social contacts and go on vacation once in a while. <
The future of surgical robotics at our doorstep: an interview with Prof. Sarthak Misra

He drew inspiration from science fiction of the ‘60’s, helped develop robots for the International Space Station, and recently received the European Research Council (ERC) Starting Grant worth 1.5 million euros to work on minimally invasive surgical robots. Shuttling between the Universities of Twente and Groningen, Professor Sarthak Misra is all about making futuristic ideas a reality, one step at a time.

Micro or macro?
‘You’re right, they are two separate lines of research, but they can also merge together. When I think of macro, I think of larger sized robots that can go inside the body. Once they’re inside, they need to deliver something – and for me, this is where the micro – and even nano – comes in. I am interested in combining both.’

You studied mechanical engineering in Montreal, and went on to work on space robots(!)
‘As a mechanical engineering student at McGill’s University in Montreal, I always enjoyed mechanics, dynamics and control engineering – building blocks for the study of robotics. During my master’s, I worked in a group called the ‘Centre for Intelligent Machines’, which was basically a robotics group. Here I became truly fascinated by this area of research. Afterwards, I had the opportunity to work on the International Space Station programme as a robotics analyst, a fantastic opportunity that not many people get. The job was very much research-oriented, and being surrounded by colleagues who were part-time faculty members at universities created a true academic vibe.’

And then somehow you shifted to medical robotics, and decided to go back to school?
‘When I was working on the International Space Station programme, I was actually employed by MacDonald Dettwiler Space and Advanced Robotics (MDA) at the Canadian Space Agency. Somewhere along the way I started thinking: can I use some of these advanced technologies to benefit people more directly? MDA has a separate branch of research for medical robots, and that sparked my interest. The leap that followed, from space robots to surgical robots, is actually not that big. Although the application area is completely different of course, the fundamentals and concepts are quite similar. Moreover, both are set in a very challenging environment with a ‘failure is not an option’ philosophy. Anyway, I realized that in order to have a shot at a career in medical robotics, I should probably study some more.

Over the next years, I did my doctoral studies at Johns
Hopkins University in Baltimore, during which I looked at the interactions of surgical tools with soft tissue, and how these interactions affect surgical simulation and planning (http://lcsr.jhu.edu). After I got my PhD degree, I started as a faculty member at the University of Twente at the MIRA-Institute for Biomedical Technology and Technical Medicine.

You recently started working at the UMCG as well. What is it that brought you here exactly?

‘Twente and the UMCG have been collaborating for some time now by facilitating the exchange of faculty members. This raised my interest because a large part of my research is translational, trying to see how we can take successful experimental set-ups from the lab to the clinic. Throughout my career I worked at institutions associated with large medical facilities, however, the University of Twente does not offer this opportunity. Luckily, the UMCG allows me to work more on developing surgical robotics while having close contact with clinicians. After all, most of my work is inspired by having discussions with them. For now, I am still really in the start-up phase. Meeting with students, setting up the lab, networking with clinicians and other researchers. Both Henk Busscher (Department of Biomedical Engineering) and Lou de Leij (Dean of Research of the UMCG) have been extremely supportive of my research initiatives, and have provided me with resources to initiate the “surgical robotics” research line within UMCG and RUG. Further, my smooth transition to the UMCG would not have been possible without the continued support from several others both at the UMCG and University of Twente, namely Henny van der Mei, Bart Verkerke, Matthijs Oudkerk, Rudi Dierckx, Bart Koopman, Peter Apers, Geert Dewulf, Rene Veth and Albert van den Berg.

You were recently awarded the prestigious ERC starting grant for the ROBOTAR project. In this project you combine your knowledge regarding the use of flexible needles and micro robotics.

‘I have been investigating the use of flexible needles for the past decade. Needle insertion into soft tissue is one of the most common minimally invasive medical procedures, and is used during biopsies, brachytherapy, tumor ablation and neurosurgical procedures such as deep brain stimulation. In all these cases the needle needs to reach a very specific location within the organ. What often happens, though, is that the needle actually deviates from its intended path. This can be due to organ deformation and anatomical obstructions, but also just due to physiological processes such as respiration and blood flow. One of the ways to mitigate these ‘needle-targeting errors’ would be to use a needle that can be steered around in some way, making it move almost snake-like through the body. Our solution was to develop needles with an asymmetric bevel tip that will bend naturally when rotated by a robot. With the ERC grant we hope to develop needles that can travel long distances within the body and reach their intended target with great precision. For this to work, we will need to develop ways to do needle path-planning. We also need to develop tracking methods that allow us to track the inserted needle in real time. For this you could use ultrasound, but ultrasound images don’t look very nice. MR and CT look much better, but are much more difficult to work with in terms of practicality. We are trying to develop MR- and CT-compatible systems though. Then, once the needle has reached its destination, we want the robot to deliver magnetic microrobots, which can be guided with an external magnetic field. The microrobots can be used for drug-delivery.

Or you could inject another invention of yours, MagnetoSperm.

‘The MagnetoSperm got a lot of media attention (for example: http://www.bbc.com/news/science-environment-27665050). It is a biologically-inspired sperm-like robot with a magnetic head and a long flexible tail of about 300 µm. By providing weak magnetic fields you can actually propel it forward by causing its tail to flap. Within that whole line of work we also developed hybrid systems along with our collaborators: bull sperm cells encased by a small platinum tube or bacteria with small magnets in them. These will behave as microrobots, but still be biological entities. The idea is that MagnetoSperm might be functional in cleaning clogged arteries. You could inject...”
several of these, and then apply fields to steer them to an exact location in the body. This way you could use them, again, for targeted drug delivery.

The inspiration for doing all of this actually comes from a movie in the 60’s called Fantastic Voyage. In this movie a bunch of clinicians were miniaturized, and they entered the bloodstream of a grievously wounded scientist in order to prevent a clot from reaching his brain. That is the inspiration of the ROBOTAR project. I admit, it might seem futuristic and far out, but that is also what ERC supports. However, ROBOTAR also has smaller sub-projects for which I think the results can be implemented on a relatively short-term timescale as well.

**You said you are in the start-up phase here at the UMCG. Does this mean you are looking for students to come work with you?**

‘I have a laboratory here in the UMCG, and I would really like to push that forward, so yes I am looking for students. Now it’s a matter of getting students interested and excited to work with me. I am looking for both Master- and prospective PhD students who are interested in doing robotics, but they don’t have to have any experience with it. The students that I am looking for preferably have a background in medical physics or biomedical engineering, or are in a general sense interested in control engineering or in applied physics – a programming background is not necessary.’

Sarthak Misra’s lab promises to be a great addition to the research going on in the UMCG. Hopefully, Groningen can inspire Sarthak and his future group to keep developing ground-breaking technologies. If you always dreamed of working with cutting-edge medical robotics, this is your chance. Do not hesitate and visit [http://www.surgicalroboticslab.nl](http://www.surgicalroboticslab.nl) for more information.

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**What do you think the biggest challenge that your research will face in the near future will be?**

‘I think, in my specific area of research, the biggest challenges are still the visualizing- and precisely controlling parts. How can we image and then control these modalities. One of the things we are now doing is developing sensing methods that are not based on images, and I really think that has a lot of potential. If we can integrate different sensors on the instrument and then couple them to various imaging modalities, we can truly know precisely where the system is in the body at what point in time. And then be able to control this system much better than a clinician can ever do, that is the idea. We are definitely not trying to take the clinician away from the setting, but rather help him or her. Clinicians will always have the final judgment call. But we can provide cues, guidance and automate certain aspects.

Another important challenge is how to transmit power to these microrobots. We are currently using magnetic fields, but are there perhaps other efficient ways to do this? Can we harness energy from the flowing blood for instance and use that to propel our systems?’

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**BY WOUTER HUITING**

**PHOTOS BY SANDER MARTENS**
The Wandering Mind

Half a year ago, I was sitting in front of a desk with a yet unsigned permanent contract in front of me for an attractive position as a senior research fellow – i.e. a principal investigator – and a pen in my hand. Now, some six months have passed, I feel over the moon and delighted with my life as it is currently unfolding.

I did not sign the contract.

Some three years before, I found myself in a position where my VENI project was about to end, and my follow-up VIDI proposal had just been declined. I could have stayed in Groningen for a year longer to apply again, but the motivation from the funder that my c.v. was insufficiently strong (despite a cum laude Ph.D. title and a year spent at Harvard as a postdoc, grumble) made me believe that I would be better off starting something new and different. Lady Luck may have left me when I was applying for that grant, but she did make a position in the United Kingdom cross my path that was virtually identical to the project that I had been carrying out in the Netherlands. So I made the move abroad once more, this time to spend a couple of years in Nottingham. This city is not only famous for Robin Hood, but also for Sir Peter Mansfield who won a Nobel prize for the invention of MRI, and for two prestigious institutions in the field of hearing research. For someone like me, who is involved in auditory fMRI, that is a veritable valhalla.

Two years further down the road, I took my second – and last – chance to apply once more for that elusive VIDI prize, confident that my c.v. had improved. I walked the walk, but in the bizarre lottery that is academic funding, I didn't make it into the final round. Some consolation was that it wasn't my c.v. that had failed me; this time, the delicate balance between innovation and feasibility had apparently not been struck quite right in the proposal. The result was that my return ticket back home was in jeopardy due to an utter lack of funding.

Somewhat fortunately, my supervisor overseas was quite eager to keep me there, so that is when a series of negotiations began. I won't go into the details; there are too many. Some ingredients were a director from a collaborating institute who withdrew from his position, resulting in unclear research priorities and an uncertain future, and a personnel department that refused to accord the salary that I had already agreed to with my supervisor. But the main problem was that I had never moved abroad with the idea of settling there permanently. Although my colleagues were wonderful folks, I remained a foreigner in a strange land, and I simply did not feel “at home”. I had promised myself that I would not make a negative decision: I would stay in England only if I wanted to remain there, not if the only reason was that I had nowhere else to go. I had exhausted my options, so it was time to keep that promise to myself.

So I resigned from my extended contract, and last Christmas I returned back to the Netherlands – initially to spend the holidays with my parents in the south, but then returning to my own house in Groningen. After fourteen years of sacrifices and hard investments into a career in science, I found myself unemployed. Seven fat years and seven lean years, they say, so I guess it fits. I started to write application letters. I consider myself lucky that I could afford to be slightly picky, and I did not get turned down immediately all the time. Still, if not always rejected, I certainly did feel dejected.

Then a position as a trainee clinical physicist opened at my previous department of Otorhinolaryngology. Although in a similar field, compared to my previous career this was a much more clinical and much less scientific position. At the same time, it did offer the prospect of more job security and the possibility to remain in an area that does feel like home to me. Of course I applied, and perhaps Lady Luck had some amendments to make because I was offered the job.

So now I have started a new challenge outside academia. I have always considered myself rather a “hardcore scientist”, so I was expecting to have a tough time leaving basic research. As it turns out, however, surprisingly I don’t miss it at all. Science will always remain a love of mine. But academia won’t. I got fed up with the system, the stress, and the disappointments. So I left and don’t feel any urge to look back. I am very happy doing what I do now. Life can be lived again!

BY DAVE LANGERS
Interview with BCN dissertation award winner Linda Geerligs

Writing your PhD thesis can be a struggle. What makes a PhD thesis ‘good’ and with what part should you start? Why not ask the winner of this year’s BCN dissertation award, Linda Geerligs? Linda is currently working at the MRC Cognition and Brain Sciences Unit in Cambridge after finishing her thesis about functional brain networks and selective attention in the ageing brain.

How are you doing in Cambridge?
I really enjoy living in Cambridge. Cambridge is a small city, comparable in size to Groningen, where I feel right at home. There are lots of nice places to visit, both inside in the city and in the surrounding areas. According to the British this area is very flat, but I really appreciate the occasional vista over the landscape when I am biking through the countryside. I also enjoy all the historical buildings that have been so well maintained, and the traditional pubs that you can find in every village. The MRC Cognition and Brain Sciences Unit is a great place to work. A lot of interesting research is done with a focus on cognitive neuroscience, which makes it a very stimulating environment for me. Before I came, I was a bit worried that scientists in Cambridge would dedicate all their time to work, with no time for a personal life, but fortunately that is not the case at all.

Congratulations on winning the BCN prize for best PhD thesis. What do you think makes a good PhD thesis?
As a researcher, I really appreciate innovative, new ways of approaching existing questions, as well as doing solid research in which existing scientific knowledge is replicated and expanded on in smaller steps. Either or both can make a good PhD project, but regardless of which approach you use, I think an important aspect of any good thesis (in my field) is to provide a good overview of the field and to show how this research builds on and expands the existing knowledge. Some of my fellow PhD students wrote a review as one of their first chapters. Although this is not something I did myself, I think it is a good way to really get to know the field and identify potentially interesting and important research topics.

What are the pitfalls in writing a thesis? Have you encountered any problems while writing?
On some days I felt like I was in a ‘flow’, writing was easy and came naturally. However, on other days the process was much more difficult. When I was feeling stressed and I wanted to finish something quickly I had the tendency to keep trying. However, with writing I think this is not the best strategy. It worked better when I did something else first and tried again after a couple of hours or even days. Some of my best ideas occurred to me when I was biking home from work. Also when rewriting my own work, it was difficult to spot the weak points of the paper after having read it so many times. In those situations it also helped me to work on something else for a couple of days or weeks and reread it later with a fresh perspective.

What do you think is a good time schedule for writing a PhD thesis? When did you start and with which part of the thesis?
Directly after every study I completed, I wrote up the results. This worked out well for me. Some of my best ideas occurred to me when I was biking home from work. Also when rewriting my own work, it was difficult to spot the weak points of the paper after having read it so many times. In those situations it also helped me to work on something else for a couple of days or weeks and reread it later with a fresh perspective.
results for a paper. In this way, I gradually wrote most of the content of my thesis throughout the four years of my PhD. In the last year, I started working on the results and discussion sections of my thesis. For me that was a really good approach. During these four years I gradually got to develop my writing skills, through the comments and feedback that I got from my supervisors. I noticed that with every new chapter, the process became a little bit easier. In the end, writing the discussion and introduction was relatively easy because it followed naturally from the content of the other chapters. Of course this is not feasible for everyone because the structure of a PhD’s experiment timeline can vary so much.

**Have you done any courses on scientific writing?**

No, I did not do any courses on writing. Over the years I developed my writing skills through a combination of different things. One important aspect was to read many papers and to get a feel for what makes a paper that’s enjoyable to read. Discussions with my supervisors were another important part. We talked about the best way to structure papers and about ways to guide the reader along, to make sure one section follows logically from another. And of course experience is the main ingredient for developing good writing skills.

**It can be difficult to stay focused while writing. Did you have trouble with that and do you have any tips to stay focused?**

Once I know what I want to write, staying focused is not a big problem for me. I have much more trouble when it is not clear how I want to frame something. In those cases, it really helps me to talk it through with someone and to make a schematic overview of the points that should be in the paper and how they follow each other in a logical order.

For four years you have mainly read and written in English. Was it difficult for you to write a thesis summary in Dutch?

Writing about my research findings in Dutch is a lot more difficult for me (and more error-prone) than writing in English. But even more importantly, I think writing the Dutch summary requires quite a different mind-set from writing the rest of the thesis. You think about different questions, such as whether your findings can be linked to the daily experiences of your readers in some way, and how it relates to things they know and care about. Thinking in this way makes it a little bit easier to translate some of the specialist English terms we use into something in Dutch that still made sense. This is difficult and time consuming, but it is important (and a lot of fun) to be able to talk to the general public about your work.
Bone regeneration - translating knowledge into products

Anne Leferink (30) is the winner of the Viva 400 2014 competition in the category of “Brainy ladies”. 400 inspirational women were nominated based on their ground-breaking scientific discoveries, development of new products or anything else that has changed the world in 2014. Last July, Anne received her doctorate at the University of Twente and in her thesis she describes the development of a new method to create bone material. This new method is of great importance to the treatment of patients suffering from arthritis or osteoporosis. It facilitates controlled concatenation of microscopic pieces to form a larger and mechanically stable platform for bone to grow on. The best news yet is that this will reduce treatment to a single injection for patients with osteoporosis.

You have set out to develop new materials and techniques to facilitate bone formation. Can you briefly explain the content of your research as well as the significance?

One of the conventional strategies to facilitate bone regeneration encompasses a combination of a carrier material with (undifferentiated) cells originating from bone marrow. This carrier material, often called ‘scaffold’, consists of ceramics, a polymer or a combination of both. The scaffold serves as a porous three dimensional (3D) platform on which cells attach, multiply and differentiate. The process of joining cells and materials together can be done both in vitro as well as in vivo.

A disadvantage of this strategy is the size of this 3D construct (mm to cm) – it is too large to be inserted via a needle. The alternative to injection is implantation which requires invasive surgery. The current alternative to either injection or implantation is the use of hydrogels. However, hydrogels are liable to error due to their limited mechanical capacity to take on weight as well as their quick degradation. It appears that no suitable means of facilitation is available for bone regeneration application.

During my PhD, I was part of the team that developed a new method to inject a mechanically stable construction. We tried different sizes and shapes of micro cubes to extract the most effective combination. Within days a homogeneous mix of tissue, cells and polymer cubes of several millimeters wide are formed that can bear some mechanical weight. The relation between sizes and shapes and differentiation of the cells is something we are currently looking into.

Scientists come in all shapes and sizes. What is your motivation for scientific research?

What really motivated me to pursue a career in science is the freedom it offers to expand my skills and develop my interests. Creativity and optimism are essential characteristics that you truly need in science – if those two factors are present perseverance will come about by itself.

The pictures of stem cell-related processes that can be viewed on your Linked-In profile are true works of art. Are imaging techniques still part of your work now that you are project leader and university lecturer?
My name is Stéphanie Klein Tuente and I recently started as a PhD student at the University Center of Psychiatry of the University Medical Center Groningen (UMCG). My research focuses on the development and application of a Virtual Reality Aggression Prevention Training for reducing victimization in Forensic Psychiatric Clinics (in dutch: FPK’s). This topic fits very well with my background in Forensic Psychology, which I studied at Maastricht University. I finished my Master’s programme cum laude in 2013 and after this I worked as a junior researcher and psychologist in the penitentiary psychiatric center at Penitentiary Institution Vught. Because of my strong interest in research, especially research on aggression in forensic psychiatric inpatients, I decided to apply for this position. For the next four years, I will try to make forensic clinics a safer place for both staff members and forensic psychiatric patients. In addition, because of my curious nature I joined the BCN Newsletter as it allows me to interview other researchers and learn about their research (careers). Besides the opportunity to get in touch with other researchers, I can practice my English writing skills and this makes the BCN Newsletter a nice addition to my daily work as a BCN PhD student!

When I was 6 years old I got my very own microscope which I used frequently to observe things too small to see with the naked eye. During my six years in high school however, my interest in microscopy waned as a consequence of some bad grades due to non-adherence to the guidelines on observation drawings. While doing my PhD research I regained freedom to perform microscopy research as I saw fit. As administrator of the electron microscope I had great joy in viewing my own numerous monsters as well as those of colleagues. It was in this period of time that I learned to record not only functional images but artistic ones as well.

Magnetic Resonance Imaging is one of the techniques used to compute the growth of bone tissue “in vitro” in 3D. Why did you use MRI in your research? The main reason we used Magnetic Resonance Imaging (MRI) in our research is due to the non-invasive and radiation free character of the technique. Unfortunately, the MRI remained unused for a large proportion of the time and as a consequence the University of Twente cut it out of their budget.

What part of doing academic research do you find the most rewarding? The most pleasing part of academic research is that I get to work with students. Most students are convinced that the possibilities are endless in research, and are blissfully optimistic when it comes to publication and finance-related matters. This attitude gives rise to new insights and creative thinking which encourages me as researcher and supervisor to be actively involved in their research.

You have recently been awarded the viva-400 award in the category of “Brainy ladies”, congratulations! This underlines the innovative angle and importance of your research. What are your academic goals for the coming years? I do not yet aspire to become (assistant) professor – more due to the political and publication pressures related to this function than to my interest in academic research. In my opinion it is important that research is viewed as the process of translating knowledge into products. I am under the impression that in the current tenure-track system, researchers are greatly discouraged to take risks since for every experiment a publication record has to be guaranteed.

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Wolves, rope, and chocolate: Tracking the elusive major project

On the hunt for a major project last spring-summer-fall, I was desperate for something exciting. No offense to the brilliant lab bunnies out there, but lab work just isn’t my cup o’ tea. I wanted something very specific. Nothing invasive. An intelligent, preferably social species. I was hoping for a wild population in a beautiful environment. I got pretty lucky and landed 4 out of 5 of my wishes. After months of trying to find something on my own, I finally cracked and asked my track coordinator for help. (Please do this earlier, kids!) Unaware that I had volunteered at a wolf and hybrid refuge back home, he suggested I contact the people of the Wolf Science Center in Ernstbrunn, Austria. How serendipitous! As the only facility to raise dogs and wolves under comparable conditions, it serves as the best place to study cognitive and behaviour differences between dogs and wolves and, ultimately, the effects of domestication on canids. After a bit of badgering, name-dropping, and a picture-packed and passionate motivation letter, I was off to the WSC.

Beyond work, I was looking forward to returning to a 3-D world – and to finally ski the beautiful Austrian Alps I’d heard so much about. Of course, I went from Nederland to Niederösterreich. Doh! Other than that, my initial impression of my new home filled me with euphoria. Impressive facilities, a beautiful student house, friendly roommates, as well as pizza, a Disney movie, and a pup to snuggle with my first night. I had hit the major project jackpot. Now, I won’t bore you with the details of the almost inevitable slide back towards reality, but I will say that it involved scrapping the project I had already invested time and hope in, adjusting to living in a full house with strangers (I’ve always taken my alone time for granted!), and trying to learn the lay of the land amidst the chaos that is science and working with intelligent, strong-willed animals. I won’t lie; I felt the urge to flee at times. But I’ve made some amazing friends and have landed a pretty bada$$ project, if I do say so myself.

Before I’d ever heard of the WSC, one of my project ideas was to go home to the refuge I knew (an unlikely prospect) and study cooperation in the animals there using the well-established “loose string” task. I had seen a fantastic TED talk by Frans de Waal on moral behaviour in animals in which he described the use of this paradigm in Asian elephants. When I landed the gig at the WSC, I was disappointed to hear they’d already initiated this project with the dogs and wolves. But when my first project fell through, I struck lucky once again. I was elated to take over the WSC’s loose string study.

So what is this loose string paradigm? It entails two animals simultaneously pulling on both ends of a rope in order to slide an apparatus within reach. The rope is threaded through a pulley system attached to the apparatus, upon which lies something desirable (e.g. yummy). When only one end of the rope is pulled, it comes unthreaded from the pulley system, the apparatus is no longer moveable, and the reward becomes unobtainable. Brilliant, right? The animals must be tolerant enough to allow each other access to the apparatus that holds the much desired food reward and attentive enough to only really pull when their partner pulls. In its basic form, it can be debated whether this set up actually demonstrates cooperation. Are the partners actually paying attention to each other or just pulling coincidentally? Once you start playing around with the set up – adding delays, another apparatus – then you really get to see the interesting stuff. Or do you? I’d say more, but I can’t just yet…

It’s fascinating to watch the animals test, and I feel very fortunate to participate in this project. (I even can’t wait to present on it!) Amongst other things, I’ve learned a few very important lessons:

1) Daily and seasonal rhythms do not bend to your will. Come breeding season, throw your timetable out the window.
2) A wolf-proof apparatus is something dreams are made of. In reality, you best be on your toes and keep your reflexes in quick, working order.
3) Cooperation tests require cooperation from humans. And lots and lots of chocolate.

BY MAIGLIN MACLEOD
Mindwise: Can we crack the secrets of talent and excellence?

It is fascinating to read about Bill Gates’ rise to become the wealthiest person on Earth, to see how Stephen Hawking has become one of the most important current theoretical physicists despite suffering from a serious neurodegenerative disease, or to watch back the incredible high-bar performance of Epke Zonderland at the 2012 Olympics. Though seeing such demonstrations of talent and excellence is very fascinating, however, researchers have been intrigued by the deeper question of what makes these individuals exceptional. This is one of the questions that our Psychology students who enroll in the new Master programme ‘Talent Development & Creativity’ can help answer in the coming years.

The historical nature-nurture debate

In 1869, Sir Francis Galton published his book “Heredity Genius”, in which he concluded that ‘nature’ is more important than ‘nurture’. In other words, excellent performers are born, not made. This was based on his observation that the relatives of high-performing individuals such as famous poets, scientists, and musicians, were likely to be high-performers as well. In 1873, however, Alphonse de Candolle challenged the conclusion of Galton. After analyzing the personal histories of 200 excellent scientists, De Candolle concluded that it is primarily the environment, such as education, familial and economic conditions, that is at the origin of talent development. The works of Galton and De Candolle subsequently gave rise to the famous nature-nurture debate, which has featured prominently in the domain of behavioural and social sciences in general.

An intense discussion remains alive. While researchers have reached consensus that both nature and nurture play a role, they do not agree on the relative importance of the two. Today, one dominant belief is that to reach the top of a certain domain, an individual should primarily engage in many (often more than 10,000) hours of deliberate practice, but another dominant belief is that being genetically endowed is a necessary component for becoming a top performer. After almost 150 years of research, one starts to wonder whether the secrets of talent and excellence will ever be resolved…

However, researchers do agree that, regardless of their relative importance, various personal and environmental factors play a role, such as genetic endowment, practice, education, familial support, and also teacher or coach support, being committed to reach the top, etc. Furthermore, looking at talent development over the life span, Simonton summarized some typical properties. First, individuals who reach excellence in music, sports, arts, and sciences, often have very idiosyncratic patterns of development. This entails that there is no common road to the top, as is evidenced by the observation that excellent performance is demonstrated at different ages for different individuals. For instance, Jodie Foster was nominated for her first Academy award at the age of 14, whereas Meryl Streep acted in her first movie in her late 20s. Second, the variables that stimulate or inhibit talent development change over time. For example, a particular student may find a new and engaging supervisor who stimulates the student’s motivation and
the time the student devotes to the project, which in turn further stimulates the student’s abilities and the engagement of the supervisor, and so forth.

All in all, talent development seems to be a process that is shaped by a combination of multiple factors including genetic endowment, psychological factors such as motivation and commitment, and environmental factors, and this process takes different forms for different individuals. Cracking the secrets of talent and excellence

In past research and practice on talent and excellence, the factors contributing to talent, whether they are more nature or nurture, have primarily been treated as stable factors, not as factors that are changing or shaping each other, over time. However, taking the typical properties of talent and excellence into account, we should not continue with the question of what the contributions of nature and nurture components across the population of excellent performers are. Rather, we should ask ourselves how the different nature and nurture components combine to shape talent over time for different individuals. Accordingly, practitioners in education, business, music, and sports, who form one component of an individual’s ‘dynamic talent network’, should focus on how they can create the conditions under which talent can be stimulated. For instance, a supervisor who is sensitive to the current level, enthusiasm, and commitment of a student, may increase the probability for a positive spiral between the commitment and enthusiasm of the student, additional support of the supervisor, and of course the (ultimately excellent) skills of this particular student.

To conclude, after a 150-year long debate on the origins of talent and excellence, we have arrived at a point at which new ideas and methods on talent development should be implemented. In September 2016, our Faculty will launch a new Master programme ‘Talent Development & Creativity’. Students in the programme will acquire scientific and practical skills on the development, selection, and stimulation of talent and excellence, so they will have the opportunity to crack the secrets of talent and excellence…

Relevant links and publications

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I’ll get out November 2018. In the meantime I will sneak off every once in a while to perform an interview or two. The BCN newsletter: A perfect excuse to get out of the basement.

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Conflict Management:
What if you both want the apple?

Everyone experiences conflicts in the workplace. These could range from small things such as whether to open or close the window in a shared office, to more serious situations such as not receiving the supervision that you need from your supervisor. On March 4, Gopher (Groningen Organization for PhD Education and Recreation), organized a workshop in collaboration with Improsa about conflict management, communication styles and cultural differences in communication.

The speakers were two members of Improsa who started with the following example: imagine you and a colleague are walking to the canteen and you see an apple on the table. You are a bit hungry and would like the apple, but you find out your colleague also wants the apple. What will you do? Your actions will depend on two things: (1) how bad you want the apple, and (2) how much you are willing to invest in the relationship with your colleague and cooperate. Based on these two dimensions, five different communication styles can be distinguished (illustrated by figure 1). If you do not care a lot about the apple, you will probably either avoid the apple and therefore avoid the conflict, or accommodate and let the other person have the apple. Accommodation leads to more investment into the relationship and 'liking' by others, but both accommodation and avoidance will not result in obtaining your goal (getting the apple). If you do care about the apple and are willing to cooperate, you will most likely compromise and share the apple. You will not get 100% of what you want, but it might be better than nothing. If you want the apple no matter what you can compete for the apple and take it, but this leads to low investment in the relationship. Last, if you really want the apple, but also want to invest in the relationship, you can collaborate with the other person to come up with a solution that benefits both you and your colleague. Remember, every individual has their own preferred communication style. No communication style is by definition "bad" or "wrong", and different conflicts will require different communication styles.
Aside from personal preference, culture can also influence the way colleagues communicate. Especially for foreign students, it could be useful to get more insight in the differences in communication styles between their culture and the Netherlands. In the 70’s, Dutch social psychologist Geert Hofstede and colleagues created a model of culture based on a wide range of cross-cultural data. The model consists of multiple dimensions that visualize how values influence communication in different cultures. In figure 2, the Netherlands is compared with the United States and China.

One example of a Hofstede Cultural Dimension is power distance, which deals with the relationship between members of different hierarchies in an organization. The Netherlands scores relatively low on this dimension, shown by the fact that the relationship between students and Dutch supervisors is often informal, and communication can be very direct and participatory. The Dutch score relatively high on individualism. Individuals are expected to take care of themselves. This might be reflected in the Dutch culture to speak up if you disagree with something, or if there is a problem. If you don’t mention something, Dutch people will often assume everything is alright. The dimension masculinity addresses the importance of values in a society such as achievement, success, and competition. The Netherlands has a relative low score and is a feminine society. Standing out of the crowd is not particularly admirable, or as the Dutch expression says: ‘doe maar gewoon, dan doe je al gek genoeg’ (Just be normal, that’s crazy enough). See the website http://geert-hofstede.com/ to read about the other dimensions and compare different countries with each other.

Of course, everyone has their own unique communication style, but learning to recognize your own style of communication and that of the person involved in the conflict can help you in any conflicting situation. If you experience undesirable conduct, unequal treatment of problems in cooperation at work, you may consult your confidential advisor. Every Graduate School has its own confidential advisor who can offer a listening ear and advice. Ask the contact person of your graduate school for more information, or contact BCN’s confidential advisor Michiel Hooiveld (m.h.w.hooiveld@umcg.nl).

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BCN Principle Investigator’s Day

This year’s PI day of BCN was held on the 23rd of April. The organizers were Pascale Dijkers, Ruud Kortekaas and Evelyn Kuiper. Some 30 PIs and BCN staff registered for this event in Time Out Café, Groningen. Apart from interesting brief lectures by fellow PIs, there were presentations about the structure of BCN and about how and where to get research funding. A ‘blind date event’ paired all present PIs to a random PI partner with the assignment to concoct and present (in 4 minutes) a collaborative research proposal to the other PIs who served as a jury. It was a great way to interact with someone outside one’s research area, and it resulted in creative and also entertaining research proposals. The winners of this event were Terrin Tamati and Marieke van Vugt who each won a 100 euro research grant by presenting the best and most entertaining proposal.

— By Ruud Kortekaas and Pascale Dijkers
— Photos by Sander Martens & Pascale Dijkers
BCN Lunch # 6: Life beyond academia

BCN Lunch meetings are designed to provide new perspectives on the PhD journey. The theme of February’s meeting was ‘How to turn your science into money: Life beyond academia’. We invited two speakers from the Rijksuniversiteit Groningen who are experts in converting scientific ideas into successful businesses: Prof. Dr. Menno Gerkema and Dr. Marijke Gordijn. Menno is a Professor of Chronobiology at the Faculty of Mathematics and Natural Sciences at the RuG, and is the director of Entrepreneurship and Education at the Centre for Entrepreneurship. Marijke teaches and conducts research at the Faculty of Mathematics and Natural Sciences, and is now running her own company successfully. Together, they shared their ideas and tips on how to apply the skills accumulated during the PhD towards starting your own business.

The skills gained during a PhD are multi-dimensional; from team work and logical thinking to the stubborn pursuit of goals, PhD’s are equipped with many desirable skills. As Menno highlighted, these are the core skills necessary to be an entrepreneur. We are trained to become experts in our fields of study but along the way we gather many other skills. We ourselves least understand and appreciate the importance of these general skills. As it turns out, skills such as being in the driver’s seat for a project and at the same time bringing together an expert team to fulfill a project in a time-sensitive manner are the core skills needed for an entrepreneur. Menno presented an excellent talk advising us to think out of the box to find value in our knowledge and skills because what we know and what we can do is useful to others.

Marijke then demonstrated how entrepreneurial advice works in practice by sharing with us her experiences starting and running a company successfully for more than four years. Marijke studied circadian rhythms and its role in depression for her PhD thesis at UMCG, and applied this knowledge to set up a company that uses the principles of circadian rhythms to improve the productivity of employees of other businesses. She shared with us the challenges of learning the financial and practical aspects of business, and how she has surpassed these practical difficulties. What we found out was that business and science share many similarities – from finding people who buy our ideas to juggling multiple processes simultaneously.

So if you imagine yourself as an entrepreneur, there may be a lot going for you already. And to help you setup your dream company, there are resources within the university to take the leap. Join us next time at the BCN lunch meeting with two new speakers who will dive into yet another aspect of your PhD life!

■ BY SHANKAR TUMATI FOR THE BCN PHD COUNCIL
BCN Lunch #7:
How to be a healthy PhD - Preventing burnout

Someone told me that if you work 45 to 50 hours per week as a PhD, it is theoretically possible that you finish in time. Ouch. I was hoping for another answer because a standard workweek from 9 to 5 already sounds like a vacation to me. Okay, now what? Although I believe I am not the burn-out type, some info on preventing this undesirable state could never harm. We invited Dr. Peter Flach and Dr. Maxi Meißner to provide BCN PhD students with some information on this matter, and ways to actually reduce your stress levels and prevent a burnout from happening.

Dr. Flach is a company doctor (bedrijfsarts) at the University of Groningen and he knows all too well that burnouts are common, especially among the highly educated perfectionists in medical settings. If you have high job demands, lack of support, and a bossy boss, watch out! You might be a prime target for burnout. (This was already described in the 80’s by Karasek.) But that’s not all, a more recent model by Siegrist states that the feeling that you are losing control of what you’re doing, with no reward is coming to you (even though you work hard) can lead to burnout. So if you notice you’re exhausted after work and your initial plans for the weekend get cancelled every time because you’re too tired, if you notice you put so much effort in your work but your results are declining; or if you think you “might” be heading towards a burnout, then it’s already too late for prevention; the best you can hope for is damage control. The advice of Dr. Flach? Keep the balance between work and the rest of your life, don’t make coffee and beer your new best friends, find support, and relax.

That’s where Dr. Meissner can swoop in: Yoga and mindfulness are at present one of the most popular areas of research. The work of Dr. Meissner focuses on bridging knowledge about physiology, psychology and yoga to better understand the health benefits of yoga as body-mind medicine. There are different types of yoga, but the main point is always to connect mind, body and spirit – and as Maxi pointed out, this does not have to happen on a yoga mat per se, it can also be happening while doing whatever activity feels good to you, and let’s relax deeply and connect with yourself. Depending on your taste you can do relaxation yoga (looks like sleeping but with full concentration) or a more aerobic form of yoga, such as ashtanga or power yoga (more energetic and with more up-tempo and difficult poses). Yoga can be beneficial in reducing stress levels by regulating your emotions, helping you adjust and respond to your environment as well as build tolerance.

Maybe a joint PhD on yoga for those of us who are vulnerable for a burnout would be an idea?

• BY CLAIRE KOS
FOR THE BCN PHD COUNCIL
BCN Retreat 2015, March 26 & 27

Report: Dafne Piersma

March 26 - A bus filled with BCN PhD students left Groningen to go to Odoorn. Bags were dropped in the conference room, everybody found a seat and the presentations could begin. Prof. Dr. Jon Laman presented before the PhDs to remind some of us about the fact that we had to present (and how to do so). Although some PhDs were secretly commenting on his style of presenting, it was a clear invitation to think about the presentation skills you wished to improve yourself. Then the PhDs were up and they received personal feedback after each session. In my opinion, the level of the presentations was quite high, but the time needed for the feedback sessions was long, indicating that we might now be even better presenters in the future. After presentations from all neuroscience-related disciplines, it was time to go outside for a mountain bike tour. Mountain biking was, despite the rain, a lot of fun!

March 27 – I was tired due to a bad night of sleep. I guess many people enjoyed bowling and drinking, but I still had to give my presentation. After a nice breakfast and some cola, my morning mood disappeared right on time to actually present enthusiastically (as I heard later). It is always great to receive compliments, so I liked the feedback and left Odoorn again feeling both tired and happy.

Report: Toivo Glatz

I will remember the 2015 edition of the BCN Retreat as a great event. Prof. Laman made a gentle start with some useful reminders about giving presentations, after which we heard a total of 26 talks by BCN PhD students over the next two days.

As could be expected when a lot of great minds from different backgrounds come together, for some topics it was hard to follow the talks and discussions. From my own field of Neurolinguistics we meandered through other matters of (human) cognition, over methodological issues to a range of medical conditions like depression to hormones and even to cell biology. The event proved to be a crash course on how wide and diverse the field of Neuroscience is.

Apart from the talks there was mountain biking – highly recommended, given you didn’t drink too much coffee over the day and brought some spare cloths :) – a walk with the forester and a bowling competition in the evening.

A compliment to BCN for the neat organization of every detail, the only slight disappointment was the scarce selection of vegetarian food. In any case, I’m looking forward to the next retreat!
Report: Stefan Knapen

The moment the bus turned around at the hotel and the letters on the building said “Bowlingcenter” I knew the BCN Retreat was going to be good. After learning how to present at the first lecture, the series of presentations from other BCN members started. Interesting to learn what they are working on and even the presentations way out of your own field proved to be a good source of inspiration in terms of methods, ways to present results and new insights.

An afternoon of mountain biking served perfectly as a way to sink in the new-learned information, and after a great buffet we turned that inspiration into new ideas. During the bowling competition our team came up with a new concept, the ‘Beerquillilibrium’: The balance between being too sober and having too much to drink in typical bar sports. And did we find the balance? Oh yeah. We are still wondering how score-counting could have gone wrong, because with our Beerquillibirum we definitely should have won. The following day, looking up more information about this concept, we learned the term was already coined in 2008. So we won’t make Nature, but in a while you can probably find our replication study in PLoS One.

Report: Isadora Alves

The BCN Retreat was a very invigorating event. It is easy to get lost in our own field of research and focus so much on our own questions that we forget we are part of something bigger. The retreat certainly changed that and helped refresh my motivation as a scientist.

Even though I did not present my own research this time, it was inspiring to see everyone presenting theirs, in their own way, with their own doubts, expertise and passion. An opportunity to present your work and get feedback and input on it is always useful and welcome, in my opinion. Nevertheless, my background being physics, everything presented at the Retreat felt completely new to me. The interesting part is that everyone I talked to seemed to have the same feeling. For me, one of the highest points of the Retreat was exactly that: being reminded that there are always a lot of questions still to be answered and new discoveries being made. The other high point was, of course, the opportunity to meet fellow PhD students, have an informal chat about our research and mingle. The mountain biking, I can say, was definitely a fun activity, even for the inexperienced ones (i.e., myself). However, the bowling undoubtedly came in first place, and not just because I was part of the winning team ;), but because the teams were defined in a way that allowed us to interact with students outside our own group of friends.

Interesting research, good food, new people, fun activities and a refreshed motivation? I would be happy to have a BCN Retreat every couple of months.
Flexibility is great, constant fear is not

My husband and I were in Groningen for four years for my postdoc. It’s hard to believe we’ve been in St. Louis four and a half years now, longer than we were in the Netherlands. We both very much enjoyed living in Groningen; the lifestyle and attitudes there often suited us better than those of people in St. Louis, even though we’re both Americans. But our family is in the States, and it’s a big, big advantage to be separated from them by a five hour drive instead of a ten hour flight.

I’m currently working at Washington University in St. Louis (Missouri, USA), in the Psychology Department, Cognitive Control and Psychopathology Lab, primarily focusing on multivariate analyses (MVPA) of fMRI data. It’s a staff position; my official title is Research Analyst. There aren’t a huge number of positions like this, but it suits me: I stay in the methodological and analytical details, working one-on-one with colleagues instead of teaching courses. The role isn’t for those who wish to head their own laboratories and become a “big name”, but gives me flexibility to pursue my own methodological questions within the framework of the needs of the ongoing projects.

I have very mixed feelings about science as a career. The flexibility, variation, challenge, and freedom in science are great. I actually look forward to starting work most days, choose how I pace my activities, and enjoy what I do. But the drawbacks are also substantial, especially the lack of job security and stability. I know at least ten people – good people – who failed to find a position in their field for every person that did. Worries about finding jobs or landing grants always turn up in conversations at conferences and meetings; fear is not a pleasant working atmosphere.

There is, of course, awareness of these problems in science-as-career, though there is no easy solution. A postdoc I know said that at the last place he interviewed (for a faculty position) he was asked about the ethics of training graduate students: is it morally acceptable to take on graduate students for a psychology PhD, given how poor the job prospects are? I’m not exactly unbiased, but think that part of the answer is to have more positions like the one I hold: staff, not faculty; doing science without producing more PhDs. But better, more stable funding for staff positions is needed – it can be very hard to justify a staff salary; a succession of postdocs is cheaper (on paper and in the short term).

I’ll close with a bit of advice: when working in science, don’t have the goal of clearing your to-do list – it doesn’t happen! There’s always more to investigate; projects multiply, but rarely definitively end. Instead, accept that there will always be something more that could be done (and that you’d like to do); finishing pieces of projects (like a paper, talk, tutorial, or blog post) on deadline with a minimum of last-minute stress and panic is the goal. In other words, take satisfaction from doing your part properly, and give yourself permission to stop working when you leave the office, even though there is more work to do.

> When working in science, don’t have the goal of clearing your to-do list – it doesn’t happen! <
> New copy editor wanted!

Do you enjoy reading the Newsletter? And are you a native English speaker with excellent writing skills? If so, why not join our enthusiastic editorial team as our copy editor 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 writing & editing skills, and be actively involved in BCN. Interested? Send an e-mail to Sander Martens, s.martens@umcg.nl!
€425.000 for research on relation between sports and school performance

Playing sports can have a positive effect on children’s brain structure and executive functions such as working memory and planning. But if there is indeed a causal relation, which factors are important? What type of activity is most effective, how often, how long, and how intensive should the physical activity be for an optimal effect on school performance? Led by Esther Harman and Chris Visscher from the Department of Human Movement Sciences at the UMCG, a multidisciplinary team consisting of researchers from the UMCG, RUG, Free University Amsterdam, Radboud University Nijmegen and the CITO institute will try to find out with their €425.000 grant from the ‘Nationaal Regieorgaan Onderwijsonderzoek (NRO).

Former BCN promovendus wins prestigious Glushko dissertation prize

Harm Brouwer won the Robert J. Glushko dissertation prize for his ground-breaking research in Cognitive Science. The prize, including $10.000, will be awarded on July 23rd in Pasadena, California (USA). Harm Brouwer (also see his alumnus column in issue 96, page 19) received his PhD degree cum laude in June 2014 from the Center for Language and Cognition at the RUG (1st promotor was BCN Prof. John Hoeks) for his research on language comprehension. He developed a computational model to predict the brain’s responses to linguistic stimuli. While developing this model, he discovered that the common interpretation of certain event-related brain potentials (ERPs) was incorrect, and proposed an alternative theory that has proven to be very successful in explaining a range of experimental results. He currently works at the University of Saarland in Saarbrucken (Germany) on a Marie Curie fellowship grant.

**> GRAND STUFF**

**PHOTO BY WWW.HBROUWER.EU**

have you recently received any grants, prizes, or remarkable media coverage? Please let us know (E.T.Kuiper-Drenth@umcg.nl) and we will try to cover it here!
Cool links


> Brainstorming does not work - why people who brainstorm are wasting their time. A short piece on the history of brainstorming and actual research conducted about it that suggests that brainstorming generates more ideas — but not necessarily of better quality. [https://medium.com/galleys/brainstorming-does-not-work-6ad7b1448dcf](https://medium.com/galleys/brainstorming-does-not-work-6ad7b1448dcf)

> Comedian Will Stephen gives a TEDx talk on how to sound smart without actually saying anything - a valuable and highly entertaining lesson in how to structure presentations to get your point across. Even if you don’t have a point. [https://www.youtube.com/watch?v=8S0FDjFBj8o](https://www.youtube.com/watch?v=8S0FDjFBj8o)

> A free alternative to SPSS is being developed in Amsterdam. It’s a standalone app that is built on top of R and allows data analysis with both classical and Bayesian techniques. [https://jasp-stats.org/](https://jasp-stats.org/)


> An ambitious effort to replicate 100 research findings in psychology ended last week — and the data look worrying. Results posted online on 24 April, which have not yet been peer-reviewed, suggest that key findings from only 39 of the published studies could be reproduced. [http://www.nature.com/news/first-results-from-psychology-s-largest-reproducibility-test-1.17433](http://www.nature.com/news/first-results-from-psychology-s-largest-reproducibility-test-1.17433)
Growing up in science

Has your Ph.D. advisor ever told you how they used to slack off as a graduate student? Do you know what alternative careers they considered as a postdoc? Did you know that they still feel deeply insecure every day?

Last year, Cristina Alberini and I started a conversation series in the neuroscience and psychology community at New York University to discuss such issues. We call it “Growing up in Science”. I have also led “Growing up in Science” events at other places I have visited, including at BCN on March 19th. The format is to have one faculty guest per event, who first tells their life and career stories; this is followed by about half an hour of open discussion. Attendees are students, postdocs, other trainees, and the occasional faculty colleague. The conversations are not meant to provide canned career advice, such as how to network or how to prepare for a job outside academia, although those issues also come up. Instead, the focus is on struggles, failures, insecurities, doubts, angsts, and weaknesses — the deeply personal and often emotional factors that play a role in the development as a scientist of guest speaker and audience alike.

One faculty member described how he coped — and failed to cope — with a childhood traumatized by excessive parental pressure. Another professor told about his one-year stint as a theater actor before he discovered psychology. A former Nature Neuroscience editor explained the discomfort that made her originally leave science, and the passion that made her return to it after eight years. A department chair, a world-famous neuroscientist, described the demon of procrastination, which he had fought his entire life and often lost to. I myself talked about “impostor complex”, the feeling that you are not good enough to be in your job or academic programme and that you have been fooling them — I have had that since my days of doing theoretical physics in Groningen, and it still hits occasionally.

Attendees bring up their own issues. At the University of Cambridge, a Ph.D. student mentioned that she had trouble letting go of her quest to outperform the people around her (rather than simply be a good scientist), because she felt that this had gotten her to where she was. At Baylor College of Medicine, students discussed how discouraging the gender disparity at the faculty level was to them. Questions of reconciling a career with personal life also regularly come up, although they are less pressing in the Netherlands than in the U.S. Bad mentorship is a popular topic as well: advisors who are never around, negative, possessive, micromanaging, mentally abusive, or who constantly change their mind. (P.S. There are also good ones.) But perhaps the most common theme is the anxiety that comes with job insecurity in modern academia.

Students and postdocs generally value these events. They serve to humanize professors, find common humanity with other trainees, and teach — or learn — coping strategies. The conversations typically fill a large gap in training. Consider this: for your happiness as a scientist, knowing yourself and dealing with psychological and social challenges is probably at least as important as your scientific knowledge and skills. By contrast, all 50-100 talks you might attend in a year are about the latter and none about the former.

For more information and links, google “Growing up in science”. For questions, comments, or tips on how to start such an event series in your department, feel free to email me at weijima@nyu.edu.

Wei Ji Ma (1978; Dutch spelling Whee Ky Ma) did his Ph.D. in Physics at the University Groningen (2001) and postdocs in theoretical neuroscience at Caltech and the University of Rochester. He was Assistant Professor at Baylor College of Medicine from 2008 to 2013, and is now Associate Professor of Neural Science and Psychology at New York University. His lab (www.cns.nyu.edu/malab) investigates perception, working memory, decision-making, and thinking, all under uncertainty. He invites you to stop by his lab if you are ever in New York.
Hora Finita – Adding educational activities to Hora Finita

Educational activities, except for courses applied for in the GSMS Course Registration System, should be added to Hora Finita by each PhD. Please beware of the description/title you put in the input panel of “name”. The text of this input panel will be printed on your Graduate School Certificate. Please also select the “type of activity”; in the future, this field will be used to arrange the educational activities on the certificate. Adding a date in the field “date completed” will result in a date printed on the certificate.

PhD students in the last year of their project

PhD students that will finish their project this year should contact Diana before September. We can discuss the need of filling out the educational activities in Hora Finita!

Reimbursement of external courses and conferences

If you would like to receive a contribution from BCN: Use the application form from the BCN website. Sending the form beforehand isn’t necessary unless you’re not sure of the amount you can count on. Please send the form (signed) to Diana and add (as far as possible the original) receipts or proof of payment by regular post!

Invite your family and friends!

Invite your family and friends to the BCN Publieksavond: Bart Eggen will give a lecture (in Dutch) entitled: Genetische netwerken in het brein, on May 29, Rode Zaal UMCG from 19.30 – 20.30 hrs.

Agenda BCN Activities

May 29, 2015
BCN Symposium: Using Big Data. Approaching Complexity in Neuroscience

May 29, 2015
BCN Publieksavond: Bart Eggen: Genetische netwerken in het brein

May and June
BCN Management Competences in your PhD project, Part 1 & 2 courses

June 24 & 25 and July 1 & 2
BCN Statistics Course.

Application: http://cursus.webhosting.rug.nl/gsms

Please check the website for detailed information.

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New courses

BCN is working on new courses/workshops in the free part of the BCN Training Programme such as: Bayesian Statistics and Writing for General Public. Diana will inform all PhDs by mail as soon as they are scheduled.

BCN courses

Please check the GSMS Course Registration System for the available (BCN) Courses: http://cursus.webhosting.rug.nl/gsms/courses/
As of today (end of April), there are 7 BCN courses available!
Longer-term effects of ADAS use on driving performance of healthy older drivers and drivers diagnosed with Parkinson’s disease

M. Dotzauer

Het wetenschappelijk onderzoek zal op ieder van de genoemde expertisegebieden verder groeien om zo daadwerkelijk de rol als expertcentrum in de volle breedte waar te blijven maken. Voor zeldzame urologische aandoeningen en voor de behandeling van complicaties zal de taak als referentiecentrum verder toenemen. Voor de minder complexe zorg zal in de toekomst een spreiding gewenst zijn via structurele samenwerking met de ziekenhuizen in de regio. Op deze wijze zal de afdeling Urologie in de komende jaren de complexe zorg in het UMCG vergroten met behoud van een excellent opleidings- en onderzoeksklimaat en tegelijkertijd een partner blijven bij de reguliere zorg voor kennis en innovatie beschikbaar te stellen binnen de regionale samenwerkingsverbanden.

EVELYN KUIPER-DRENTH, OP BASIS VAN PERSBERICHTEN VAN DE RIJKSUNIVERSITEIT GRONINGEN
voorruit aan op welke momenten het veilig was om kruisingen over te steken. Het systeem had duidelijke effecten op het rijgedrag. Bestuurders met de beschikking over het systeem keken minder opzij, staken kruisingen vlotter over en reden sneller, en ze veroorzaakten minder botsingen dan de bestuurders zonder ADAS.

Dotzauer onderzocht daarnaast een groep oudere automobilisten met de ziekte van Parkinson. Ondanks de beperkingen in motorische en cognitieve functies die van belang zijn voor veilige verkeersdeelname heeft 80 procent van de mensen met Parkinson een rijbewijs en rijdt 60 procent geregeld. Ook bij hen bleek het ADAS van invloed te zijn op het rijgedrag: de tijd om een kruising over te steken nam af, evenals het aantal keren dat ze stopten voor de kruising. Ook had het systeem effect op de snelheid: wanneer het systeem werd ingezet, leidde dit tot een verandering in de op de mogelijkheden van de automobilist in combinatie met de technische ontwikkelingen van auto’s.

Adaptieve automatisering betekent zoveel als een technologisch ingerichte werkomgeving die zich aanpast aan de gebruiker. Binnen het onderzoeksgebied adaptieve automatisering worden technologische systemen ontwikkeld die flexibel zijn en zich kunnen aanpassen aan de specifieke behoeften en eisen van de individuele mens. Het idee is dat het hele systeem (mens en machine samen) het best functioneert als de werklast van de mens op een optimaal niveau wordt gehouden. Enerzijds moet voorkomen worden dat de hele taak geautomatiseerd wordt, zodat de menselijke bestuurder niet meer snel en adequaat kan ingrijpen als er iets mis gaat met het geautomatiseerde systeem. Anderzijds moet voorkomen worden dat oververmoeidheid en concentratieverlies optreden door een voortdurende (te) hoge werklast.

Een belangrijke eerste voorwaarde om de werklast op een adequaat niveau te houden is deze te kunnen meten. Een geschikte manier om mentale belasting te bepalen is met behulp van fysiologische methoden, in het bijzonder met behulp van hartslag, bloeddruk en ademhalingsmaten. In de literatuur is er nog enige onduidelijkheid over de relatie tussen mentale inspanning en de psychofysiologische reacties daarop. In dit proefschrift worden een aantal onduidelijkheden over deze relatie ver klaard aan de hand van een onderscheid dat gemaakt wordt tussen toestand-gerelateerde (of compensatoire) effecten en korte termijn effecten die naar verwachting meer rechtstreeks verband houden met veranderingen in de taaksteun. De toestand gerelateerde effecten zijn pogingen van het lichaam om te herstellen van langdurige inspanning en terug te keren naar een evenwichtssituatie. De korte termijn effecten ontstaan doordat het lichaam reageert op momentane verschillen in werklast waar het lichaam energie voor moet leveren. In het beschreven onderzoek is een aantal experimenten in een gesimuleerde ambulancemeldkamer en in een rijsimulator uitgevoerd op basis waarvan een nieuwe
methode is ontwikkeld die meer inzicht geeft in de momentane werklast van de mens. Deze methode leent zich ook uitstekend voor gebruik bij adaptieve automatisering. In het kort kan worden gezegd dat de toestands Effecten, met andere woorden het herstellen van inspanning, de effecten die door de huidige werklast worden veroorzaakt, in veel werksituaties overschaduwen. Hierdoor zijn de directe effecten van werklastveranderingen vaak niet zichtbaar. De oplossing die in dit proefschrift wordt beschreven is een keuze voor korte termijn cardiovasculaire maten. Daarmee zijn verschillen in hartslag, hartslagvariabiliteit en andere cardiovasculaire maten nog steeds zichtbaar in de korte termijn respons patronen, ondanks de aanwezigheid van de toestands Effecten. De korte termijn analyse berust op een tijd-frequentie methode waarbij de variabiliteit van de cardiovasculaire maten wordt berekend in tijdsegmenten van 30 seconden. Deze methode is getoetst in experimenten die opnieuw in de ambulance meldkamer simulatie en rijsimulator zijn uitgevoerd.

De conclusie is dat de verschillen in gevonden effecten in eerder beschreven onderzoek m.b.t. werkbelastingmaten in belangrijke mate verklaard kunnen worden uit de compenserende werking van het bloeddrukregulatie systeem. De compenserende werking van het bloeddrukregulatiesysteem nivelleert de directe effecten van mentale inspanning en maakt daarmee de interpretatie van de werklast-effecten op de cardiovasculaire maten moeilijker. Dit geldt met name voor de hartslag en hartslagvariabiliteit. Door onderscheid te maken tussen effecten die direct gerelateerd zijn aan de taakeisen en effecten die veroorzaakt worden door het bloeddruk regulatiesysteem, krijgen we meer zicht op de echte taakgerelateerde mentale inspanning. Door het maken van dit onderscheid is de interpretatie van de werklast-effecten op de cardiovasculaire maten moeilijker. Dit geldt met name voor de hartslag en hartslagvariabiliteit. Door onderscheid te maken tussen effecten die direct gerelateerd zijn aan de taakeisen en effecten die veroorzaakt worden door het bloeddruk regulatiesysteem, krijgen we meer zicht op de echte taakgerelateerde mentale inspanning.


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De promovendus concludeert dat lichamelijke activiteit bij ouderen met dementie net zo goed leidt tot een verbetering in balans, kracht en uithoudingsvermogen. Deze verbetering werkt ook door in gewone dagelijkse activiteiten zoals wassen en eten. Om een gunstige uitkomst te hebben, moet een bewegingsinterventie volgens Blankevoort een redelijke intensiteit hebben (niet rustig wandelen, maar matig-intensieve training) en minimaal drie maanden duren, met zo'n drie sessies per week van ieder 45 tot 60 minuten. In Bewegingsprogramma’s die ook het cognitieve functioneren willen verbeteren, moeten begeleiders zich in ieder geval richten op het verbeteren van de loopsnelheid. Blankevoort oppert tot slot dat het meten van de loopsnelheid misschien ook een rol kan spelen in de diagnostiek van dementie.


De wetenschappelijke ontwikkelingen in de radiologie en radiotherapie binnen de geneeskunde in Nederland 1896-1922

Promovendus
K.J. Simon
Proefschrift
De wetenschappelijke ontwikkelingen in de radiologie en radiotherapie binnen de geneeskunde in Nederland 1896-1922

Promotores
Prof.dr. M.J. van Lieburg
Prof.dr. R.A.J.O. Dierckx

Nederlandse artsen zagen nut röntgenstraling voor klinische praktijk niet


Afbeeldings- en bestralingstechnieken zijn inmiddels een vanzelfsprekend en belangrijk deel van de medische praktijk. Ze stellen behandelers in staat om, zonder te snijden, een beeld te krijgen van de binnenkant van ons lichaam en om tumoren gericht te bestrijden. Simon, zelf jarenlang werken als radioloog, was benieuwd hoe het allemaal begon. Hij ging daarvoor te rade bij het archief van de NVvER en bij correspondenties tussen Nederlandse pioniers op het gebied van de radiodiagnostiek, zoals de gedegen, maar ‘brave’ Wertheim Salomonson, de erudiete Groninger Wenckebach en de flamboyante Eijkman.

In die zoektocht kwam Simon verrassend veel rellen en relletjes op het spoor. Anders dan vandaag de dag was academisch onderzoek nog gescheiden van de klinische praktijk, waardoor het langer kon duren voordat nieuwe wetenschappelijke inzichten in ziekenhuizen werden geaccepteerd. Zo begonnen academische onderzoekers rond 1899 belangstelling te tonen voor mogelijke toepassingen van röntgenstraling, maar zagen artsen het nut ervan eerst niet in. Toevalligheden in het leven van de onderzoekers, zoals vroegtijdig overlijden of benoemingen als hoogleraar elders, zorgden ervoor dat veelbelovende ontwikkelingen stagneerden. Zo vertrok Wenckebach van Groningen naar Straatsburg, nadat hij een Leidse longarts niet had kunnen overtuigen van het nut van röntgendiagnostiek voor het vaststellen van longtuberculose.

Op vergelijkbare wijze, zo ontdekte Simon, bleef de radiotherapeut in Nederland lange tijd ondergeschikt aan de chirurg. Alleen als
die een klus te gecompliceerd vond, mocht de radioloog proberen radiotherapie toe te passen. Dit was in Duitsland andersom, daar gebruikten gynaecologen liever röntgenstraling om bijvoorbeeld vleesbomen in de baarmoeder te behandelen dan een chirurgisch mes. Pas toen Nederlandse patiënten naar Duitsland vertrokken, werd deze paradigmawisseling ‘vom Stahl zum Strahl’, met in het kielzog het ontstaan van specifieke bestralingsinstituten, in Nederland nagevolgd. Dat leidde onder andere tot de oprichting – in 1913 – van het ‘Antoni van Leeuwenhoekhuis’, inmiddels uitgegroeid tot een internationaal toonaangevend ziekenhuis voor de diagnose en behandeling van kanker.


Offspring of subfertile couples: neurodevelopmental outcome at preschool age

PROMOVENDUS
P. Schendelhaar
PROEFSCHRIFT
Offspring of subfertile couples: neurodevelopmental outcome at preschool age
PROMOTORES
Prof.dr. M. Hadders-Algra
Prof.dr. M.J. Heineman
CO-PROMOTOR
Dr. K.J. Middelburg

Langdurige vruchtbaarheidsproblemen ouders vertoont samenhang met lichte neurologische disfunctie kind

Kinderen van ouders met vruchtbaarheidsproblemen hebben een grotere kans op het ontwikkelen van lichte neurologische disfuncties. Dat geldt vooral voor kinderen van ouders die er lang over deden om zwanger te worden. Dit concludeert Pamela Schendelhaar op basis van gegevens uit de Groningen ART cohort studie, waarin de gezondheid en ontwikkeling werden bekeken van kinderen van ouders met vruchtbaarheidsproblemen die al dan niet werden behandeld met in-vitrofertilisatie (IVF, reageerbuisbevruchting).

Schendelhaar en haar collega’s onderzochten of kinderen in de voorschoolse leeftijd van ouders met vruchtbaarheidsproblemen (na > 1 jaar zwanger) zich neurologisch vergelijkbaar ontwikkelden als kinderen van ouders zonder vruchtbaarheidsproblemen, in termen van motoriek, mentale functies en gedrag. De ouders met vruchtbaarheidsproblemen (binnen 1 jaar zwanger) bestonden uit paren die een IVF-behandeling ondergingen, en paren die zonder IVF-behandeling toch zwanger werden. De promovenda bestudeerde onder andere de effecten van hormoongebruik en de laboratoriumprocedures, inherent aan de IVF-behandeling, op de neurologische ontwikkeling van het kind. Ook onderzocht zij of de aanwezigheid en de duur van de vruchtbaarheidsproblemen van de ouders de neurologische ontwikkeling van hun kinderen beïnvloedden.

Een aantal factoren blijkt volgens Schendelhaar en haar collega’s geen invloed te hebben op de gezondheid van de kinderen. Zo zijn kinderen die na IVF geboren zijn neurologisch gezien net zo gezond als hun leeftijdgenootjes op twee- en vierjarige leeftijd. De onderliggende vruchtbaarheidsproblemen kunnen echter wel een rol spelen in de neurologische ontwikkeling, in termen van motoriek, mentale functies en gedrag. Schendelhaar ontdekte dat naarmate ouders met vruchtbaarheidsproblemen er lang over deden om uiteindelijk zwanger te worden, hun kinderen vaker lichte neurologische disfuncties vertoonden. Deze bevindingen onderstrepen het belang van het langdurig volgen van de gezondheid en ontwikkeling van deze en andere kinderen van minder vruchtbare ouders die al dan niet met IVF worden behandeld.

Health of children born to subfertile couples: Aetiological pathways and neurodevelopmental correlates

PROMOVENDUS
J. Seggers

PROEFSCHRIFT
Health of children born to subfertile couples: Aetiological pathways and neurodevelopmental correlates

PROMOTORES
Prof.dr. M. Hadders-Algra
Prof.dr. M.J. Heineman

CO-PROMOTOR
Dr. M. Haadsma

Niet IVF-behandeling, maar onderliggende vruchtbaarheidsproblemen verhogen risico op aangeboren afwijkingen

Kinderen die na een IVF-behandeling geboren zijn, zijn over het algemeen op twee- tot vierjarige leeftijd net zo gezond als hun leeftijdsgenootjes. Aangeboren afwijkingen kunnen niet worden toegeschreven aan de IVF-behandeling. In plaats daarvan hangen ze samen met onderliggende vruchtbaarheidsproblemen van de ouders. Dat zijn enkele conclusies van het promotieonderzoek van Jorien Seggers. Wel vond ze aanwijzingen dat het hormoongebruik bij IVF een klein nadelig effect heeft op de bloeddruk van de vierjarigen.

Meer dan 1 op 10 paren wordt geconfronteerd met vruchtbaarheidsproblemen; bij hen lukt het niet om binnen een jaar zwanger te worden. Een toenemend aantal paren zoekt hiervoor medische hulp. Wereldwijd zijn er inmiddels vijf miljoen kinderen geboren na hulp bij de voortplanting, zoals in vitro fertilisatie (IVF). Seggers onderzocht of IVF-kinderen net zo gezond zijn als kinderen van vruchtbare ouders en kinderen van ouders met vruchtbaarheidsproblemen die zonder behandeling toch zwanger werden. Ze keek daarvoor naar de effecten van hormoongebruik, de laboratoriumprocedures in de IVF-behandeling en de onderliggende vruchtbaarheidsproblemen van de ouders op de gezondheid van de kinderen.

Seggers en haar collega’s toonden aan dat niet de IVF-behandeling, maar de onderliggende vruchtbaarheidsproblemen het risico verhogen op aangeboren afwijkingen, een slechtere uitkomst rondom de geboorte (zoals een lager geboortegewicht) en een minder optimale neurologische ontwikkeling op tweejarige leeftijd. Verder ontdekte de promovenda dat genetische screening van de embryo’s geen nadelige effecten heeft op de bloeddruk van de kinderen. Dat geldt wellicht wel voor de hormonen die de moeder aan het begin van de IVF-behandeling krijgt geïnjecteerd. Seggers vond aanwijzingen dat die een klein nadelig effect hebben op de bloeddruk van de vierjarigen. Omdat deze verschillen later mogelijk groter kunnen worden, pleit ze ervoor om de bloeddruk van mensen die met IVF verwerkt zijn goed in de gaten te houden.


Neuroticism and the brain: Neuroimaging and genetic imaging studies on the personality trait neuroticism

PROMOVENDUS
M.N. Servaas

PROEFSCHRIFT
Neuroticism and the brain: Neuroimaging and genetic imaging studies on the personality trait neuroticism

PROMOTORES
Prof.dr. A. Aleman
Prof.dr. J. Ormel

CO-PROMOTOR
Dr. H. Riese

Hersennetwerken werken anders bij mensen die hoog scoren op neuroticisme

Bij mensen die hoog scoren op neuroticisme (een psychologische persoonlijkheidsstijl) is de basale netwerkorganisatie van de hersenen tijdens rust anders dan die van ‘gezonde’ mensen. Dat concludeert Michelle Servaas. Het verschil verklaart volgens haar mogelijk waarom deze mensen emotionele informatie sneller en gemakkelijker verwerken.

Mensen die hoog scoren op vragenlijsten voor neuroticisme ervaren over het algemeen meer negatieve emoties, zoals angst en somberheid, en reageren emotioneler op negatieve gebeurtenissen. Neuroticisme kan leiden tot het ontwikkelen van psychiatrische stoornissen, zoals angst- en depressiestoornissen, met alle medische kosten van dien. Servaas onderzocht de neurale mechanismen die ten grondslag liggen aan neuroticisme. Ze maakte
hierbij gebruik van fMRI (functional magnetic resonance imaging) tijdens rust en emotionele verwerkingsstaken. fMRI is een niet-invasieve manier om hersenactiviteit in beeld te brengen tijdens informatieverwerking.

Om informatieverwerkingsfouten te voorkomen, verwerken onze hersenen verschillende soorten informatie (bijvoorbeeld visueel, emotioneel, cognitief) zoveel mogelijk gescheiden. Om deze informatie weer samen te voegen, gebruikt het brein een beperkt aantal lange verbindingen. De verbindingen tussen hersengebieden, zo ontdekte Servaas, zijn bij mensen met hogere scores op neuroticisme meer willekeurig gestructureerd en minder sterk dan bij mensen met lage scores. Dat houdt in dat zij wellicht minder efficiënt informatie kunnen verwerken.

Tot slot bleek in deze eerste groep het hersennetwerk dat gerelateerd is aan het identificeren en interpreteren van emoties juist beter te werken. Dat zou volgens Servaas kunnen verklaren waarom mensen die hoog scoren op neuroticisme al tijdens rust meer emotionele instabiliteit ervaren.


The a-typical effects of olanzapine on body weight regulation: And the possible counter-effects of Topiramate

PROMOVENDUS
S.S. Evers

PROEFSCHRIFT
The a-typical effects of olanzapine on body weight regulation: And the possible counter-effects of Topiramate

PROMOTORES
Prof.dr. A.J.W. Scheurink
Prof.dr. G. van Dijk

Effectiviteit antipsychoticum en bijwerking gewichtstoename mogelijk voorspelbaar

Het antipsychoticum Olanzapine (OLZ), voorgeschreven bij schizofrenie, kan bij sommige patiënten gewichtstoename en insulineresistentie veroorzaken. In zijn proefschrift toont Simon Evers aan dat de gewichtstoename door Olanzapine vooral voorkomt bij mensen met een lage thyroid stimulerend hormoon (TSH)-spiegel in het bloed. ‘Op basis van dit onderzoek en wat we al weten over schizofrenie, denk ik dat TSH een voorspeller kan zijn voor de effectiviteit van Olanzapine.’ Evers laat ook zien dat het anti-epilepticum Topiramaat deze gewichtstoename kan tegengaan. Hij promoveert 6 maart 2015 op zijn onderzoek aan de Rijksuniversiteit Groningen.


Met zijn onderzoek wilde Evers achterhalen hoe gewichtstoename door Olanzapine precies ontstaat en of er een manier is om die gewichtstoename te remmen. Daarvoor gebruikte hij ratten met karaktereigenschappen die lijken op schizofrenie. Ze hebben een verhoogde activiteit van het dopaminesysteem in de hersenen, vertonen impulsief gedrag en

PHOTO BY JACOB GERKES

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zijn gevoelig voor het ontwikkelen van een verslaving.' Die ratten vergeleek hij met een andere groep, die die kenmerken niet heeft, maar wel gevoelig is voor overgewicht en insulineresistentie als gevolg van veranderingen in de voeding. De resultaten laten zien dat juist ratten met kenmerken van schizofrenie aankomen door behandeling met Olanzapine,' vertelt Evers. ‘Dat wijst erop dat een hogere gevoeligheid van het dopaminesysteem samenhangt met een hogere gevoeligheid voor de werking van Olanzapine. De reactie van een individu op Olanzapine hangt samen met zijn genetische eigenschappen en karakter.’

Tenslotte onderzocht Evers het effect van Olanzapine bij gezonde mannelijke proefpersonen. Het blijkt dat mannen met weinig thyroid stimulerend hormoon (TSH) in het bloed gevoelig zijn voor gewichtstoename door Olanzapine. ‘TSH wordt gemaakt door de hypothalamus, die weer onder invloed staat van het dopaminergic systeem,’ verklaart Evers die resultaten. ‘Dit onderzoek laat zien dat gewichtstoename door Olanzapine ook bij mensen waarschijnlijk samenhangt met het dopaminergic systeem.’ Wellicht zou bij het voorschrijven van Olanzapine gelet moeten worden op de hoeveelheid hypofysehormonen in het bloed, om de effectiviteit van de Olanzapinebehandeling te kunnen voorspellen.

Het anti-epilepticum Topiramaat (TPM) bleek in gezonde mannen de gewichtstoename door Olanzapine te remmen, ook weer specifiek bij mannen met lage TSH-spiegels. ‘TPM is een effectieve behandeling voor depressie en vermindert de schizofrenieklachten,’ concludeert Evers. ‘Komedatieven die juist een hogere gevoeligheid hebben voor Olanzapine en de hierbij behorende schizofrenieklachten, zijn inderdaad aanvankelijk effectiever bij dit soort behandeling.’

Physical activity and depressive symptoms: Is a healthy body necessary for a healthy mind?

**PROMOVENDUS**
N. Stavrakakis

**PROEFSCHRIFT**
Physical activity and depressive symptoms: Is a healthy body necessary for a healthy mind?

**PROMOTORES**
Prof.dr. A.J. Oldehinkel
Prof.dr. P. de Jonge
CO-PROMOTOR
Dr. A.M. Roest

Lichamelijke beweging kan depressie niet voorkomen

Voldoende lichaamsbeweging geeft geen garantie dat jongeren geen depressie ontwikkelen. Wel kan aan een depressieve periode een periode van minder lichamelijke activiteit voorafgaan en worden jongeren met depressieve symptomen gemiddeld lichamelijk minder actief. Tot slot blijkt niet iedereen een betere stemming te krijgen van voldoende lichaamsbeweging – ongeacht of men depressieve symptomen vertoont of niet. Nikolaos Stavrakakis vond deze opmerkelijke resultaten in zijn promotieonderzoek.


Stavrakakis vindt dat er in eerder onderzoek te veel is gekeken naar het effect van lichamelijke activiteit op depressie en te weinig naar de andere kant van het verhaal; naar de invloed die depressie uitoefent op lichamelijke activiteit. Hij concludeert na het bestuderen van deze wederkerige relatie dat jongeren die veel bewegen niet per se gevierd blijven van depressieve symptomen. De promovendus ontdekte ook dat niet alle volwassenen die meer gaan bewegen hiervan een significant positief effect ervaren. Samenvattend concludeert hij dat voor het ontwikkelen van effectieve, gepersonaliseerde bewegingsinterventies eerst duidelijker moet zijn welke depressieve mensen baat kunnen hebben bij een meer actieve levensstijl.

Motor control after anterior cruciate ligament reconstruction

PROMOVENDUS
A. Gokeler

PROEFSCHRIFT
Motor control after anterior cruciate ligament reconstruction

PROMOTORES
Prof.dr. E. Otten
Prof.dr. K. Postema
Prof.dr. P.U. Dijkstra

CO-PROMOTOR
Dr. M.P. Arnold

Verhoogde aandacht verhindert leerproces na gescheurde kruisband

Dat jonge sporters zelden volledig herstellen na het scheuren van de voorste kruisband, komt niet omdat het maken van normale kniebewegingen na een hersteloperatie onmogelijk is geworden, maar omdat mensen mogelijk extra alert zijn om het kniegewricht tijdens lopen en springen te ontzien. Dat concludeert Alli Gokeler. Hij pleit voor een herziening van het revalidatietraject, waarbij de aandacht van de patiënt wordt afgeleid van de bewuste controle over de knie, bijvoorbeeld met behulp van virtual reality.

Bijna elke week verschijnt er wel een bericht in de krant dat een bekende sporter de voorste kruisband van de knie heeft gescheurd (VKB-ruptuur). Dit is een ernstige sportblessure waarvan velen niet volledig herstellen, ook niet na een operatie waarin de voorste kruisband wordt gereconstrueerd. Jaren na de ingreep kunnen mensen er nog hinder van ondervinden.

Gokeler onderzocht hoe mensen de knie bewegen na de operatie. Ook zocht hij voor een verklaring voor de veranderde manier van beweging.

De promotieonderzoek toont aan dat het ontzien van het kniegewricht een verhoogd risico oplevert om de voorste kruisband opnieuw te scheuren of de andere knie te beschadigen. Omdat hij vermoedde dat deze verhoogde aandacht het herwinnen van een normale kniebeweging verhindert, zette hij een studie op waarin hij 40 mensen met een VKB-ruptuur in een door een computer gesimuleerde virtuele omgeving afleidde. Het gevolg was dat de kniebewegingspatronen ‘normaler’ werden en veel meer leken op die van gezonde proefpersonen. Hieruit concludeert Gokeler dat het kan lonen om nieuwe revalidatieoefeningen te ontwikkelen. Zo’n nieuwe benadering van het revalidatieproces kan mogelijk helpen om het risico op nieuwe blessures te verlagen.


A dynamic approach to the development of lexicon and syntax in a second language

PROMOVENDUS
H.P. Chan

PROEFSCHRIFT
A dynamic approach to the development of lexicon and syntax in a second language

PROMOTOR
Prof.dr. C.L.J. de Bot

CO-PROMOTOR
Dr. W.M. Lowie

Input buiten de klas belangrijk bij taalverwerving

Taal vloeit voort uit taalgebruik; leerders ontdekken de regelmatigheden en patronen van taal tijdens communicatie. Om de ontwikkeling van taal te verklaren is het nodig te onderzoeken hoe taal wordt gevormd en beïnvloed door input. Een groepsonderzoek door Belinda Chan toont aan dat het moment waarop incidentele input wordt verstrekt een belangrijke rol speelt bij het aanleren van contextuele woordenschat (collocaties en associaties). Chan keek ook meer in detail naar de processen die invloed hebben op hoe leerders woorden gebruiken in hun schriftelijke producties. Ze concludeert dat het leerproces van iedere leerder op het vlak van woordenschat op een verschillende manier afhankelijk is van de hoeveelheid ontvangen input en dat de taal van elk individu zich op een verschillende manier ontwikkelt. Chan onderzocht eveneens twee verschillende soorten taalproducties: gesproken en geschreven. Daarbij heeft ze gekeken naar lexicaal en syntactisch elementen.
Ze concludeert dat geschreven taal wordt gekenmerkt door een hogere mate van lexicale diversiteit dan gesproken taal, terwijl gesproken taal gekenmerkt wordt door meer syntactische complexiteit. Voorts stelt Chan dat het verband tussen geschreven en gesproken taal verandert in de loop van de tijd en dat de relatie tussen de twee soms competitief en soms ondersteunend is, en dat individuele taalontwikkelingspatronen niet identiek zijn, zelfs niet bij identieke tweelingen.


Environmental influences on neuroticism: A story about emotional (in)stability

PROMOVENDUS
B.F. Jeronimus
PROEFSCHRIFT
Environmental influences on neuroticism: A story about emotional (in)stability
PROMOTORES
Prof.dr. J. Ormel
Prof.dr. A.J. Oldehinkel
CO-PROMOTOR
Dr. H. Riese

Studie naar hoe omgevingsinvloeden neuroticisme voorspellen
Stressvolle en onvoorspelbare levensgebeurtenissen, vooral sociale stress en conflicten, kunnen ervoor zorgen dat mensen een hoger niveau van neuroticisme (emotionele instabiliteit) ontwikkelen. Bertus Jeronimus stelt dat op basis van onderzoek naar de relatie tussen omgevingsinvloeden en neuroticisme. Er is ook goed nieuws: positieve levensveranderingen kunnen leiden tot een afname van neuroticisme. Jeronimus concludeert dat het neuroticisme-niveau van mensen veel veranderlijker is dan lang werd gedacht.

Neuroticisme is niet alleen een zware belasting voor mensen die ermee kampen, maar ook een grote kostenpost voor de maatschappij. Het kwart van de Nederlandse bevolking dat het hoogst scoort op vragenlijsten voor neuroticisme maakt samen meer medische en economische kosten dan alle andere gebruikers van de geestelijke gezondheidszorg bij elkaar. Het zou daarom volgens Jeronimus de moeite waard kunnen zijn om meer geld te besteden aan preventiestrategieën. Daarvoor moet eerst duidelijk zijn wat mogelijke oorzaken van een hoog neuroticisme-niveau zijn, en hoe een eventuele afname van emotionele instabiliteit bewerkstelligd kan worden.

Om die twee vragen te beantwoorden, bestudeerde de promovendus eerdere studies naar veranderingen in neuroticisme in volwassenen. Hij vast eigen dat stressvolle gebeurtenissen, die gekarakteriseerd kunnen worden als onvoorspelbaar, oncontroleerbaar, onverwacht, onwenselijk of niet passend bij een normale levensloop, vaak worden gevolgd door een langdurige toename in neuroticisme. Andersom bleken positieve levensveranderingen dus tot een afname van klachten te leiden. Tot slot concludeert Jeronimus dat een hoog niveau van neuroticisme een belangrijke voorspeller is voor de ontwikkeling van psychische problemen zoals depressie.


Environmental influences on neuroticism: A story about emotional (in)stability

Low-intensity wheelchair training in inactive people with long-term spinal cord injury

PROMOVENDUS
J.W. van der Scheer
PROEFSCHRIFT
Low-intensity wheelchair training in inactive people with long-term spinal cord injury
PROMOTORES
Prof.dr. L.H.V. van der Woude
Prof.dr. H.E.J. Veeger
CO-PROMOTOR
Dr. S. de Groot

Trainen met lage inspanningsintensiteit maakt mensen met een dwarslaesie niet fitter
Twee keer per week rolstoelrijden met een lage trainingsintensiteit blijkt weinig tot geen effect te hebben op fitheid en activiteit bij mensen die al lang een dwarslaesie hebben. Dat ontdekte Jan van der Scheer in zijn promotieonderzoek. Zijn onderzoek laat zien hoe lastig het is om een effectieve en praktisch uitvoerbare training te vinden voor fysiek inactieve mensen die al lang een dwarslaesie hebben.

Door verlamming en een rolstoelgebonden leven is het moeilijk voor mensen met een dwarslaesie om fysiek actief en fit te blijven. Door te trainen met een hoge inspanningsintensiteit kan de fitheid van fysiek inactieve mensen die al lang een dwarslaesie hebben verbeteren, maar dat is misschien ook te belastend voor deze groep. Van der Scheer was daarom benieuwd of trainen met een lage inspanningsintensiteit ook positieve effecten heeft.

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Om dit te onderzoeken, deelde hij 29 deelnemers door loting in twee groepen in: een trainingsgroep of een niet-trainende controlegroep. De eerste groep ging gedurende 16 weken twee keer per week rolstoelrijden op een lopende band met een inspanningsintensiteit van 30 tot 40% van de maximale capaciteit. Opvallend genoeg zorgde het trainen voor weinig tot geen verschillen in fitheid, rolstoelvaardigheden, fysieke activiteit en techniek van het rolstoelrijden. Van der Scheer concludeert dat er voor grote effecten misschien vaker getraind moet worden, of dat er andere trainingsvormen nodig zijn. Juist omdat het vinden van een goede training zo lastig is, zouden behandelaars volgens hem er extra aandacht voor moeten hebben dat mensen met een dwarslaesie fysiek actief blijven.


From stem cells to Schwann cells: Potential applications of iPS cells and neural crest stem cells

PROMOVIDUS
M.S. Ma
PROEFSCHRIFT
From stem cells to Schwann cells: Potential applications of iPS cells and neural crest stem cells

PROMOTOR
Prof.dr. H.W.G.M. Boddeke
CO-PROMOTOR
Dr. J.C.V.M. Copray

Perifeer zenuwletsel behandelen met lichaamseigen cellen

Onze zenuwvezels in het niet-centrale (perifere) zenuwstelsel worden omgeven door een laagje cellen dat prikkels geleidt en de zenuwvezels beschermt – zogenaamde Schwanncellen. Bij mensen met perifeer zenuwletsel, bijvoorbeeld door een grote verwonding, is de beschermende laag beschadigd geraakt. UMCG-onderzoeker Ming-San Ma liet in proefdieronderzoek zien dat het mogelijk is om stamcellen om te vormen tot Schwanncellen die een rol zouden kunnen spelen in de behandeling van perifeer zenuwletsel.

Recent DNA-onderzoek heeft duidelijk gemaakt dat het mogelijk is om alle celtypen in ons lichaam in het laboratorium na te maken. Dat gebeurt door in te grijpen in het DNA van volwassen lichaamscellen – zoals huid- of haarcellen. Deze worden kunstmatig geherprogrammeerd tot stamcellen (iPS-cellen) die vervolgens kunnen worden omgewordt tot nieuwe gespecialiseerde cellen. Samen met zijn collega’s ontwikkelde Ma een methode om, met een hoge efficiëntie, uit muizen afkomstige iPS-cellen om te vormen tot Schwanncellen. Voordat zulke nieuwe Schwanncellen in de klinische praktijk gebruikt kunnen worden, moeten volgens Ma alle risico’s goed in kaart gebracht worden.

De promovendus toonde daarnaast in proefdieren aan dat Schwanncellen die lichtgevend gemaakt zijn met behulp van bioluminescentie en daarna onderhuids geïmplanteerd, zichtbaar gemaakt kunnen worden, dus door de huid heen gevolgd kunnen worden. Deze techniek kan gebruikt worden om getransplanteerde Schwanncellen in levende dieren te onderzoeken. Dit kan belangrijke informatie opleveren over het functioneren van deze cellen in zenuwherstel.

Neurocognitive profiling of children with specific or comorbid reading disabilities

PROMOVENDUS
B.J.A. de Groot
PROEFSCHRIFT
Neurocognitive profiling of children with specific or comorbid reading disabilities
PROMOTORES
Prof.dr. K.P. van den Bos
Prof.dr. A.E.M.G. Minnaert

Leesproblemen bij kinderen met ADHD en/of taalontwikkelingsstoornissen

Uit het onderzoek blijkt dat met de ernst van een leesprobleem de betrokkenheid van klankverwerkings- en benoemprocessen groter wordt. Een bovengemiddeld goede technische leesprestatie wordt juist veel minder door deze processen bepaald.

Verder blijkt dat het hebben van een bijkomende taalontwikkelingsstoornis aanwezige leesproblemen vaak aanzienlijk verergert, terwijl daar bij ADHD nauwelijks sprake van lijkt te zijn.

De vaardigheid om de namen van cijfers en letters snel uit het lange termijngeheugen te kunnen ophalen en te benoemen kan mogelijk differentaal-diagnostisch ingezet worden bij kinderen met een ernstige lees- en/of taalontwikkelingsstoornis. Een deficiënte klankverwerkingsvaardigheid bleek daarentegen een gemeenschappelijk kenmerk te zijn van deze stoornissen.

Klankverwerkings- en benoemprocessen zijn duidelijk sterker gerelateerd aan leesproblemen dan aan ADHD. Echter, gegeven de overeenkomsten tussen kinderen met specifieke leesproblemen en kinderen met leesproblemen en ADHD, zowel wat betreft het lezen zelf en leesgerelateerde cognitieve verwerking, lijkt er in dit geval geen empirische basis te zijn voor een verder differentaal-diagnostisch onderscheid.


Rol biologische klok in geheugenprocessen bij veroudering

Kees Mulder deed verrassende ontdekkingen over de rol van de biologische klok bij het geheugen voor tijd en plaats – het zogeheten Tijd-Plaats Leren – dat zeer gevoelig is voor effecten van veroudering en neurodegeneratieve aandoeningen zoals de ziekte van Alzheimer.

Net als mensen kunnen dieren onthouden wanneer en waar belangrijke gebeurtenissen hebben plaatsgevonden. Het type geheugen dat gebruikt wordt voor Tijd-Plaats Leren (TPL), lijkt erg op het menselijke episodisch (wat-waar-wanneer) geheugen. Het is aangetoond dat dieren een intern kloksysteem gebruiken voor TPL, maar er is weinig bekend over de specifieke rol van deze biologische klok bij geheugenvorming. Mulder onderzocht de rol van een aantal biologische-klokomponenten en de effecten van veroudering op TPL.

Zijn onderzoek leverde drie opvallende bevindingen op: 1) In tegenstelling tot wat werd verwacht, bleek een set klokgenen, de Per genen, niet vereist voor TPL, terwijl een andere set klokgenen, Cry genen, wel vereist zijn. Deze opmerkelijke bevinding dwingt het veld van de chronobiologie om de functionele rol van deze genen in TPL te herzien. 2) De belangrijkste klok in het brein, die bijna alle dagelijkse ritmes reguleert, bleek overbodig voor TPL. Een andere nog ongeïdentificeerd klokssysteem neemt dus de leiding in TPL. 3) Het kunnen aanleren van TPL gaat verloren bij veroudering. Oude individuen kunnen nog wel TPL laten zien als ze vanaf jonge leeftijd zijn getraind, maar ze lijken het vermogen verloren te hebben om te vergeten en het geheugen aan te passen.

Concluderend, Mulder heeft laten zien dat TPL een waardevol paradigma kan zijn om de rol van de biologische klok in geheugenprocessen te bestuderen, in het bijzonder bij veroudering.


Evelyn Kuiper-Drenth, op basis van persberichten van de Rijksuniversiteit Groningen
“Against all odds, it is possible to survive four years in Groningen without a bicycle.”

> Mandy Dotzauer

“If you’re waiting for the perfect time to have kids, you’re never going to have kids (grey’s anatomy S6E19)”

> Jorien Seggers

“The correct conclusion for this dissertation was already written in 1883 by Friedrich Nietzsche: “There is more wisdom in your body than in your deepest philosophy.”

> Alli Gokeler

“Every individual develops his/her own language pattern as every pinot noir develops its own flavor in Burgundy.”

> Belinda Chan

“What’s learned in the cradle lasts till the tomb, also holds for mice.”

> Cornelis Mulder

“The opdeling in persoon en omgeving is een statistische kunstgreep, er is geen harde grens waar de persoon eindigt en de omgeving begint.”

> Bertus Jeronimus

“Promoveren beoogt een ontwikkelingstraject te zijn tot zelfstandig onderzoeker, maar is ook een persoonlijke ontdekkingsreis.”

> Michelle Servaas

“Door verbeelding kenmerkt zich de radioloog.”

> Kees Simon

“Ik beweeg dus ik denk.”

> Gerwin Blankevoort