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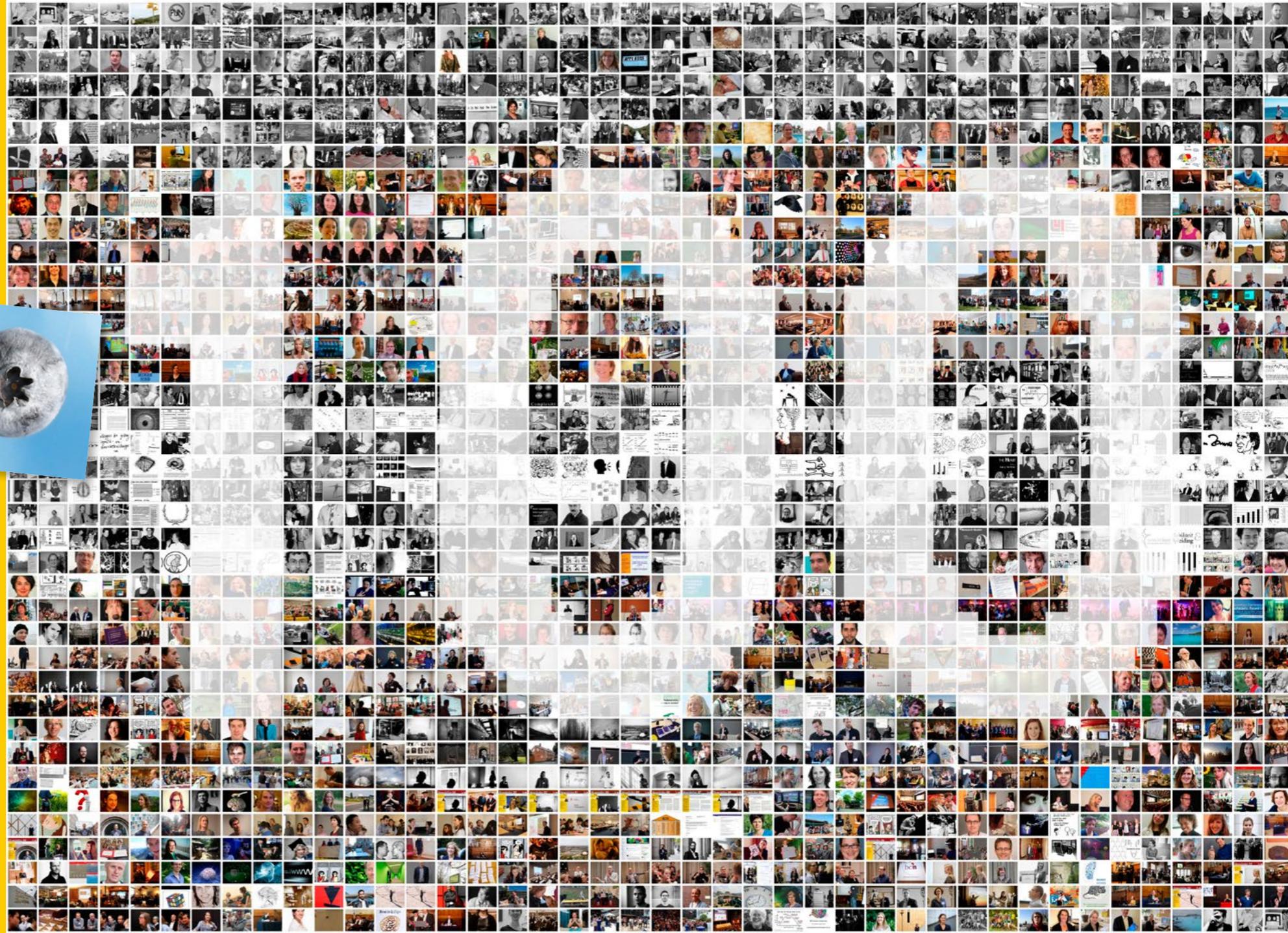
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The future of science



university of
 groningen



Head Office Matters

It is an honour to be invited to open this 100th BCN newsletter. Before I give a short introduction to myself as the new director of BCN, I would like to give my congratulations to all involved with a major achievement! BCN is as alive as it has ever been, and together with the board and many others I am determined to invest in its future as a leading research school.

So who am I? A psychiatrist (still practising, although less than before), 53 years old and head of the Department of Psychiatry at the UMCG since March 2010. Medical studies at the University of Amsterdam and psychiatry training at the Valeriuskliniek (VUMC Department of Psychiatry) finishing in 1997. I started doing epidemiological research out of the urge to better understand the nature of mental disorders and especially depression. What are its causes? What determines its course? How can we understand its huge impact on wellbeing, functioning, medical comorbidity and excess mortality? I obtained my PhD at the VUMC in 2005 and have continued to work on epidemiological studies, but I have also become more involved in treatment research. In Amsterdam, this involved a series of RCTs in which we compared efficacy and determinants of outcome of psychotherapy and pharmacotherapy for depression. In Groningen, we are also investing in treatment studies, among which is a study with microTMS ('pulsed electromagnetic fields') for patients with depression and studies with anti-inflammatory agents in psychosis. We will soon start a study with oral ketamine for patients with therapy resistant depression, together

with BCN colleague Marije aan het Rot (Dept. of Clinical Psychology). For these trials, we often collaborate with other mental health providers through a unique clinical and research network in the northern provinces (www.rgoc.nl).

In our department, the collective aim is to deconstruct the major mental disorder categories into more meaningful 'personalized' subtypes based on a better understanding of the underlying disease mechanisms. We are exploring these questions in large cohorts such as TRAILS, NESDA, GROUP and LIFELINES, with great colleagues such as VICI laureates Tineke Oldehinkel and Peter de Jonge, and also in clinical and fundamental research. The latter may include a range of different determinants such as the role of inflammation and stress and the functioning of different brain circuits (with the group of André Aleman at the NIC), but we also focus in more detail on individual characteristics by repeated assessments of symptoms and contextual influences using the smartphone as a data collector. Marieke Wichers recently joined our department as a leading researcher in this field. And psychiatrist Wim Veling joined us to study influences of social stress in persons with an increased vulnerability

for psychosis using virtual reality paradigms. To explore these questions, we are collaborating with a range of specialists from other areas and disciplines. A recent example of such a collaboration is a paper that appeared in JAMA Psychiatry in November by PhD student Claudia van Borkulo, who has a strong interest in novel methods of analysis. In this paper, we explored characteristics of the symptom network structure of depressed patients and related this to the course of their depression. The aim is to see whether this may lead to new clinical applications.

The possibility of working across disciplines (and faculties) is also what attracts me to BCN. I find it very rewarding to be able to meet and listen to researchers who are specialists in their field, and see where there is common ground. My overall goal is to see if what we understand about disease mechanisms may lead to better treatments or prevention from a clinical angle, which often fits well with the aim of other researchers who want to dive deep into more fundamental research questions.

Being new on a job has its advantages. One of them is that you can ask a lot of questions. As a board, we recently invited the BCN education committee, the PhD council, the Think Tank, the coordinators of the research masters, and our allies from the University of Twente (MIRA) to tell us how they see BCN at this point of time, and give us feedback on what is going well and what could be improved. Overall, I was very happy with the enthusiasm and support for BCN as an interfaculty organization, as well as with the many helpful suggestions we got. One

of the suggestions was to better communicate what BCN stands for, and highlight typical examples of BCN collaborations to illustrate this through the website and other media. As a board, we will take this up by inviting inspiring researchers from the different faculties to prepare short 'TED-like talks' about their research topic, which will be recorded at the next BCN Winter Meeting on February 11, 2016. We are also thinking of other ways to improve the visibility and possibilities for exchange and collaboration between master students and researchers with different backgrounds, and got great suggestions from the group to do this. We will invest in international networks that may provide new funding options as well as possibilities for PhD students to gain experience abroad. Lastly, as a board, we will divide the portfolios among the board members so that we can be easily contacted about the different issues at hand. A very simple way to enhance the visibility of BCN is to all use this affiliation on our research papers and theses, which is something we want to stimulate. One thing however we will not change; this newsletter that celebrates its 100th anniversary! Many compliments to all who have made this possible.

I want to conclude this introduction by thanking my esteemed predecessor Erik Boddeke who, together with Michiel Hooiveld, Diana Koopman, Evelyn Kuiper, Berry Kremer and many others, managed to secure the existence, funding and growth of BCN against considerable odds. Let us keep up the good work!

■ BY ROBERT SCHOEVERS

■ PHOTO BY ANTOINETTE BORCHERT



The future of science: Harder, better, faster?

Another milestone for BCN: our Newsletter reached issue 100...! Rather than looking back as we did when BCN existed 25 years, we decided to look ahead instead. Science is getting harder, better, faster... and is ever changing. So in which direction is it heading? In which direction should it be heading? What major questions will be answered in the coming century? We asked rising stars – one from each faculty within BCN and nominated by the BCN board – to give their view on the future of science.

1. What makes a good a scientist?

MARTINE MAAN

There are many ways to be a good scientist – although the current system might promote a particular type of person: extravert, productive, strategic... But perhaps the most important trait in a scientist is curiosity, quickly followed by creativity and open-mindedness.

CATARINA DUTILH NOVAES

A good scientist is first and foremost someone with insatiable curiosity, who really wants to understand how things hang together. A good scientist must also be a patient person, because new discoveries are not easy to come by, and it takes work and dedication to develop firm grounds for one's ideas. Moreover, a good scientist is creative, drawing connections that others have not yet seen. Finally, a good scientist is imbued with intellectual humility to listen and learn from others, and intellectual honesty. Especially in these days of acute competition among researchers (see below), the temptation to 'cut corners' is sometimes difficult to resist...

BERRY VAN DER BERG

In our work we have been taught to be methodological: ask a question based on previous literature, form hypothesis, analyze data, and interpret results according to the established scientific method. Most aspects of this scientific approach have been standardized: we ask certain questions and analyze data according to established methods. On one hand this is a good thing, it enables scientists to easily check each other's work and to have a standard operating procedure for doing stuff. A good scientist will go against the standard, and he or she will go out and try different but well thought approaches. At the same time a good scientist is patient, persistent and stubborn. In order to progress, we sometimes need to take a different approach and challenge the established authorities to not limit ourselves by a sort of set procedure, because the brain is far from typical.

WIM VELING

A good scientist has two seemingly contradictory characteristics: boundless creativity and a strict sense of order. He or she is curious, is not satisfied with the obvious answer, likes to think outside the box and to walk off the beaten track. At the same time, he or she is somewhat neurotic, feels uncomfortable when data are messy and when details are missing or seemingly incorrect. Whereas the latter characteristic can partly be compensated by a good research coordinator or assistant, the former cannot. Frustration tolerance is helpful, as is ambition, because these characteristics help the scientist never to give up and to pursue his/her scientific dreams persistently. Finally, and perhaps most importantly, a good scientist finds joy in research, cannot stop himself/herself and infects others with passion for research.

MARTIJN WIELING

Besides having important qualifications such as being intelligent, inquisitive and having a critical attitude, I

> *A good scientist has two seemingly contradictory characteristics: boundless creativity and a strict sense of order.* <

>> CONTINUATION OF THE FUTURE OF SCIENCE: HARDER, BETTER, FASTER

think one of the main characteristics a good scientist needs to have is perseverance. In science, at every step of the way there will be setbacks, ranging from rejected grant proposals to failed experiments. To become a tenured professor, a goal of many scientists, being perseverant is a necessity. While there are certainly highly successful scientists who are jack-of-all-trades, I think another characteristic of a good scientist is being a good collaborator. In my experience, collaborative research projects are not only more fun to do, but they generally result in higher quality research as well. Unfortunately, a final characteristic that makes (in the sense of being the cause of success) a good scientist, is simply being lucky. There are many good scientists

out there, but with current success rates in grant applications, with around 15% for the NWO grants, not all good scientists will be able to secure grants. Some scientist will be ranked just above the cut for funding, while others will be ranked just below. Given that there is always some subjectivity involved in this ranking process, another committee might have yielded a different ranking. Since obtaining a grant is seen as an indicator of quality and also enables one to become a better scientist due to the availability of more money and time to do research, the Matthew effect ensues (i.e. 'the rich get richer and the poor get poorer'). This widens the gap between those who were successful in obtaining a grant compared to those who were not?

SARTHAK MISRA

A good scientist is one who is able to successfully tackle problems that are either beautiful OR useful. Note that this is OR; very few results are both beautiful and useful. Beauty is subjective, of course; nevertheless, beautiful research results, in my opinion, have properties like elegance, simplicity, and insight. Too often people are distracted by a third criterion, which is how impressive or technically difficult the research appears to be. If it looks technically difficult but has no use or beauty, then a good scientist does not find it very interesting.

SHORT BIOGRAPHY

> WIM VELING



I was trained as a psychiatrist at Parnassia Psychiatric Institute in The Hague. During this training, I did my PhD on the puzzle of an increased incidence of psychotic disorders among ethnic minorities in the Netherlands. Ever since, my main research interest is the relationship between psychiatric disorders and the social context in which people live, trying to understand epidemiology, environmental risk factors and psychosocial mechanisms, and always looking for potential novel treatments. After my PhD, I obtained subsequent grants to investigate determinants of psychiatric problems in ethnic minority and Dutch youth, and found that social stress was an important factor. I developed a social empowerment training for preventing psychiatric disorders in youth with early symptoms. As it is difficult to measure the complex daily social context and individuals' responses to it, I initiated Virtual Reality studies. I obtained a Veni grant, with which I have investigated how exposure to virtual social stress environments is associated with development of paranoia, negative affect and distress, and whether these responses are moderated by experiences of social adversity. My research group developed a VR exposure therapy for patients with a psychotic disorder, the efficacy of which is tested in an ongoing RCT. Recently, I won grants to develop VR interventions for aggression prevention training, aimed at reducing aggression in psychiatric forensic patients, and a social cognition training for patients with psychosis or autism. I currently have a position as psychiatrist and head of the department of psychotic disorders, Universitair Centrum Psychiatrie, UMCG. I am assistant professor and am in a tenure track for full professor.

■ PHOTO BY JEROEN VAN KOOTEN

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2. What is the most important question in your field of research that will hopefully be answered within the next 100 years?

BERRY VAN DER BERG

My field of research is cognitive neuroscience. I have mostly been working with high temporal resolution electroencephalography (EEG) and its average signal the event related potential (ERP) to make inferences about neural correlates and its relationship to cognition. Our quest is to disentangle how cognition emerges from neural activations. I guess that's the question we would like to answer in the upcoming century: how does the mind emerge from a purely biological system? This is of course a rather typical answer, but in fact it is actually what drives a lot of us; we are trying to find a way to figure out the brain.

WIM VELING

My field of research is psychiatry. While the brain and human interactions are extremely complex and dynamic, the main questions in psychiatry are still quite basic. We really want to know how the soup of genes, brain, psychological and social factors can boil over into dysregulated perceptions, cognitions, emotions and behaviors that constitute psychiatric disorders. And if we get more clues, how can we repair these dysregulations with personalized treatments?

MARTINE MAAN

One big question in evolutionary biology concerns the relative importance of genetic and non-genetic sources of variation to biological diversity. That may sound rather vague, but here is an example: some characteristics of organisms can change a lot during an individual's lifetime, such as body size or behaviour. Other traits have a much stronger genetic basis, such as eye colour or even cognitive ability. In the next 100 years, I think we will learn a lot about why this is the case, and how this variation in causal underpinnings affects how organisms adapt to changing conditions.

> *Our quest is to disentangle how cognition emerges from neural activations.* <

SHORT BIOGRAPHY

> BERRY VAN DER BERG



I was born on January 13th 1988 in the very small village of Gieterveen in Drenthe. I attended high-school in Stadskanaal, and after graduating I traveled and volunteered for half a year in Southeast Asia. In 2007 I decided that studying Psychology was a good idea and after a lot of thinking, head banging and doing other things (sport climbing, working at a call center, student committees, visiting the occasional bar) going into the fundamental understanding of cognition and the brain caught my interest. I decided to follow the BCN (c-track) master in which I did various projects. One project was studying decision making in medical experts. Eventually I went to Duke University in the spring of 2012 to finish with an internship in the Woldorff lab. At Duke I developed a strong interest in using electrical brain recordings (EEG) to understand the neuro mechanisms and timing of cognitive processes in the brain. Subsequently we (me, Monique Lorist and Marty Woldorff) set out a collaborative PhD project, for which I remained at Duke for the next three years as both a lab manager, and graduate student. In the next couple of years I hope to finish my PhD project here in Groningen. My project is aimed at using both EEG and fMRI to figure out how stimulus-reward associations are learned, how reward influences attention, and how stimulus-reward associations are updated based on feedback.

■ PHOTO BY CHRIS BORNIS

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SARTHAK MISRA

My field of research is Medical Robotics. I feel the most important result that would be delivered within a century will be truly scarless and painless surgery. Many of the gadgets that were envisioned during the 60s, and we saw Leonard McCoy ('Bones') employ in Star Trek, will become a reality. I also feel we will be in a position to perform surgical interventions at home by taking a "robotic pill".

CATARINA DUTILH NOVAES

When my older daughter was about 6, she read a short book on what philosophy is, so as to understand what it was that kept her mother so busy. After she read it, I asked: "So Marie, what is philosophy?" Her answer: "Philosophy is asking a lot of questions, and when you get answers, you ask even more questions." This is exactly right! We are in the business of formulating

questions, not in the business of answering them, haha... In a sense, we've been dealing with the same questions for the last 25 centuries, and this is why reading authors such as Plato and Aristotle remains rewarding.

But perhaps one of the most pressing questions for philosophy at this point is a methodological one: to what extent should philosophical analysis rely on findings from other disciplines, in particular empirical research? And if so, how should the integration between different approaches proceed? There has been a surge of what is often described as 'empirically-informed philosophy' in the last 10 years or so, in particular in philosophy of mind, and it is to be hoped that this trend will continue to grow. But a number of methodological issues remain, which will have to be addressed if the trend is to flourish.

MARTIJN WIELING

I don't think the most important question has been thought of yet. New research techniques are developed constantly, and these techniques inspire new questions. For example, a century ago the computer was not yet invented, but its invention later on has generated many new research questions. My field of research, linguistics, is relatively broad, so I'll try to indicate an important question for one of the subfields I do research in, namely speech production and its variability. With respect to this subfield, I think an important research question is to understand in detail how we get from the formation of a message in our brains, via production (and its variability) to the representation of that message in the listener's brain.

3. You are the editor of your perfect scientific journal. How would you select the papers that are published? What would the publication process look like?

BERRY VAN DER BERG

It seems that at some point data should become open-source, after all it's usually the society that pays for it anyways. There are already cool initiatives. For instance, Kaggle (www.kaggle.com) posts data challenges to the community for everyone to have a look at! In that way, everyone can become a scientist and data explorer. I hope eventually we will go past the whole set IMRD (introduction, methods, results, discussion) idea, and have a more dynamic system in which there is room

for reanalysis, and reinterpretation. A scientist collects the data, gathers all the methods, analysis scripts and makes these – together with the data – available for everyone to have a look. Subsequently there will be discussions on the most interesting datasets! Other people will be able take a look at the data and can then append the original article with new results and interpretations. Top results and interpretations will be upvoted, thus introducing a sort of theoretical discussion!

MARTIJN WIELING

I would select the papers to be published on the basis of having a good experimental setup, an adequate analysis of the data, and conclusions supported by the data. Null results would also be publishable if they adhere to these standards. Furthermore, a hard requirement for publication would be that all study materials, data and analysis methods necessary for reproduction of the results need to be made publicly available. The publication process would involve

> Besides the accepted manuscript, the reviews and the initial version of the manuscript would be made available. <

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submission of the manuscript, including the material necessary for reproducing the results, after which the manuscript would be reviewed by at least two non-anonymous reviewers. After revising the manuscript on the basis of the reviewers' comments (if it adheres to the criteria above), it would be published online in open access. Besides the accepted manuscript, the reviews and the initial version of the manuscript would be made available. By appending the reviews, these may be referred to by other works.

MARTINE MAAN

I don't have particularly strong opinions about this. I follow the various current initiatives for alternative systems with interest, but my main concern is how to

find the time to read it all and to add my own significant contributions.

SARTHAK MISRA

My ideal scientific journal would strive to have a rapid peer review process. There would be no endless cycles of re-re... revisions. Final decisions would happen within 3 months of initial paper submission. I would have a strong editorial board that would filter-out papers demonstrating only small incremental results early during the review process. I would institute a process whereby the reviewers would be periodically reviewed as well.

CATARINA DUTILH NOVAES

As one of the editors of a real-world, imperfect scientific journal (the Review of Symbolic Logic), I know all too well how difficult it is to conduct the refereeing process in a smooth, timely, and fair manner. The main problem seems to be that the pool of qualified, trustworthy potential referees is rather small, and those people are already overwhelmed by demands and obligations. It is not unusual to have to send 10, 15 referee requests before obtaining 2 referee reports (which may take long to arrive and/or be of varying quality). So what is required is a better incentive system for referees, but it is unclear to me what that could be. I seem to recall that economists have experimented with a system of monetary compensation, and some journals now

SHORT BIOGRAPHY

> MARTIJN WIELING



Martijn Wieling (1981) graduated cum laude in both Computing Science and the BCN research master at the University of Groningen. After obtaining his PhD cum laude in June 2012 with his thesis A Quantitative Approach to Social and Geographical Dialect Variation, he spent a year in Tübingen, Germany as a post-doctoral researcher funded by an NWO Rubicon grant investigating Dutch dialect differences using articulography (i.e. the measurement of tongue and lip movement during speech). In September 2013, he returned to Groningen with an NWO Veni grant investigating the articulation of Dutch and German second language learners of English. In March 2015, Martijn was elected as one of the ten new members of De Jonge Akademie, a dynamic and innovative group of fifty top young scientists. As of July 2015, Martijn is an assistant professor with tenure at the Department of Information Science at the University of Groningen.

Martijn has (co-)authored almost 50 peer-reviewed papers and frequently collaborates with researchers from Canada, the USA, England, Germany, Italy and Spain. He teaches advanced statistics courses, both in Groningen and by invitation abroad at universities including McGill, Cambridge and Oldenburg. As an advocate of open science, Martijn generally tries to make his publications, data and methods available via his website <http://www.martijnwieling.nl>.

■ PHOTO BY GERHARD TAATGEN

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reward referees with book discount and such like. It is not clear that such compensations would be sufficient, but it's a possibility worth considering.

Either way, a perfect journal should adopt triple-anonymous refereeing, that is: neither the handling editor nor the referees know the identity of the author, and the author does not know the identity of referees. This is important so as to minimize the influence of all kinds of biases in e.g. whether the paper should be sent to referees or not, how to select referees, how to interpret the reports etc. on the basis of the author's (fancy or not) affiliation, gender, nationality etc. Some journals within philosophy have implemented this

system already, and it does not make the logistics of the refereeing process that much more complicated. Typically, the result is a significant increase in the rate of acceptance of papers by authors who do not fit the stereotype of what a top researcher is like, that is a white male working in an English-speaking prestigious university. There are so many top researchers out there who do not fit this stereotype, and they must be given a fair chance to have their papers assessed purely on the paper's merits.

WIM VELING

My perfect scientific journal would not be a journal. I hope that the flawed system of impact factors, journal

rankings, citation indexes and ever increasing numbers of papers that nobody reads will be changed in the near future. Sharing scientific discoveries with peers and the rest of the world should be organized differently. It should not be about who is most important, but which ideas advance science. Alternative methods of peer review should be tested, universities might be better suited to publish research protocols, databases, hypotheses and articles than current scientific journals, publication quota may be needed for scientists who publish too many papers, online research communities may provide better platforms, etc etc.

4. If you could change one thing about the contemporary system in which scientists operate, what would that be?

MARTIJN WIELING

I would like to reduce the reliance on commercial academic publishers to publish research results. While commercial academic publishers provided a necessary service at a time where journals were printed and distributed by post, their use is less clear in this digital age. Considering that researchers do most of the work (writing, reviewing, and editing) without getting paid for it, it is unclear to me why journal subscriptions need to be so costly. For example, the University of Groningen spends about 4 million euros annually on journal subscriptions. If universities would collaboratively setup and manage international open access journals for various fields, much more money would be available for research and teaching. Of course, such a scheme would only work if nobody

would submit their work to the commercial academic publishers anymore, thereby alleviating the need for subscriptions. Unfortunately, it is not very likely that this will happen given that publishing a paper in a high-impact journal is generally (but not always rightfully) seen as an indicator of quality.

SARTHAK MISRA

In the current system, evaluation of the scientists relies heavily on the publication output and the ability to secure funding. I would seek to devise a metric whereby scientists are also evaluated on the scientific and technological impact of their work.

MARTINE MAAN

I think we need a different way to distribute research funding. Many people are now spending a lot of time to write and evaluate research proposals, and to manage the whole process. All this goes at the expense of research and teaching.

WIM VELING

It would be the publish or perish culture, but as that is described in the previous answer, I pick funding here. An unreasonable amount of time and energy of researchers is consumed by writing grant proposals that fit the agenda of funding bodies.

> *An unreasonable amount of time and energy of researchers is consumed by writing grant proposal.* <

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CATARINA DUTILH NOVAES

More transparency in how experiments are conducted, including systematic reporting of negative results; more extensive sharing of raw data.

BERRY VAN DER BERG

Pressure for publishing and grant writing. These factors hold us back because they shift the thinking from what we want to learn to a focus on quickly publish or get grants! I don't know what would be a good solution, but we are not doing science to publish or get grants,

right? We (the PhD-students and faculty) utilize our full potential to find answers to questions that really matter. Even if that requires a couple of papers less but rather taking the time to think hard about what the results mean! In an ideal world creative minds should be able to focus on the science and no other things!

5. Science is like sex: sure, it may give some practical results, but that's not why we do it.

SARTHAK MISRA

Sure, there is some level of truth to this statement. But both should be done in the right way.

WIM VELING

I do not agree. I am trained as a psychiatrist, and I really enjoy working with patients. My clinical work is an important part of my drive for doing research. I think that science should contribute to society in some way, not in the least because it is funded by society. This responsibility does not have to reduce the excitement and fun of research, at least it does not for me. What is more satisfying than unraveling real world problems and solving these?

BERRY VAN DER BERG

As scientists we love the quest of discovery; if we would know everything it wouldn't be very exciting would it? :(It is interesting that as scientists we aim to explore the world, but we need unexplored ground to do so. We do it because we like the fundamentals, we like to understand the world and this makes us curious, and thus we stimulate our minds with novel ideas and perceptions of the world.

CATARINA DUTILH NOVAES

I do think that the production of knowledge is ultimately geared towards the improvement of lives (of human and non-human animals, but also eco-systems in general). But the emphasis is on 'ultimately': it is a mistake to expect scientific research to always have immediate applications. Take for example the emergence of electronic computers, possibly the most radical technological innovation since the invention of the press. How did it start? Now, while the concept of computability has a long and distinguished pedigree, and the whole story will involve the emergence of numerical systems, calculating techniques etc., a turning point in the history of these developments was Frege's invention of a Begriffsschriif, a concept-script, to be used in the investigations of highly esoteric issues in the foundations of mathematics with no immediate practical import. Via authors such as Russell and Hilbert, it eventually led to the development of the modern theory of computability by people such as Turing and Church, which in turn formed the basis for the construction of modern computers. So while it is generally a good principle to aim for ways to improve lives, it is very hard to predict what practical

applications a new discovery may have in the long run, so we should remain open-minded about this. But science is definitely like sex in at least one respect: it is lots of fun!

MARTIJN WIELING

I partly agree. While I generally do science to increase our understanding of how the world (and more specifically, language) works, in some cases the goal is more practical. For example, in my research I am not only interested in assessing differences in tongue movement of first and second language learners of English, but I also investigate if visualizing these differences helps second language learners improve their pronunciation.

MARTINE MAAN

I would hypothesize that the engine of scientific discovery is fueled by a combination of intrinsic curiosity about how the world works, and the personal ambition to become rich and famous (and thus sexually attractive). About practical results: see under 8.

> I do think that the production of knowledge is ultimately geared towards the improvement of lives. <

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SHORT BIOGRAPHY

> CATARINA DUTILH NOVAES



Catarina Dutilh Novaes is associate professor and Rosalind Franklin Fellow at the Department of Theoretical Philosophy of the Faculty of Philosophy in Groningen. She obtained her PhD in Leiden (2006), and before coming to Groningen in 2011 she worked at the Institute for Logic, Language and Information at the University of Amsterdam on a VENI project funded by NWO. Since 2011 she has been leading the NWO VIDI project 'The Roots of Deduction'. Her main areas of research are the philosophy and history of logic, philosophy of mathematics, and all things pertaining to reasoning and cognition in general (thus including philosophy of mind and cognitive science). She has published two monographs: *Formalizing Medieval Logical Theories* (2007) and *Formal Languages in Logic – A Philosophical and Cognitive Analysis* (2012) as well as over 50 articles in journals, edited volumes etc. What is distinctive of her work is what she describes as an 'integrative methodology', which brings together traditional philosophical conceptual analysis, historical inquiry, the use of formal methods, and the integration of results from the empirical sciences of the mind into philosophical analysis. She is also concerned with ways in which philosophy can make a contribution to real-life issues pertaining to gender, race, sexuality, and social justice.

For further details, see her website <https://sites.google.com/site/catarinadutilhnoaes/home>

6. Publish or perish... Harsh competition among scientists is the way to ensure good quality research.

BERRY VAN DER BERG

Perish of course, we would hate to have to read less papers! But seriously, I have difficulty writing, finding the right words, and not being sure about interpretations. This part of science has never been my forte, but slowly but surely through a lot of practice and help I am getting better at it. Luckily, I have been able to get that help through my supervisors and peers. What I am afraid will happen is that some folks that are excellent scientists won't be able to get that help and won't keep up with the publishing culture, and will be left out. That would be a shame.

The publishing pressure has the danger that scientists will just publish for the sake of publishing, not for the sake of the science. Hence, this might result in less quality research and probably even fraudulent results. For instance, in EEG data and also fMRI data, there are a lot of dimensions to be explored. But the danger is that these dimensions get explored for the sake of finding something that is publishable and not for the sake of a useful understanding. What we need at some point is not this harsh competition of publishing experiments, but to really think hard how to move forward! Perhaps a theoretical neuroscience lab that is going to reinterpret the current studies in face of newer studies.

SARTHAK MISRA

I would not say harsh competition, but healthy competition. One of the key metrics in our line of work is to measure productivity of a scientist by her/his ability to publish high quality work (but it may not always be in the top-rated journals of the field).

MARTIJN WIELING

No, I believe the highest quality research is obtained when scientists collaborate, rather than compete. A bit of healthy competition is useful to keep you on your toes, but I doubt a field with harsh

> I would not say harsh competition, but healthy competition. <

>> CONTINUATION OF THE FUTURE OF SCIENCE: HARDER, BETTER, FASTER

competition between scientists will result in better scientific studies than a field in which collaboration is the norm.

MARTINE MAAN

Some competition is good, but collaboration and mutual inspiration are far more productive.

CATARINA DUTILH NOVAES

Not really... These days there is much too much being published, people often end up saying the same things in multiple papers so as to 'milk' their results the farthest they can. Just as the idea of a self-regulating free market simply doesn't work, extreme competition in science is in no way guarantee of good research. (See the point about intellectual honesty above.) This being said, a plurality of ideas and approaches, as advocated by the philosopher of science Paul Feyerabend, is in my opinion beneficial for the advancement of scientific knowledge as a whole.

WIM VELING

Resources are too scarce. There are many more good researchers than money. Harsh competition can be good, but only when quality would decide. In the current system, that is not necessarily the case. Quantity of papers is not a good measure of quality. Previous successes in obtaining funding and successful completion of a project may be good measures, but the Matthew effect is strong: "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken even that which he hath (Matthew 25:29)."

SHORT BIOGRAPHY

> SARTHAK MISRA



Prof. dr. Sarthak Misra joined the University of Twente in 2009. He is currently faculty member in the Department of Biomechanical Engineering within the Faculty of Engineering Technology. He directs the Surgical Robotics Laboratory, and is affiliated with MIRA - Institute for Biomedical Technology and Technical Medicine. He also has a part-time appointment in the Department of Biomedical Engineering at the University of Groningen and University Medical Center Groningen. Sarthak obtained his doctoral degree in the Department of Mechanical Engineering at the Johns Hopkins University, Baltimore, USA. Prior to commencing his studies at Johns Hopkins, he worked for three years as a dynamics and controls analyst at MacDonald Dettwiler and Associates on the International Space Station Program. Sarthak received his Master of Engineering degree in Mechanical Engineering from McGill University, Montreal, Canada. He is the recipient of the European Research Council (ERC) Starting grant, Netherlands Organization for Scientific Research (NWO) VENI award, Link Foundation fellowship, McGill Major fellowship, and NASA Space Flight Awareness award. He is the co-chair of the IEEE Robotics and Automation Society Technical Committee on Surgical Robotics, and area co-chair of the IFAC Technical Committee on Biological and Medical Systems. Sarthak's broad research interests are primarily in the area of applied mechanics at both macro and micro scales. He is interested in the modeling and control of electro-mechanical systems with applications to medical robotics. Please visit the Surgical Robotics Laboratory website for additional details.

>> CONTINUATION OF THE FUTURE OF SCIENCE: HARDER, BETTER, FASTER

7. The set-up of any experiment performed should be published beforehand, so that no results can be left out.

BERRY VAN DER BERG

Well, ideally we can trust each other to properly describe what we are doing, but with the publishing pressure it can be easy to leave out some results to make it easier to publish. I think science would benefit from more open-source approach that I already mentioned above. That is, make all the experimental setups, paradigms, data, and analysis scripts publicly available. That way, it should be easier to replicate studies, and easier to check how other folks are working.

CATARINA DUTILH NOVAES

There is widespread agreement that research in the social sciences is currently marred by a number of methodological issues, as attested by the so-called replicability crisis, the increasing phenomenon of retraction, among others. (A good overview of these issues can be found here: <http://fivethirtyeight.com/features/science-isnt-broken/>) One of the reasons that have been identified is the bias against negative results. One way to counter this bias is indeed to make the set-up and methodology of an experiment public before it is performed – or else to conduct the peer-reviewing

process of the presentation in article form based solely on the set-up and methodology, thus masking the results at the refereeing stage.

MARTIJN WIELING:

I think publishing the setup of an experiment beforehand is a good idea, especially if this setup (together with the background) would be peer-reviewed and the results would be guaranteed to be published, irrespective of the outcome of the experiment. In fact, the journal *Attention, Perception, & Psychophysics* already has this option. In that scheme,

> If we can get rid of the overly competitive atmosphere in academia, we may not need these kinds of measures. <

SHORT BIOGRAPHY

> MARTINE MAAN

Martine Maan received her MSc degree in Biology at the University of Groningen (1997) and her PhD degree at the University of Leiden (2006). She then conducted postdoctoral work in the US (University of Texas at Austin) and in Switzerland (University of Bern and Swiss Federal Institute of Aquatic Science and Technology; Eawag). In 2011 she moved back to the University of Groningen with a VENI fellowship. Since August 2013, she is appointed as a Rosalind Franklin Fellow at the Groningen Institute for Evolutionary Life Sciences.

Martine Maan studies the biology of species formation, specifically asking how adaptations to different environmental conditions contribute to the development of reproductive barriers between incipient species. To address this question she conducts observational and experimental work in African cichlid fish, that belong to one of the most species-rich and colourful families of vertebrates on the planet.



>> CONTINUATION OF THE FUTURE OF SCIENCE: HARDER, BETTER, FASTER

there would also be no reason to leave out results, given that it does not affect acceptance of the paper.

MARTINE MAAN

Sounds attractive, but it adds yet another layer of administrative hassle. If we can get rid of the overly competitive atmosphere in academia, we may not need these kinds of measures.

SARTHAK MISRA

I think realising a good and solid experimental set-up is part of solving the research questions, and obtaining the expected or unexpected results.

WIM VELING

For Randomized Controlled Trials, it is already compulsory to register the research protocol and main outcome measures before data collection has started.

This makes research more transparent and increases methodological quality. It makes sense to do this for other types of research too. However, as study protocols are written several years before data analyses are done, novel revolutionary hypotheses may have popped up in the literature or in your own head, which may happen to be testable in your dataset. This should be allowed of course, but it should be explained why, and shown that statistical power is adequate.

8. Economics will shape the way we'll do science in the coming decades.

BERRY VAN DER BERG

I think in the upcoming year we will focus more and more on gaining funding for research. But there is good news! There is a whole world of money out there, a world largely unexplored: the world of capitalism. We should embrace possibility with industry! I think in the near future most research will not be funded by governments but rather by the private industry. However, there is a big danger: the private industry will influence the results of research. We need to watch out what kind of contract we sign and maybe even have laws preventing too much influence of industry on the research and what we are allowed to publish. Recently there have been numerous examples of scientists working in close collaboration with big corporations (e.g. Adam Gazzaley and NVIDIA) in which both parties and society benefit from collaboration!

MARTIJN WIELING

Unfortunately, I think this is at least partly true. More and more money is distributed via grants, which frequently have a particular research theme (for example, the so-called Topsectoren). Research fields where there is more money are able to employ more researchers, while opportunities to do truly curiosity-driven unbounded research are diminishing.

SARTHAK MISRA

Maybe this will be the case. I think we are moving towards this trend. But this is something with which I do not always concur. I feel that without the possibility to do blue-sky research there will not be any new and significant findings in the coming years.

MARTINE MAAN

Superficially, this sounds like a nightmare. But if we consider long-term rather than short-term economics, basic science is one of the most economically sound investments you can make. Thus, if economics (rather than short-term politics) really determines where science is going, we would have nothing to worry about: long-term economic profitability easily justifies persistent funding for basic research.

WIM VELING

No way! Economics may determine size of research budgets, but researchers have never let themselves be controlled by ordinary problems such as money. We'll have to be creative in selling our ideas to funding bodies and society, and if that does not work out, revolution!

> *Basic science is one of the most economically sound investments you can make.* <

The future of food: Going green

In the 15th year of the 21st century, as the world turns its attention to a green, sustainable, lifestyle, I am meeting with John Hoeks, professor of Communication and Information Sciences. He is a vegan activist and part of a worldwide movement that aims for a better way of treating the earth and its inhabitants.

From quitting smoking to becoming vegan: the story behind milk and eggs

My girlfriend and I used to be heavy smokers. When we decided we wanted to have children, we realized that we had better stop smoking. At that point, quitting smoking was a kind of mini-crisis in which I realized that change in other fields was possible too. As a vegetarian from the age of 12, I already felt that we shouldn't eat meat, but then I became convinced that eggs were also out of bounds. In the production of eggs, half of the chickens that hatch are male. And, as these young males are not of any economic value, they are put into a shredder. As soon as you learn that – or at least after a while (changing

your mind takes some time) – you don't want to eat eggs anymore. And it is the same with milk; for a cow to give milk, the cow needs to be made pregnant. Again, half of the cows that are born are male, which aren't of use for the dairy industry, and will be sent to factory farms to become meat and leather. Once I knew the facts behind milk and eggs, I decided to move from vegetarian to vegan.

A vegan diet is as viable as other diets

From a scientific viewpoint, it is not necessary to eat meat, fish or dairy. Authoritative institutes like the American Dietetic Association explicitly state that a vegan diet

Based on persuasive theories of communication John Hoeks is investigating how to inspire/encourage people to be more sustainable. In September 2015, the Convincing Conversations (CoCo) project started, a joint project with the Information Sciences Department. The aim of the project is to build a computer-based dialogue system that can convince people to move towards a plant-based vegan diet. First, the system analyses what the participant already knows/thinks about a plant-based diet and then the system tries to convince the participant to adopt more animal friendly eating habits. At the moment they are constructing a database of arguments and counterarguments concerning a plant-based lifestyle.



>> CONTINUATION OF THE FUTURE OF FOOD: GOING GREEN

> *What is behind it are feelings of empathy for animals that have to die and that also suffer to serve as food for us. But it is not necessary food.* <

is as viable as other diets. Even the rather conservative Dutch 'Voedingscentrum' (Food Centre) acknowledges that now. And this is not merely a matter of 'opinion', but of hard scientific fact. There is also plenty of anecdotal evidence that a vegan lifestyle is no barrier to healthy, successful living: There are vegan body builders, Olympic champions and vegan professors. What is more, there is accumulating evidence that a vegan diet may be even healthier than other diets.

Sustainability @ the University of Groningen

Sustainability is a very broad concept, which has led to some people suggesting not to use it anymore. But I believe this is not a problem, but rather a strength. Sustainability should not only be about environmental concerns (greenhouse gas emissions, land and water use, deforestation), but also about more ethical aspects such as the way we treat humans and animals (fair trade, democracy, emancipation). The University of Groningen has the ambition to become a leading institute with regards to sustainability. We do pretty well in national and international rankings, such as the Sustainability and the Green Metric. There is a task group in place called the Green University, which develops ideas about sustainability in various projects at our university. It has asked the university board to treat

sustainability not as a separate project, but to integrate sustainability and responsible behaviour into education, research and all of its other operations.

Why is this necessary?

I guess I'm pretty much an optimist in lots of respects, but I must admit I'm a bit pessimistic in how we will fare in the next couple of decades. I think we will face some serious problems as we don't do enough to stop climate change. You already see that in California, where they have enormous droughts. So, it's becoming visible and it's affecting us already. And even closer to home, in the north of Groningen, the land is starting to become too dry for agriculture. Sure, things like this also happened before, as part of a natural cycle, but I'm afraid it will happen more and more often. However, people are not scared enough – yet – to take measures, and unfortunately being scared enough is necessary before measures are taken. I think that we eventually will need to live a simpler life; we cannot rely on high-tech solutions. There simply will not be as much electricity

ANIMALS & SCIENCE

We shouldn't involve animals in science. Animals should be free, they shouldn't be used. They shouldn't be bred in captivity, put in plastic boxes and never see daylight. If it's necessary to use animals for that kind of knowledge, I don't want that kind of knowledge. Just ask yourself, could you live with the state of medical knowledge we have right now? So why not stop now with animal testing?



>> CONTINUATION OF THE FUTURE OF FOOD: GOING GREEN



> *Vegan diets are as healthy as other diets, perhaps even healthier.* <

and other sources of energy as we have now. We will certainly not be able to invest our precious electricity and other resources into factory farming! But I think a simpler life, with plant-based food, can still be very comfortable.

Food @ the University of Groningen

At the University of Groningen, we also have the 'Green Office', which is a group of ambitious students, who design and carry out several projects. One of the projects called 'sustainable canteens' aims to increase the use of fair trade and organic products in the university's canteens. This project is presently carrying out a baseline measurement, looking at products and assigning them points in terms of environmental footprint or animal suffering. The more points, the worse the product fares. And I believe that a measurement system to assess sustainability is extremely important. Certainly also for communication about sustainability, where the best strategy is to be upfront about where you are and tell people exactly how it is. In communicating sustainability, it is essential to be courageous enough to be transparent about the extent to which your products or projects are not as sustainable as you would want. So, when you are buying or selling factory-farmed products, acknowledge that. And where a project uses animal testing, be open about it. You can even use emoticons to show the extent to which you are doing well: you get a red sad face for things that are really not good, or a smiling green face for things that are highly sustainable. If you are not honest about where you are on your journey towards sustainability, people won't believe you; if you only talk about your green faces, people will know you're fooling them.

MAXIMIZATION OF FREEDOM

'All beings should be as free as possible. To the emancipation of slaves, of black and coloured people, of women, and of homosexuals, we must now add the emancipation of animals.'

How should we proceed?

Things are happening, but it is not yet good enough. For instance, it would be great if all of our university canteens would decrease their use of dairy, eggs, fish and meat, starting with animal products from factory farming. That is of course a rather slow process. It is good to know, though, that every canteen in the city center has vegan options. If you go to the Harmonie or Academy canteen, you can get a vegan lunch or dinner on request. These options should become much more visible. But in more general terms, I believe the university should make an effort as soon as possible and start to educate students and teachers about the large negative impact that animal agriculture has on our world. It affects land and water use, biodiversity, leads to deforestation and greenhouse gas emissions, and causes animal suffering on an industrial scale. The university should show everyone – based on scientific evidence – that you can easily live long and prosper on a vegan diet.

■ BY ANNELOT DE RECHTEREN VAN HEMERT
 ■ PHOTOS BY SANDER MARTENS

> A COLUMN ABOUT LIFE AS A POSTDOC

The Wandering Mind

This newsletter is celebrating its 100th issue with the theme “the future of science”. Assuming that science has a future in the present era of apparent gradual de-enlightenment, this is a great opportunity to speculate and pretend to be a futurologist.

Lots of developments are going on in science, but I think an important one that is at the root of many other changes, is that the ivory tower is slowly starting to crumble. Science is starting to be more and more accessible to the general population: call it the democratization of science, call it crowd-science, or call it scientific populism, depending on whether you wish to emphasize the pros or the cons.

Perhaps something can be learned from other branches of society. Take commerce for instance. There are many ways in which individuals are taking initiatives there. Lots of small start-up companies are being created every day that rely on crowdfunding. People with original ideas are provided with a podium to turn their concepts into products. 3D-printers enable you to do prototyping and manufacturing. And these technologies are accessible to all; apart from numerous online options, you might for instance turn to FabLab Groningen (<http://www.fablabgroningen.nl>) to develop your own idea. On top of that, it is pretty easy nowadays to open your very own webshop and gain access to a market that potentially reaches customers world-wide.

How might this translate to science? The crowdfunding of scientific projects is not commonplace yet, although such initiatives do exist and are gaining momentum (<https://experiment.com>). However, science is reaching out to the public in many other ways. Certainly, science is trying to be more open. Enormous amounts of data are deposited in various kinds of repositories in a way that allows them to be mined by anyone with novel ideas or original approaches. Data acquisition itself is changing shape. More and more types of data are recorded automatically; just think of communications on social media or logged location data, to name a few. But also the public is actively engaged by scientists to contribute, whether by counting birds that visit your garden, cataloguing the shape of galaxies, folding protein chains optimally, or letting a computer search for large primes during idle time. Appliances are getting smarter and the internet of things will allow them to contribute their data to the virtual cloud. The analysis of such data certainly isn't reserved for researchers at scientific institutes. But also more generally, it is getting easier to acquire sophisticated datasets. Programmable microcontrollers, telephone apps, or do-it-yourself EEG hardware are wonderful examples. Much of what used to be top-notch science a few decades ago can be accomplished by a creative amateur in his (or her) garage nowadays. I know that my smartphone is more intelligent and less

cumbersome than the equipment that was available at university when I did my studies. At the same time, journals are increasingly adopting open access publishing models, allowing almost anyone to inform themselves about the state of the art in a science field, aided by a growing collection of freely accessible but high-quality Massive Open Online Courses (MOOCs). Why rely on your regional school when you have easy access to the most prestigious teachers in the world? Universities may be forced to reinvent themselves, perhaps a bit comparable to publishers that are currently faced with a need to come up with new business models.

These developments of course have some great implications. Science will be open to all, and that will include talent from underprivileged circles and developing countries as well. But there is a fine line between popularisation and populism, as we may be able to learn from the present-day political scene. Populist parties flourish and even those that escape this trend can hardly be caught voicing ideology anymore. Leadership is lacking. It can be debated whether a referendum about a treaty with the Ukraine counts as progress. Similar problems may emerge for science. We already see that many new journals are sprouting that exploit the open access model in a predatory fashion. Grassroots science not necessarily conforms to standard scientific practices, but also elevates



dissident theories to practised science: think of cold fusion, intelligent design, or various forms of alternative medicine for instance. If you ever sat in a job application committee, you may agree that it is not getting any easier to judge the credentials of candidates. And reviewing a research paper is also getting more and more complicated as the complexity of datasets grows, as exemplified by the credibility crisis that science appears to be heading into. All in all, tearing down the walls around the privileged academic courtyard probably is a good development... as long as we are not tearing down the walls of the scientific building itself along with that. Since futurology is hardly a science, time shall have to tell where we are heading.

■ BY DAVE LANGERS



Gamification: Get people to do what they do not want to do

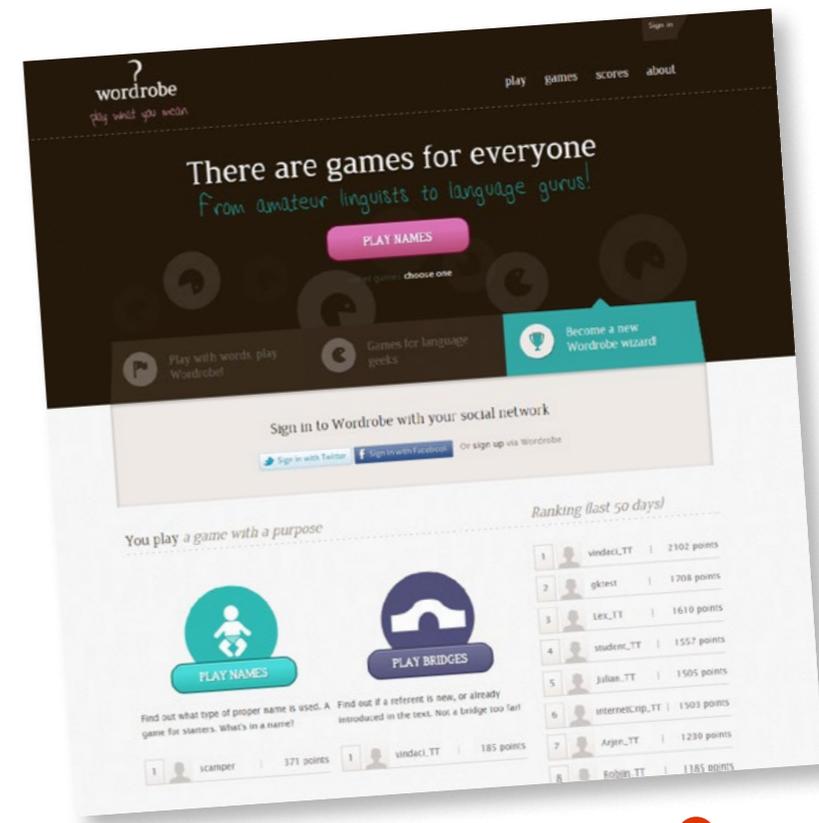
Johan Bos is professor and Endowed Chair of Computational Semantics at the University of Groningen. He recently received a prestigious VICI NWO grant for his project “Lost in translation” in which he takes a closer look at automated translation. In addition to this project, he is working on correct classification of sentences. “Wordrobe” is the product of this research. It is a game that consists of a large set of questions related to word classification, which are extracted from the Groningen Meaning Bank he constructed. Gamification is a new approach to data collection and is particularly useful to get people to perform otherwise dull classification tasks. Classification of objects or words is something computers are not able to do yet, but it is something we would like them to learn. With the aid of Wordrobe, a golden standard is constructed based on the majority of votes, for word labeling. This is not an easy feat since ambiguity is inextricably linked to linguistics.



I compare gamification to broccoli coated in chocolate sauce. You have to get people to do something they do not really want to do. For instance, we would like people to identify annotations and anaphora in rather dull pieces of text. This chocolate sauce can be cooked according to different recipes. In Wordrobe we chose to keep the outlay sober, whereas others might choose to have an elaborate videogame format. However, the latter will cost you more time since you acquire less data per person.

A few years ago, I got to know the game “Phrase Detectives”. In this game people get points for correctly classifying sentences. I reckoned that this was something I could do too, but I wanted to incorporate more aspects of linguistics. This is how “Wordrobe” was created.

You ask people to correctly classify a large corpus of words, and by doing so, they can get points. This



scoring system is interesting since it is established in order to motivate people to continue playing. It is not at all motivating if you play Wordrobe for the first time and your score is nowhere near the high scores. We made the decision to recalculate the score over a period of 50 days. If other people agree with your answer in the meantime, then your score increases, but if they disagree, then your score decreases. This gives new people who enter the game the opportunity to achieve high scores as well; the top score will not remain intact. If you do not play for quite some time, your score will go down. We thought this was a bit sad, so we decided to add “achievements” to the game. If you complete a certain amount of so called “drawers”, you get achievements that are not taken away if you cease to play, as an extra motivator. You still have something to show for your hours of playing even if your points are no longer up to scratch. This is important since gamification relies on a certain status a player derives within an online community. We tried to improve the

> Gamification is like broccoli coated in chocolate sauce. <

>> CONTINUATION OF GAMIFICATION

attraction of the game by awarding players monetary prizes. This, however, did not have any effect, so we decided to stick to the points and achievements.

A big disadvantage of gamification is that it is very time consuming. You could get a large number of people to classify a large number of words in a shorter amount of time with crowdsourcing. The difference between crowdsourcing and gamification is that in crowdsourcing you pay people to participate. However, the quality of data obtained with crowdsourcing is a bit lower than with gamification, so the choice between these two options depends on your goal.

The trouble with gamification is that it is a challenge to attract new people to play the game. In Wordrobe for instance, 90% of the questions have been answered by 10% of the players of the game. It is an absolute must to keep attracting new players in order to remain relevant and obtain your data. Fortunately, new players are still signing up for Wordrobe, but in the future we need to come up with new ways to attract players. I strongly believe that if gamification is to have a secure future, we need a platform where different types of games can be gathered. On this platform everyone has to be able to upload their game, for a certain fee, as long as it requires labeling. The problem now is that everyone develops their own game on their own island, resulting in disintegration.

There are several motives for people to participate in a game such as Wordrobe. Most prominent among those motives are 'money',



'obligation', 'status derived from scores', 'education' and 'entertainment'. Ideally, I would like to create a situation where people have to perform a series of sentence classifications. An example of this is the CAPTCHA system of von Ahn, one of the founders of crowdsourcing. This system is used today on numerous websites, where you are asked to retype a visually altered sequence of characters to prove you are not a computer but actually human. This way an incredibly large international database is obtained. If people were forced to classify a few sentences to access their Facebook for instance, data collection would go incredibly fast. If we can reinvent this, the future will be golden. However, this would mean that we would leave the world of gamification and enter a different realm.

■ BY ELOUISE KOOPS
■ PHOTOS BY SANDER MARTENS

Introducing a new copy editor

> TERRIN TAMATI



I'm currently a postdoctoral researcher in the dB-SPL group in the Department of Otorhinolaryngology at the UMCG. I joined the group in 2014 after receiving my PhD in Linguistics from Indiana University. The focus of my current research is to investigate how cochlear implant users perceive speech in the real world, outside the lab or clinic. In particular, I am interested in the cognitive, linguistic, and perceptual skills necessary for cochlear implant users to understand real-life forms of speech, such as conversational speech or accented speech. I look forward to working with the BCN Newsletter team and learning more about the BCN research school!

Now what? Life after the defense: A double interview with Michelle Servaas and Iris Hovens

From cheering you up if you are down to an inspiring chat during coffee break, your colleagues play an important role in everyday life. Iris Hovens and Michelle Servaas are both postdocs in the same department where they spent the last couple of years as PhD students. They discuss how they were very lucky with their colleagues and received a lot of support and help when necessary. But they also acknowledge the importance of free time and limiting the number of evenings and weekends spent with colleagues in the lab.

IRIS

Is your postdoc about your old subject?

MICHELLE

Not exactly, my PhD was about neuroticism, which is a personality trait. If people score higher on neuroticism, they are more likely to develop anxiety disorders and depression. Now I am working on remitted recurrent depression. After my PhD I worked for six months at the University Center Psychiatry (UCP) with dr. Ruhé and prof. Schoevers. We combined data from diaries with fMRI. Now I am back at my old spot. You are also working at the same department, right?

IRIS

Yes, I continued with the same project I was working on during my PhD. My project is about postoperative cognitive problems after surgery. I investigated the possible mechanisms in an animal model. During my PhD I focused on what kind of cognitive problems occur and which inflammatory factors and brain areas are related to that. Now, I started a new experiment with an intervention.

MICHELLE

Did you develop something that works against the inflammatory factors?

IRIS

Well it seems that reducing the inflammatory response helps. But the problem is that the inflammatory response in the brain also has a physiological function. If you are sick or wounded, you have to exhibit certain behaviour. What we are researching at the moment is if we can balance the inflammatory response rather than suppress it entirely. So how did you research neuroticism?

MICHELLE

240 female students filled out a questionnaire that measures neuroticism. Then, we took resting state and fMRI measures from 120 students during a couple of tasks and we took saliva to investigate some risk genes.

IRIS

Interesting, what were your results?

MICHELLE

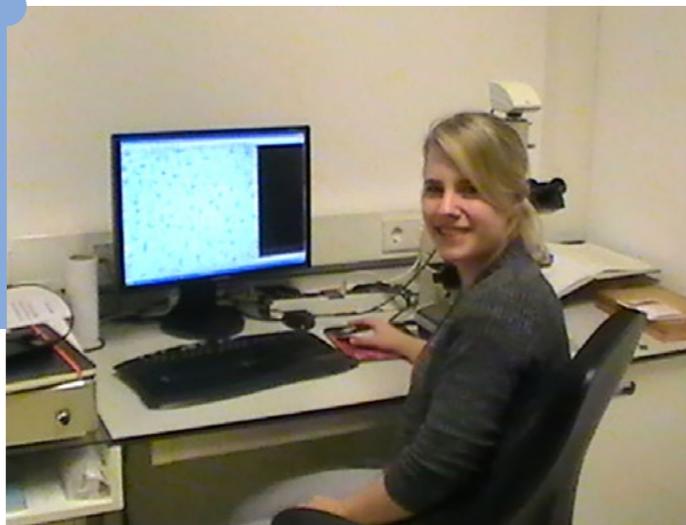
I think that the most interesting result was about the brain organization. The brain consists of networks that



> There are always people who do more than you, so at one moment you have to say to yourself 'it is enough', and take a day off. <

>> CONTINUATION OF NOW WHAT? LIFE AFTER THE DEFENSE: A DOUBLE INTERVIEW WITH MICHELLE SERVAAS AND IRIS HOVENS

> Luckily, I had very motivated students, especially the ones that scored high on neuroticism. <



are connected to each other. The brain organization of people with a high score on neuroticism seems to be more random and the connections appear to be weaker. In addition, we observed that the emotion and salience network play a more prominent role within the brain organization than cognitive control networks.

IRIS

Interesting! Nice that you can investigate humans with your MRI study.

MICHELLE

But with animals you can do things that you can't do with humans.

IRIS

That is true. Animals don't say they want to quit halfway your experiment. I also did an analysis of a study in the hospital with patients. With some patients, if they notice that they perform very poorly on cognitive tests, they tend to quit. Or if it costs them too much energy, they quit. And those are exactly the patients we were interested in.

MICHELLE

Yes, luckily, I had very motivated students, especially the ones that scored high on neuroticism. So, what would you say was the most fun thing about your PhD?

IRIS

The variation in the work and the collaboration within our department. Definitely the last couple of years, we had a very nice group of PhD students in our room.

MICHELLE

We have the same thing here; everyone wants to help you.

IRIS

Yes, or support you if you are down or if you just want to chat. One of the less fun things about a PhD is that in the beginning, I didn't realize that so many things can go wrong. I had a group of older rats that were sick and had to be isolated from the rest of the animal facility. But in the end, it turned out to be a positive thing, and we could actually use them in a publication.

MICHELLE

Yes, research is a rollercoaster. On one day you feel fantastic, and on the next day you can feel very down. You have to realize that everything will be all right in the end.

IRIS

What are important things you learned during your PhD?

MICHELLE

Well, in the beginning you don't really know what you get yourself into. Or at least, that was what I experienced. Over the course of the years, you learn how to be an independent researcher. A PhD is a

personal journey. You learn that you have to stand up for yourself and run your own project.

IRIS

I agree. I also supervised a lot of students, and I learned a lot from that. I also organized a mini-symposium before my thesis defense. That was the moment I really learned how to network and to write to people you don't know. Also on the day itself, I learned to keep people informed and to make sure everything goes according to plan.

MICHELLE

I also learned that you have to sell yourself sometimes a little bit. And if you always think about the big picture, you will get crazy. Or, at least, I had that feeling at the end. Just do things step by step and do as much as possible. Eventually, it is important to realize that your PhD is not your entire life.

IRIS

What I also noticed is that everyone in my department works overtime. When I was there on weekends or evenings, there were always people. So you don't really have the feeling that you are doing something extra, and it feels normal. There are always people who do more than you, so at one moment you have to say to yourself 'it is enough', and take a day off.

MICHELLE

Exactly, and don't feel guilty. But it is difficult, because in the last year I was always thinking about my project. It was always in my head. Your project is so personal; it is almost your baby.

■ BY MANON VAN ASSELT

■ PHOTO MICHELLE SERVAAS (PREVIOUS PAGE) BY JACOB GERKES



Glia Open Access Database (GOAD)

An interview with Inge Richelle Holtman (Department of Medical Physiology)

Public databases are becoming increasingly more important as the amount of genome-wide sequencing data increases exponentially. Inge is completing her PhD on genetic and epigenetic factors regulating microglia and has worked with many RNA-sequencing datasets herself. During her PhD, she noticed that it is very difficult for many glia researchers to work with previously published datasets, but these datasets are very expensive to generate and contain a lot of valuable information. In a discussion with her supervisors Bart Eggen and Erik Boddeke, she came up with the idea for an online database tool to make this data easily available. They contacted Michiel Noback, the coordinator of the bio-informatics training programme of the Hanze University of Applied Sciences, to discuss whether this could become a student project. Fortunately, Michiel showed great interest in these plans, and two months later the first students started working on it. Since then, six bachelor students have helped to build and expand the features of GOAD. It was officially launched in March 2015, has resulted in a publication in the *Glia Journal*, and is accessible via www.goad.education.

Can you tell me what GOAD is and how you came up with the idea?

The Glia Open Access Database (or GOAD) is an online database tool where you can find genome-wide gene expression data from previously published studies on glia cells. One of the issues was that the number of studies generating genome-wide transcriptome profiles of glia cells increases at a fast rate. So, I thought it would be very useful for glia researchers to collect these datasets and make them easily accessible. At first, my colleagues were very skeptical and said that I was underestimating the difficulties associated with such a database. In hindsight, they were right! However, when we contacted Michiel Noback, the coordinator from the Bioinformatics Bachelor program, to see if there was any

interest, I was positively surprised to hear that the next practical JAVA/MySQL course, where the students could start working on it, would start in two months. I was asked to give a presentation and meet the students.

> At first, my colleagues were very skeptical and said that I was underestimating the difficulties associated with such a database. In hindsight, they were right! <



>> CONTINUATION OF GLIA OPEN ACCESS DATABASE (GOAD) AN INTERVIEW WITH INGE RICHELLE HOLTMAN



> *On good days, we have had more than 130 visitors from all over the world* <



The first students, Marije van der Geest, Marieke Bijlsma, Kim Duong and Peer Ketelaars, joined us, and we immediately noticed that they were very positively involved in the whole project and were able to develop a very nice first version. Later, Marissa Dubbelaar and Stephan Boersma brought it to a higher level, with more features and a more efficient source code. A few months ago, I presented GOAD at the Glia conference in Bilbao, Spain, and the responses were very positive. Many people could see the added value of such a tool. Using Google Analytics, we can keep track on how many visitors our website gets and where they are from. On good days, we have had more than 130 visitors from all over the world. So, that looks promising.

Some of your colleagues were skeptical. Were there a lot of things that went wrong?

Yes, we have had our fair share of difficulties. The most stressful moment was three days before the Glia Conference, when we found out that GOAD was not showing the data properly. Marissa and Stephan, the students who were working on it, had just gone on holiday and were no longer in reach, and Michiel Noback had also started his holiday. So, I was afraid that I had to present a non-functioning database tool at the conference. However, Michiel came back from his holiday and was able to locate and correct the error

one day before the conference started. Ultimately, the website worked nicely again, so we were all very relieved.

What are the plans for the future of GOAD?

Over the last months, it has become difficult for me to analyze all the new datasets, especially because I am nearly at the end of my PhD. I could almost make a full-time job out of it. One of the plans for the near future is to make an automated pipeline that is able to analyze the data in the appropriate formats for integration on the website. Moreover, we would like to start incorporating other types of data, such as epigenetic datasets. We would also like to extend features related to cross-species comparisons. During the Glia Conference, we were contacted by a consortium of glia researchers from Germany, who showed interest and might be willing to invest resources. If everything works out, we hope to be able to bring it to an even higher and more professional level.

How do you see the future of these types of genome-wide sequencing?

It is a field that has developed incredibly fast. Over the last years, we have seen that the costs for sequencing have dropped tremendously, making it possible to sequence individual cell types in health and disease.

Right now, my lab is mainly focused on the level of the transcriptome. However, it is possible to look at many different levels of regulation: from the genome, epigenome, transcriptome, proteome, microbiome, and beyond. This amount of data will open up new avenues and will also be integrated in health care. I believe that in a couple of years, when a patient goes to a hospital, it will become standard practice to sequence these multiple layers of regulation from blood or other tissues that are affected. This data will give a lot of insight into how a patient will respond to particular treatments and be a major step forward towards individualized medicine.

What are your plans after your PhD?

I just accepted a post-doc position in the lab of Professor Christopher Glass in University of California, San Diego (UCSD). This lab is at the forefront of integrating genetics, epigenetics and transcriptome data in macrophages and chronic, inflammatory conditions. If everything works out with the visa and such, I will move there mid-January. I have to say that I am very much looking forward to moving to California and starting with this next step in my career.

■ BY MANON VAN ASSELT

■ PHOTO BY MICHEL MEIJER

■ GOAD LOGO BY ILIA VAINCHTEIN



Tracking yourself – lifestyle hype or helpful research tool?

On a recent weekend I visited the Noorderlicht Photo Festival at the Old Sugar Factory. I was particularly struck by the Data Rush exhibit, where I saw photos on internet addiction running rampant in China, on the extensive use of surveillance cameras in England, and on people logging their lives using apps built for tracking various psychological variables, such as sleep and mood.



After seeing the first two series, I felt angry and upset. How can we let children spend days on end on a computer without eating or sleeping, where some even die as a consequence? Why do we allow ourselves to be videotaped 24/7 as if we are all criminals-in-waiting? But then I saw the third series, by Travis Hodges, and it made me reflect on one of my research interests.

I like to use a method known as ecological momentary assessment (EMA, though other terms are used as well) for studying how people interact with others in their everyday lives. EMA is more broadly used to sample psychological (and biological) variables from daily life, and usually involves recording how you felt, behaved, etc., multiple times a day for several days.

In two recent reviews (Bos, Schoevers, & aan het Rot, 2015; Bosman, Jung, Miloserdov, Schoevers, & aan het Rot, 2016), my co-authors and I highlighted the usefulness of EMA and related methods in clinical settings. During her second Research Master year, Fionneke Bos conducted a literature study on the use of EMA in psychopharmacology research and practice.



>> CONTINUATION OF TRACKING YOURSELF – LIFESTYLE HYPE OR HELPFUL RESEARCH TOOL?

We developed this literature study into a systematic review, which was recently published in *European Neuropsychopharmacology*. The review shows that EMA may allow researchers and clinicians to track patients during different phases of pharmacological treatment: before treatment to predict outcome, during treatment to examine the effects of treatment on symptoms and different aspects of daily-life experience, and after treatment to detect vulnerability for relapse. Moreover, EMA can potentially help determine how long and in what contexts medications are effective.

Renske Bosman, who graduated from the BCN Research Master program, and Sophie Jung, who completed her bachelor's degree in psychology in Groningen, conducted the second systematic review after a literature study by Kristina Miloserdov, another BCN graduate. Their effort was recently published in the *Journal of Affective Disorders*. In this review we focused on Premenstrual Dysphoric Disorder (PMDD), which according to the DSM can only be diagnosed after patients provide at least two consecutive months of daily symptom ratings, i.e. keep a diary for that time. EMA is essentially a more advanced form of diary keeping. To date, no EMA studies of PMDD have been conducted, but in our review we argued that EMA should be used to study PMDD. There are indications that premenstrual symptoms are not stable throughout the day, and so by asking about them at the end of the day only (as is typically done in diary studies), there may be an over- or under-reporting of symptoms.

EMA studies in clinical psychopharmacology and diary studies in women with PMDD have rarely

focused on the effects of pharmacological treatment and the menstrual cycle on how people interact with others. I hope to focus on the former in an upcoming project for which I submitted a grant proposal last week, and results from a pilot study on the latter were recently submitted for publication. While these pilot data were obtained from 9 women with self-reported premenstrual syndrome (PMS), a mild version of PMDD, in another recent study I asked more than 120 first-year Psychology students to report on their social interactions for two weeks. The data from this study still have to be analyzed (Minita Franzen will be doing this in the upcoming 9 months or so), but they are relevant to this blog post because study participants use their personal smartphones to record how they felt and behaved during their interactions with others.

This is the study I thought of when I was at the Data Rush exhibit. Travis Hodges reminded me of the fact that while I mostly view EMA as a helpful research tool, I may be riding on the wave of recent lifestyle hype. So far, I haven't offered study participants any feedback on their data, the way the apps mentioned by Travis Hodges do. However, merely filling out the social



interaction questionnaires (the average number was 65 in a previous study that used paper forms; aan het Rot, Moskowitz, & de Jong, 2015) can make people more aware of how they come across and how they see and react to the people they interact with. I decided that in a future study I will ask participants more qualitative details about their experiences with the EMA method. I usually ask if it interferes with their social interactions, but I haven't asked them whether they enjoy logging their social lives and whether it feels as an intrusion of privacy. I'm curious to find out.

■ BY MARIJE AAN HET ROT
 ■ PHOTOS NOORDERLICHT BY SANDER MARTENS

Relevant Links and References
 aan het Rot, M., Moskowitz, D. S., & de Jong, P. J. (2015). Intrapersonal and interpersonal concomitants of facial blushing during everyday social encounters. *PLoS ONE*, 10(2), e0118243. doi: 10.1371/journal.pone.0118243
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 Bosman, R. C., Jung, S. E., Miloserdov, K., Schoevers, R. A., & aan het Rot, M. (2016). Daily symptom ratings for studying premenstrual dysphoric disorder: A review. *Journal of Affective Disorders*, 189, 43-53. doi: 10.1016/j.jad.2015.08.063

HealthHack050 – a Social Lab at ‘Noorderzon’

Throughout our lives we develop awareness of how to be healthy and specific diseases that people struggle with daily. But let's face it – we differ in our interest in health – and many people feel that knowledge and advice regarding health behaviour doesn't really help individuals with for example regulating a healthy diet, regular exercise and work-life balance. One of the tools to make some aspect of your life healthier in a quick, cheap, and easy way is HealthHacks.



Lifelong healthiness is a process that already starts before conception, with parents who pass on their genes, and with them, the risks and opportunities for a healthy life course, or the occurrence of illness later in life. Within our BCN research institute more than 100 scientists from a broad field of expertise are conducting multidisciplinary and translational research on the processes of healthy ageing. To maintain healthy ageing, detailed knowledge is required about the influence of lifestyle, food patterns and environmental factors, and how they interact with one another. However, 'healthy ageing should not be limited to academia', according to Jan Bouwhuis, director

Facilities and Estates at the UMCG. Following this idea, HealthHack050 was born as an opportunity to bringing together personal experiences and ideas on how to be healthy.

The facilitative leader of HealthHack is Ritzo ten Cate, a serial kickstarter, public speaker, and lecturer at the University of Groningen. He is interested in new business strategies to tackle societal problems, such as the increase of the ageing population, and he has started different projects in Groningen that raise effective solutions by public engagement (see <http://ritzotencate.blogspot.nl/>). His work originates

from the work of Zaid Hassan in The Social Labs Revolution (2014). Social labs bring together a diversity of individuals – not to create a long-term plan but to develop a portfolio of prototype solutions, test those solutions in the real world, use the data to further refine them, and test them again. Hassan builds on a decade of experience and draws from cutting-edge research in complexity science, networking theory, and sociology to explain the core principles and daily functioning of social labs.

During the latest edition of Noorderzon that took place August 10-20, 2015, HealthHack050 formed a social lab

> It started minimalistically with two white walls of paper, some coloured markers and a bowl of apples for healthy vibes <

>> CONTINUATION OF HEALTHHACK050 – A SOCIAL LAB AT 'NOORDERZON'



> A good laugh now and then may give you a mental boost similar to meditation <

for developing and testing ways to maintain or increase healthy behaviour. Visitors of Noorderzon were invited to share their ideas within the set-up, which initially started minimalistically with two white walls of paper, some coloured markers and a bowl of apples for healthy vibes. Several people from both within and outside the UMCG accompanied the lab each day, inspiring and guiding visitors to contribute to HealthHack.

A wide variety of ideas were put forward, ranging from public power napping to storytelling couches in the city centre of Groningen. We noticed that the HealthHacks were both relaxing as well as stimulating, which nicely reflects the different needs and perspectives on healthy behaviour. Furthermore, many ideas seemed to centre around nutrition and physical activity. For

example, one of the initiatives tested at Noorderzon was 'Noorderkruid', a healthy combination of natural herbs and spices that could serve as a substitute for salt in the food people prepare. Many visitors were surprised when they found out the actual amount of salt that is added to many food products, by means of a quiz presented by Jelmer Humalda (PhD student UMCG, Nephrology) assisted by Nicole Dijk (PhD student, UMCG, Pediatric Pulmonology and Pediatric Allergology). Subsequently, visitors received a small pouch of Noorderkruid together with some recipes to try at home. Currently, we are still gathering recipes via the newly launched Facebook page, surprisingly named Noorderkruid.

Another HealthHack was 'DobbelFris'. Research has suggested that staying seated for too long is bad for your health, regardless of how much exercise you do. Still, much of our work is done sitting at a desk. DobbelFris was created to stimulate physical activity, for example during coffee breaks. As the name already suggests (for the Dutchies), DobbelFris is a dice with six different playful exercises that one can perform either alone or with colleagues without sweating (too much). These exercises include, for example, a lunchtime walk, jumping rope, sidewalk chalking, and horizontal climbing (see picture). After testing DobbelFris at Noorderzon, we concluded that visitors are a bit hesitant to play (at work), or to leave standard business practices for the standing desk, the desk bike, and fitness ball or even simply a standing meeting.

Furthermore, several visitors of Noorderzon gathered in a circle to test a HealthHack on 'laughing meditation'. Psychologist Marlies Bouwman encouraged the curious spectators to participate in a kind of bizarre situation in which they walked around and laughed with each other. 'Lachen is gezond' (translated from Dutch:

'laughing is healthy'). When we laugh, endorphins are produced in our brain, which makes us feel happy. Indeed, though a bit artificial, visitors really enjoyed the laughing meditation. No time to just sit and breathe? Then, at least pull up a quick funny YouTube video; a good laugh now and then may give you a mental boost similar to meditation. In addition, the initiative of 'Gezond-hond' (translated from Dutch: 'healthy dog') was born; a dating service for people who own a dog or people that would like to go for a walk with a dog. From helping fight off heart disease to boosting our self-esteem, experts say that dogs (and other animals) do wonders for people, both emotionally and physically.

Altogether, we conclude that HealthHack050 succeeded in facilitating health behaviour, based on knowledge as well as personal experiences. It was inspiring to mutually construct ideas and actually realize some of them with a wide variety of people. Together with the Groningen municipality, the University of Groningen is planning to further develop HealthHack as part of its continuous efforts to support initiatives facilitating health behaviour in Groningen and surrounding areas. Do you also want to contribute? Visit HealthHack050 on Twitter or Facebook for more information!

■ BY HELEEN HOOGEVEEN

HoeGekIsNL – How Nuts Are the Dutch?

HoeGekIsNL is a national crowdsourcing study designed to create an empirically based representation of mental strengths and vulnerabilities and their role in mental disorders.

It is an initiative of the Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), UMCG. The team behind the project is led by professor Peter de Jonge and is comprised of scientists from different fields, including psychiatric epidemiology, psychology, computer science, and mathematics.

Many people occasionally feel blue – some end up developing depression. Faced with extreme circumstances, some people enter a depressive state – others remain seemingly undisturbed despite problems in life. How can there be such big differences between people? And what could explain them? HoeGekIsNL is a project aimed at generating hypotheses and later answering such questions. From the get-go, the researchers emphasize they are not interested in a black-and-white approach and advocate that a sharp distinction between ‘normal’ and ‘not normal’ is not useful. Instead, they are attempting to figure out what combination of factors influences the development of depression. They also state that examining psychologically robust people may help zero in on what actually helps fight mood disturbances.

A single measurement cannot determine how feelings, thoughts and behaviour influence each other, so the main part of this research is a diary study in which participants repeatedly take measurements in their daily environments (prompted by texts with, if unused in allocated time, self-deactivating links). The outcome

will help shed light on whether, for example, depressed people are happier when they are busy or when they relax at home. These kinds of relationships are sometimes invisible to the naked eye, but can be traced by means of statistical tools.

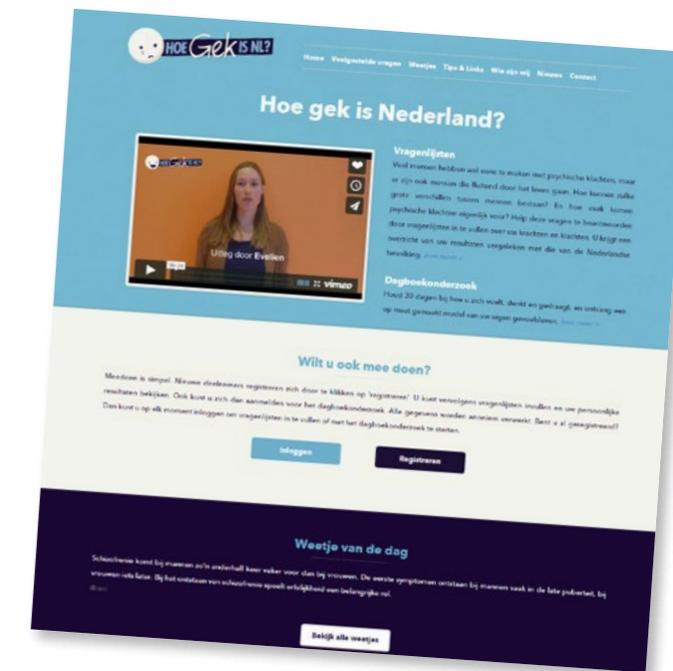
There is no financial compensation for taking part in the research; instead, what participants get in return depends on how much they put in. If they fill in the diary often enough (75% of the time), they get a personal, automatically-generated report that provides information about patterns in their emotional life and behaviour. If they fill in 85% of the measurements, the analysis includes a component that describes how their strengths and vulnerabilities interact.

So how does it work? It seems simple: you go to the website HoeGekIsNL.nl, fill out a registration form, and you’re only a couple of clicks away from becoming a participant in a giant research project that already has had more than 12000 participants. Red flag: before taking part in specific research assignments, you are asked

to submit a number of personal details, such as your gender, age, postal code, relationship status, both your own and your parents’ country of origin, family income, living arrangement, religion, living situation, occupational situation, and many others. Then you can move on to questionnaires. One of them based on DSM criteria: your mental health may be investigated by means of questions about (another red flag!) suicidal ideation, fatigue, or changes in weight. Participation is officially open to 18+ Dutch and Belgian citizens, although over 200 legal minors participated in the project, as admitted by the research group.

I identified two red flags in the paragraph above: details about mental health combined with a participant’s proximate address, ethnicity, and income are collected within one project, although stored on two separate servers. The researchers promise that the privacy of participants will not be breached and access to both datasets will only be granted to an administrator (the person however is not named). However, security of data, especially medical data, is not a trivial thing, and I therefore sincerely hope that the HoeGekIsNL research is safeguarded extremely well. This information should not fall into the wrong hands.

The unquestionable benefits? A wonderful example of strategically marketing a project. The website of HoeGekIsNL has been



developed with a sleek design and is promoted in an attractive language (look no further than the tongue-in-cheek name), often rare in communicating science. It comes as no surprise the project has been met with a warm response of over 12000 participants.

“Perhaps there is no such thing that gives greater happiness than what one does for other people.” (D. Bonhoeffer, own translation). Indeed, a two-way interaction is a very fulfilling aspect of citizen science when it helps educate, gather gigantic datasets, and garner financial support by providing tangible examples of utility of research. Although a large online study inherently suffers from a response bias, HoeGekIsNL may help generate new hypotheses about how key variables interact to create a mental condition.

■ BY ALEXANDER PIETRUS-RAJMAN

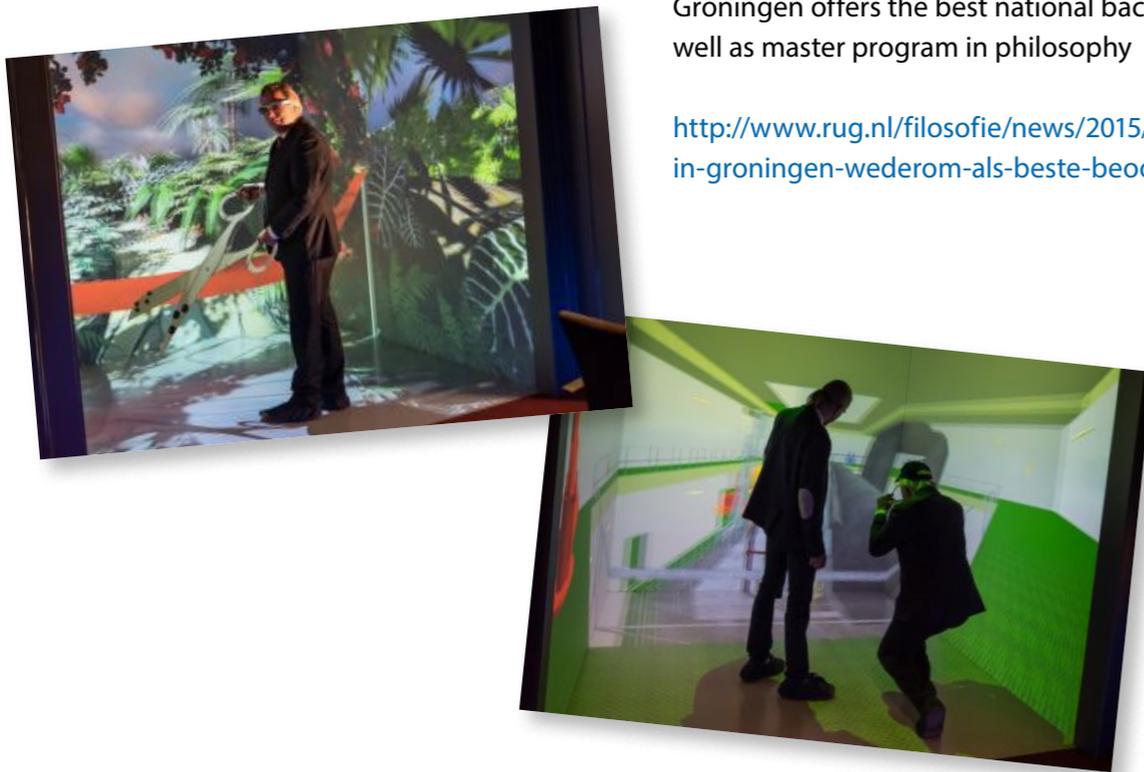


> GRAND STUFF

Virtual Reality Center

The renewed Virtual Reality Center was opened by mayor Peter den Oudsten on October 15th. The Reality Center of the Center for Information Technology (CIT) offers unique, highly advanced Virtual Reality (VR) facilities. These facilities are used for innovative research conducted in many different fields of science.

Their 'Virtual Reality' experts ensure optimal expertise and support for researchers and scientists.



External parties can also purchase its services, for example for architectural, landscape or interior design visualizations.

See <http://www.rug.nl/society-business/centre-for-information-technology/research/hpcv/> for more information.

Groningen offers best Philosophy education

According to both students and professors, Groningen offers the best national bachelor as well as master program in philosophy

<http://www.rug.nl/filosofie/news/2015/filosofie-in-groningen-wederom-als-beste-beoordeeld>

STW grant for SMARTBREED project

Technology Foundation STW has awarded EUR 230,000 to the SMARTBREED project of Prof. Nicolai Petkov and Dr. G. Azzopardi of the Johann Bernoulli Institute for Mathematics and Computer Science (JBI). The grant is awarded within the Partnership Programme Breed4Food that wishes to develop more sustainable and animal friendly breeding.

The SMARTBREED project is a collaboration with the Animal Sciences department of the Wageningen University. It will apply big data and advanced machine learning on the genetic data of millions of animals gathered by the four breeding improvement companies involved with STW's Partnership programme.

>> 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!

Save the date: BCN Winter Meeting

*Dear all,
The BCN New Year's meeting will from now on be called BCN WINTER MEETING. The previous title suggests something like a reception, but in addition to drinks there will also be a lot of interesting content, just like in our summer and other meetings. Apart from a smashing (we hope) plenary lecture, poster presentations, the presentation of prize winners, and the forum, all of which were highly appreciated in the past, we have added a new element for the 2016 version. For this meeting, we will ask some of our most inspiring researchers to prepare a TED-like talk. The talk will be recorded with us as live audience members, and will later be made available on the BCN website. In our recent brainstorm session, one of the suggestions was to put more effort into highlighting and communicating about researchers and research projects that illustrate what BCN stands for; interdisciplinary, creative and high quality Behavioural Cognitive Neuroscience! The Winter Meeting will take place on 11 February in the UMCG and will start at 9.30. Further news about the programme is upcoming.*

*Hope to see you all there!
Robert Schoevers*

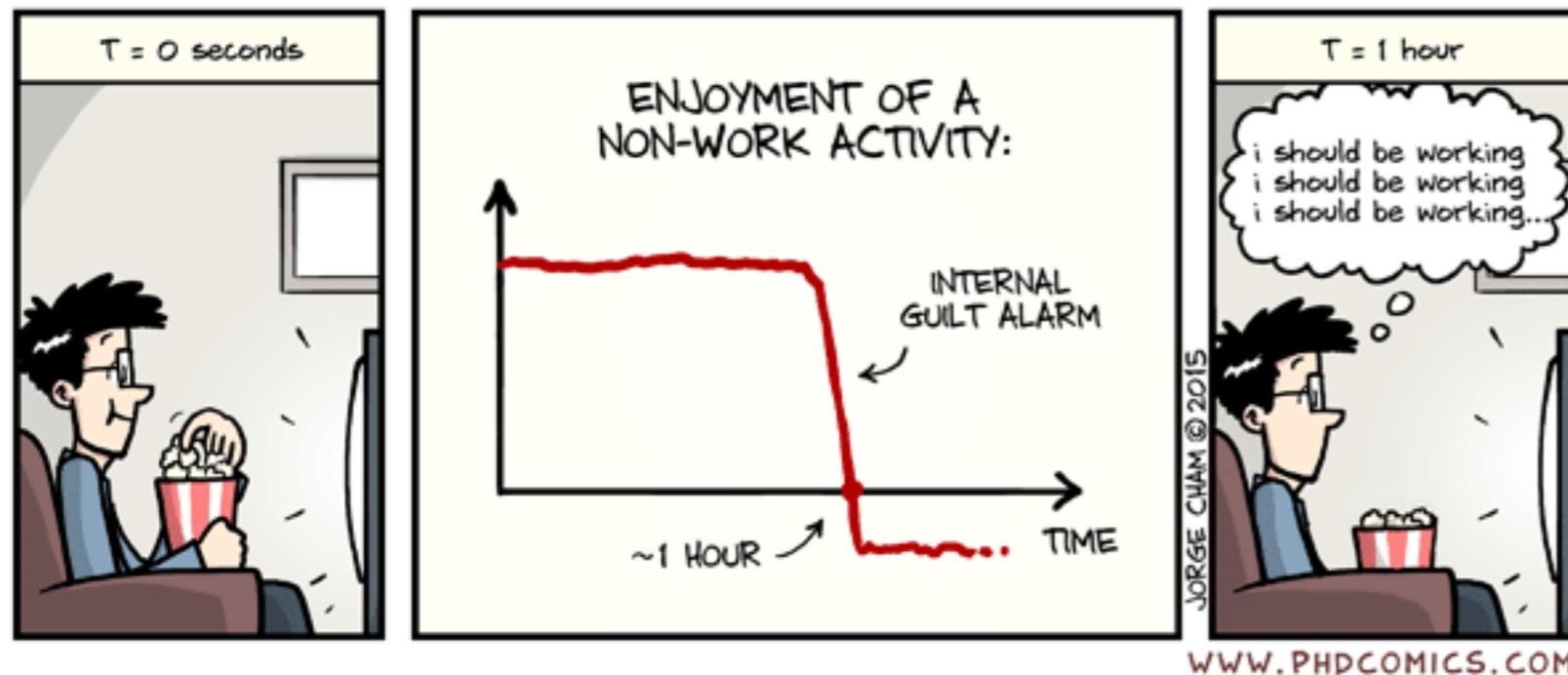
Cool links

> Interdisciplinary: How to catalyze collaboration
<http://www.nature.com/news/interdisciplinarity-how-to-catalyse-collaboration-1.18343>

> How scientists fool themselves - and how they can stop
<http://www.nature.com/news/how-scientists-fool-themselves-and-how-they-can-stop-1.18517>

> The best Science AMA's (Ask Me Anything) on Reddit
https://www.reddit.com/r/IAmA/search?sort=top&q=flair%3AScience&restrict_sr=on

> The brain forgets in order to conserve energy
<http://www.sciencedaily.com/releases/2015/10/151027082317.htm>



NEW PHD COUNCIL MEMBERS WANTED

We, the BCN PhD council, represent the interests of BCN PhD candidates and organize various social activities.

And we would love to have you on board! As a Board member, you will get in touch with other PhD candidates, help organize events, and MORE AWESOME THINGS.

If you are interested, please get in touch:

bcnphdcouncil@LIST.RUG.NL

> PHD COLUMN

I like to move (it), move (it)...

I love sports. Sports are my hobby, my passion and also my profession, as I am a human movement scientist by training. I consider myself very lucky to have such a healthy and beneficial obsession. Personally, I believe that exercise is a cure for everything and, like a prophet, I try to spread and popularize this view wherever I go. Fortunately, a rising number of scientific publications support my belief, helping me on this quest.

Thanks to my parents, I have been training regularly since as early as nursery school. During the years sports taught me discipline: working hard, making sacrifices, teamwork, dealing with success and failure, setting and striving for goals, the value of practice and preparation, and patience. Meanwhile, I also developed an intrinsic need for physical activity that simply does not allow me to become a couch potato. Since quite a young age, I have been eternally committed to basketball, but besides that I discover other sports every now and then. My relationship with exercise turned out to be so strong that I eventually ended up studying sport science. I spent my undergraduate years in a sporty environment where there was always the possibility and the company to do some sports. Not only students but teachers were active as well. You could meet the dean at the gym during lunchbreak or even see the 70-year-old professor running around the campus. When I came here as a graduate student I was really surprised that in this non-sport-related

scientific environment the advantageous effects of exercise are not fully recognized, or at least it is not practiced. I am “angry” with those graduate students pronouncedly, who do not incorporate training in their lifestyle, or even worse, they avoid it as much as possible.

Why, tell me, why?

At the GELIFES seminar a(nother) devastated PhD fellow walked by my poster about the beneficial effects of exercise on depression after myocardial infarction. After staring at it for long minutes he turned to me with the following question:

-Soooo... the take home message is that for depression (which at a certain point for sure hits EVERY PhD student) the solution would be doing sports?!

YES, yes and yes!

Well, I have to be honest, training will not solve the issues with your supervisor, student etc. directly. But, it switches you off, and takes you away from your headaches – at least for a short period of time. Moreover, it can help you find a solution; you may gain new perspective or even have a world changing idea. If you are stressed and anxious, training can ease that for you. If you are feeling down, 20 minutes of exercise gives you a happy shot of endorphins that no chocolate can ever give.

But even if you do not have any problems (lucky you), it is generally beneficial for your physical entity. Working a lot, sleeping only a little,

> Free up
only 30
minutes
a day <



gallons of coffee, kant-en-klaar food, biertje, biertje, biertje – just to mention a few things with which we destroy ourselves daily. If we want our body to serve us for a long time, we have to take care of it. We have to compensate for all the detrimental factors it is exposed to.

But this is not a new thing; I did not reinvent the wheel at all. So if you have already exercised, I guess I do not have to introduce you these “side effects” of training. If you are a freshman in this regard, first I would like to shock you with a sad fact, just to show you the seriousness of the topic. Your IQ is probably not as high as it could have been if you had been exercising since your childhood. However, you can still improve or at least slow the decline down, so it is never too late to start!

Okay, at least now you know that you SHOULD be more active physically, and I hope I made you feel guilty/curious/motivated/whatever enough to get you moving. But when it comes

to action, you can still come across with a pile of excuses to postpone your training a day, a week, a month, a year, a lifetime...

I have heard hundreds of excuses to skip training and I am sure you – even me – could find some new ones. I often meet people saying that they do theoretical not physical work, thus there is no need to exercise their body. Well, as far as I know, thinking is a complex neuronal activity in your brain. Without going into details, I think you can see the connection why improving the general physiological function of your body (which your brain is part of) would also enhance your intellectual performance. Another common excuse is that one does not like sports. As there are over 8000 types of sports, I truly believe that there is a sport for everyone. Just do not give up the search! I bet you did not give up when your experiment went wrong or your paper got rejected. Why would you give up in this case?! Finally, lack of time is often the main reason for being sedentary. You have to realize that you have time for whatever you really want. You do not need to be a time millionaire; free up only 30 minutes a day – and it will keep the doctor away :-).

What I basically want to say is: respect yourself, respect your body, realize that the brain you work with is a major part of it, so take care of it. Trust me, it will pay off, both physically and mentally. Now is the time to get out of your chair!

■ KATA TÓTH
MOLECULAR NEUROBIOLOGY,
GELIFES RESEARCH INSTITUTE OF
SPORT SCIENCES, UNIVERSITY OF
PHYSICAL EDUCATION (BUDAPEST)



> ORATIONS

From stamp collection to center of expertise

ORATION

F.J. van Spronsen

TITLE

From stamp collection to center of expertise (Van postzegelverzameling tot expertisecentrum)

CHAIR

Paediatrics, especially Defects in the Amino Acid Metabolism

FACULTY

Medical Sciences

DATE

September 22, 2015

Inborn errors of metabolism are diseases in which a defect in an enzyme or transporter results in substance A not being converted into substance B or is not transported. Such substances can be anything, such as sugars, fat, and protein. Parts of protein are called amino acids. The chair of Prof Francjan J van Spronsen studies the defects of amino acid metabolism.

Rare diseases are hot. European governments have recognized that rare diseases are indeed rare (frequency at most 1:2000) but in total do occur. Rare diseases are usually also complex, and diagnostics, treatment and care of patients depend on knowledge that is not easily available. Further, diagnostics and treatment are rather expensive.

Probably, in Europe the idea of expert centres was developed to give patients the possibility to know where they can be treated and cared for in the most optimal way. Expert centres (ECs) are based on a team of professionals that are responsible for the whole chain of care, from family physicians to the highest level of experience in (usually) a university hospital. An EC develops guidelines, is in contact with patient organisations, and carries out research at its own and within a consortium with other European ECs. For metabolic diseases, that implies that university medical centres will refer to each other for specific metabolic diseases such as, in Groningen, defects of amino acid metabolism, glycogen storage disease, and medium and multiple chain acyl coA Dehydrogenase deficiency. In an EC, patients are treated from birth to death and the professional in charge of caring for the patient may be chosen because he/she has the best knowledge and experience for that disease rather than having experience usually treating just children or adults.

In his inaugural lecture, van Spronsen discusses student education, considering it of importance to teach students about inborn errors of metabolism rather than 'one or two' of the more than 600 rare diseases. This way, we can also teach the students about specific parts of the metabolism that are important for other aspects of medicine, other than inborn errors of metabolism themselves.



The paediatrician of metabolic diseases will become a therapeutodiagnostic rather than a diagnostic that he used to be. Both the heel prick and new metabolic and genetic techniques makes it possible that more patients have a diagnosis. Also, the possibilities of treatment have increased largely. But, within our field, there will also be patients who may not really need as much strict treatment that was considered necessary before. We will need epigenetics and other – metabolic – techniques

to determine which patients need more treatment.

In inborn errors of metabolism, the organ most affected is the brain. Unfortunately, this also is the organ that is followed the most inadequately. Better follow-up measures – not using simple IQ alone – will be important for knowing whether we are treating our patients in the most optimal way. These diagnostics are not only needed

>> CONTINUATION OF ORATIONS

for research but also for normal care. If not used, how will we be able to validate our new treatment strategies? The combined effort of pharma and nutritional developments will be needed in order to create a new type of treatment, the nutraceuticals. Those nutraceuticals will necessitate other development tracks and regulation, which also requires nutrition and pharma companies to sit together at the same table at the same time. Therefore, collaboration contributes many aspects in the field of inborn errors of metabolism that make it so fascinating.

Shared Responsibility in a Divided Society

ORATION

F.A. Hindriks

TITLE

Shared Responsibility in a Divided Society
(Gedeelde verantwoordelijkheid in een verdeelde samenleving)

CHAIR

Ethics, Social and Political Philosophy

FACULTY

Philosophy

DATE

October 6, 2015



Summary

The participatory society (“participatiemaatschappij”) emphasizes taking individual responsibility. This emphasis is misplaced to the extent that we still live in a divided society. Opportunities for getting a job or being promoted are not equal, for instance between rich and poor and between men and women. It is problematic to emphasize individual responsibility in a partly unjust society. Someone who does not participate fully can easily be stereotyped as someone who has not taken his or her responsibility, often illegitimately so. Such stereotyping only makes it more difficult for such a person to participate. This is the paradox of the participatory society. According to this participatory paradox a call for participation can lead to exclusion, in particular when opportunities are not equal. In light of this, it is crucial that we take our shared responsibility to make our society more just. A call for participation is unproblematic only once we have taken our shared responsibility.

Brain immune physiology: radically refined

ORATION

J.D. Laman

TITLE

Brain immune physiology: radically refined

CHAIR

Immune physiology

FACULTY

Medical Sciences

DATE

October 20, 2015

Immunology is the study of the immune system, which protects us against infections by bacteria, viruses, fungi and worms. But when immune responses spiral out of control, they cause chronic diseases such as diabetes, rheumatoid arthritis, and multiple sclerosis (MS). They can even contribute to obesity and cardiovascular disease. Moreover, the immune system is essential to the process of aging. Immune responses can also be provoked by the body’s own components, physiologically, but sometimes too strongly and persistently. The ensuing inflammatory responses provoke tissue damage.

Laman’s research field is Immune Physiology, concentrating on brain and spinal cord. That also explains the title of the “oratie” (public lecture): immune responses have to be either (or consecutively) very radical, or highly refined. A pathogen killing indispensable and irreplaceable neurons cannot be tolerated. Conversely, immune response should leave nerve tissue intact, and hence some viruses take up long term habitat in such locations.

>> CONTINUATION OF ORATIONS

Research of the team focuses on supportive cell types of the brain, collectively called glia, and especially on microglia, the innate immune cells of the brain that also have many housekeeping and sentinel functions. Employing leukocytes and brain tissue of patients, including MS and Alzheimer disease, and animal models, the group dissects the subtle mechanisms of brain protection versus damage. Exciting recent studies demonstrate that microglia are involved in axonal pruning, in cognition and behaviour, and hence likely also in psychiatric disease. The team investigates how brain inflammation and microglia function are driven by external factors such as infections and bacterial components

from the gut microbiome. The rapid developments in single cell isolation, genetics, and bioinformatics are employed to dissect the biology of glia cell types.

An ultimate goal in the research is to contribute to basic understanding of microglia and astrocyte biology to support rational development of novel therapies manipulating these cell types, for which no current medication exists.

■ **EVELYN KUIPER-DRENTH, ON THE BASIS OF PRESS RELEASES BY BY THE UNIVERSITY OF GRONINGEN**



> PROMOTIONS

Characterizing postoperative cognitive dysfunction in the elderly

PHD STUDENT

I.B. Hovens

THESIS

Characterizing postoperative cognitive dysfunction in the elderly

PROMOTORS

Prof.dr. E. Heineman

Prof.dr. E.A. van der Zee

CO-PROMOTORS

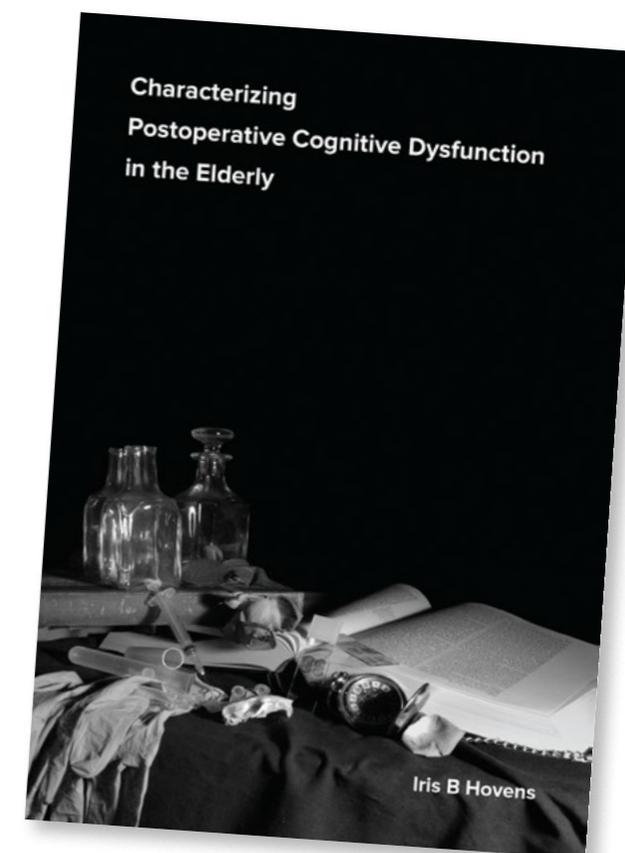
Dr. B.L. van Leeuwen

Dr. R.G. Schoemaker

FACULTY

Medical Sciences

In the Netherlands, yearly more than 400.000 elderly patients undergo surgery. An estimated ten percent of these patients develop long-lasting postoperative cognitive dysfunction (POCD), associated with a reduced quality of life, increased dependency and worse prognosis. Currently, there is no treatment for POCD. A good understanding of the underlying mechanisms of POCD is essential to develop adequate (preventive) therapies. In this thesis we investigated the hypothesis that, in parallel to a local inflammatory response, which is necessary for wound healing, an inflammatory response (neuroinflammation) occurs in the brain. This neuroinflammation disturbs sensitive brain areas of vulnerable patients, resulting in dysfunction in specific cognitive domains.



■ **COVER BY KIM TAMINÁU**

A unique rat-model for POCD was developed to study the influence of surgery on multiple brain regions and cognitive domains. We found that in healthy adult rats with a low risk for POCD minor and temporary (neuro)inflammation and cognitive impairment occur after surgery. A potential break-through in POCD research is the finding that the presence of risk factors for POCD lead to a longer-lasting and more generalized postoperative neuroinflammation and cognitive dysfunction. Such risk factors include aging, more severe surgery and prior infection. These results were translated to the

>> CONTINUATION PROMOTIONS



clinical setting with a patient study, revealing that also in surgical patients POCD in specific domains is associated with the inflammatory response to surgery.

The studies presented in this thesis promote interpretation of postoperative cognitive complaints and provide new insights into the mechanism underlying POCD, opening new avenues for therapeutic approaches.

Iris Hovens (1984) completed her bachelor studies in life science and technology and physiotherapy and her master studies in biomedical sciences at the University of Groningen. Her research took place at the Department of Surgery and Surgical Oncology at the UMCG and the Department of Neurobiology at the University of Groningen, who financed the research. Hovens will continue her career at the UMCG as a postdoctoral researcher. She was promoted on September 9, 2015.

Plasticity in daily timing of behavior: Causes and consequences

PHD STUDENT

V. van der Vinne

THESIS

Plasticity in daily timing of behavior: Causes and consequences

PROMOTORS

Prof.dr. R.A. Hut

Prof.dr. D.G.M. Beersma

FACULTY

Medical Sciences

Circadian clocks control daily rhythms in physiology and behavior and thereby allow organisms to anticipate daily changes in their environment. Although most small mammals are strictly nocturnal under standard laboratory conditions, studies in more natural environments show that substantial plasticity exists in the daily timing of behavior. Mammals

that are otherwise nocturnal choose to switch temporal niche and become diurnal in response to adverse conditions. The thesis of Vincent van der Vinne investigates the causes and consequences of that plasticity in daily timing of behavior. A literature review reveals cold and hunger as important environmental factors responsible for temporal niche switches. Based on this observation, Van der Vinne proposes the circadian thermo-energetics hypothesis, which predicts that diurnality is associated with energetic savings. Controlled laboratory studies show that mice use the plasticity of their circadian system in response to changes in their energetic state and become diurnal in response to cold and hunger. This diurnality is supported by phase advances of circadian clocks in peripheral organs but not the main clock in the suprachiasmatic nucleus. Quantification of the energy expenditure of mice shows that diurnality results in a 6-10% reduction in daily energy expenditure. Under natural conditions, these energetic benefits will have to be balanced against other consequences of temporal niche switching (e.g. predation risk). Indeed, when tested under semi-natural conditions, temporal niche switching is observed in mice when food availability and perceived predation risk are manipulated. Overall, this thesis identifies plasticity in daily timing of behavior as an adaptive response to changes in the environment.

Vincent van der Vinne (1985) defended his thesis at the University of Groningen on research he did with the Chronobiology research group of the Centre for Behaviour and Neurosciences (CBN). He currently works as a postdoc at

the University of Massachusetts Medical School. In February 2015, the article 'Timing of Examinations Affects School Performance Differently in Early and Late Chronotype' was published in the Journal of Biological Rhythms, for which Van der Vinne was the first author. He was promoted on September 18.



■ PHOTO BY ANOUK VAN DER VINNE

>> CONTINUATION PROMOTIONS

Membrane protein targeting to the outskirts of the endoplasmic reticulum: A characterization of sorting signals

PHD STUDENT

A. Kralt

THESIS

Plasticity in daily timing of behavior: Causes and consequences

PROMOTOR

Prof.dr. B. Poolman

CO-PROMOTOR

Dr. L.M. Veenhoff

FACULTY

Medical Sciences

The majority of membrane proteins synthesized in the cell is inserted into the membrane of the endoplasmic reticulum (ER). The ER forms a network that extends from the nuclear envelope (NE), a double membrane surrounding the nucleus, to the cortical ER that underlies the plasma membrane (PM). Localization of membrane proteins to their destined membrane depends on the presence of sorting motifs. We investigated the transport of membrane proteins to the inner nuclear membrane (INM) of the NE and to regions where the ER membrane and PM are closely associated. Both targeting routes rely on a sorting motif composed of basic amino acids and an intrinsically disordered (ID) region between the transmembrane domain and the basic amino acids.

To reach the INM, membrane proteins have to travel through the nuclear pore complexes (NPCs) that form selective gates between the



■ PHOTO BY CHALITA GABRIËLLE
PHOTOGRAPHY

outer nuclear membrane and INM. For the transport route that we studied, the basic amino acids interact tightly with transport factors that are able to overcome the barrier of the NPC, while the ID region allows flexibility for the transport factors to interact properly with components of the NPC. In the targeting of membrane proteins to the PM-ER junctions the transmembrane domain of the protein

remains in the ER, while the basic amino acids interact with the PM. Here, the ID region creates length to span the distance between the two membranes. For both localizations the ID region should be of sufficient length to mediate efficient targeting of the proteins.

Annemarie Kralt (1983) studied Chemistry, with a focus on Biochemistry. Her research is part of the research programme Molecular Neuroscience and Ageing Research of BCN-BRAIN. Her research was supported by funding of NWO. She was promoted on September 23.

Diagnosis and imaging of essential and other tremors

PHD STUDENT

A.M.M. van der Stouwe

THESIS

Diagnosis and imaging of essential and other tremors

PROMOTORS

Prof.dr.ir. N.M. Maurits

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

FACULTY

Medical Sciences

Everyone suffers from trembling hands from time to time, for instance, when you are nervous, such as during a speech, or after a few of cups of coffee. Some people tremble considerably more than others: they are not at all nervous, but tremble nonetheless. This can be related to several different tremor diagnoses, from the most common, essential tremor, to the most well-known, tremor in Parkinson's

disease. It is important to distinguish one type from the other, as both prognosis and treatment vary substantially. The first part of this thesis investigates tremor diagnosis, in which consultation by a neurologist including the physical examination is of primary importance. We investigated 5 typical characteristics that point to certain tremors and established that these tests differentiate the different tremor syndromes quite well. Next, we focused on muscle investigation (EMG), and found that certain advanced techniques are of additional value in diagnosis. In the second part of this thesis, the focus shifts towards the most common form of tremor, essential tremor, and how it is generated in the brain. By using a combination of simultaneously recorded muscle investigation (EMG) and brain scans (fMRI), we were able to establish increased, abnormal activity in the little brain or cerebellum and the network it is a part of. The knowledge from this thesis is of immediate additional value in daily clinical practice on the one hand, while on the other hand it adds to our understanding of essential tremor.

Madelein van der Stouwe (1988) studied Medicine at the University of Groningen. She did her research as part of an MD/PhD-track, in which study and PhD research are combined, in the Department of Neurology and the Human Movement Disorders research group at the UMCG. Her research was financed by the Junior Scientific Masterclass Groningen and the Prinses Beatrix Fonds. She now works at ANIOS Neurology in the Isala Klinieken in Zwolle. She was promoted on September 23.

>> CONTINUATION PROMOTIONS

Functional differentiation of the premotor cortex: Behavioural and brain imaging studies in humans

PHD STUDENT

A.R.E. Potgieser

THESIS

Functional differentiation of the premotor cortex: Behavioural and brain imaging studies in humans

PROMOTOR

Prof.dr. R.J.M. Groen

CO-PROMOTORS

Dr. B.M. de Jong

Dr. E.W. Hoving

FACULTY

Medical Sciences

The premotor cortex is a brain structure that is involved in the preparation of movements. It has an important role in the final integration of task-related information and to funnel this to the primary motor cortex, which subsequently causes the execution of a movement. Premotor areas can also influence motor output through their direct interactions with both the spinal cord. Within the premotor cortex, the ventral premotor cortex (PMv), dorsal premotor cortex (PMd) and supplementary motor area (SMA) can be identified. These premotor areas differ in both functional specialization and connectivity with other areas. Behavioural studies and functional and anatomical MRI studies were used to study this functional and anatomical specialization. Impairment of premotor cortex function may arise from a local lesion in the premotor cortex itself or in areas inflicting disconnection with the premotor areas. Another

cause of impaired premotor cortex function is a reduced input from deeper brain structures, which occurs in Parkinson's disease (PD). This thesis aims to focus on various aspects of premotor cortex function, particularly during writing and scaling of size.

Therefore, we conducted behavioural and functional MRI studies in healthy individuals. We showed that there is functional specialization of premotor cortex areas during different aspects of writing. Subsequently, we investigated patients with PD and patients with a tumor, in which conditions of compromised premotor cortex function are studied. Based on these studies, we made specific assumptions about premotor cortex areas.

Arnoud Potgieser (1988) studied Pharmacy and Medical Sciences at the University of Groningen.



■ PHOTO BY L.L. EENHUIS

He did his research in the Departments of Neurology and Neurosurgery at the UMCG, as part of the research institute BCN-Brain, with funding of the Junior Scientific Masterclass. Potgieser will continue his career as a doctor in the department of Neurosurgery at the UMCG. He was promoted on October 7, 2015.

Biomarkers in premanifest Huntington's disease

PHD STUDENT

J.C.H. van Oostrom

THESIS

Biomarkers in premanifest Huntington's disease

PROMOTORS

Prof.dr. K.L. Leenders

Prof.dr. R.A.C. Roos

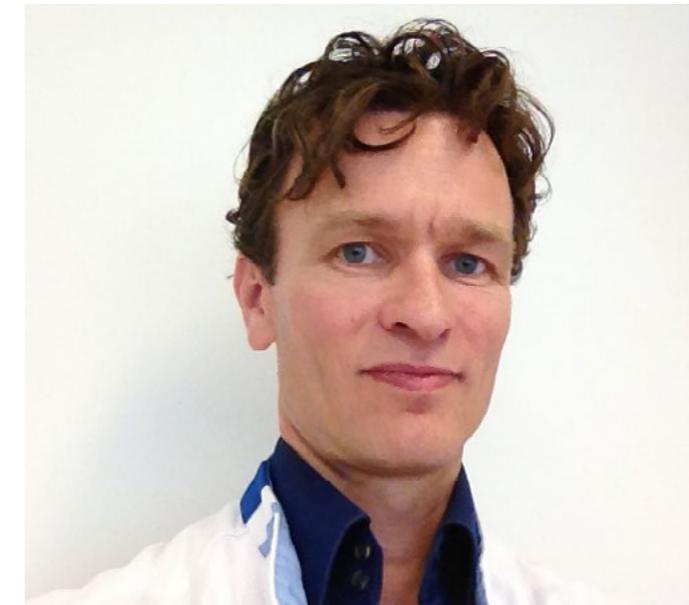
CO-PROMOTOR

Dr. B.M. de Jong

FACULTY

Arts

In persons who carry the Huntington's disease (HD) mutation, but have not fallen ill yet, we found changes in PET-scans of the brain in almost half of them. These changes increase over time. PET scanning with a glucose or dopamine receptor tracer is more sensitive to detect these changes than anatomical MRI scans, MR-spectroscopy scans, or blood testing for heat shock proteins. We conclude that in the future PET-scans may help to measure the effectiveness of preventive treatments for Huntington's disease.



Joost van Oostrom (1968) studied Medical Sciences in Maastricht and was trained as neurologist at the UMCG. He did his research in the Translational Neuroscience research programme of BCN-BRAIN, with funding from the Princess Beatrix Foundation. Van Oostrom is working as neurologist at the Rijnstate hospital in Arnhem. He was promoted on October 14, 2015.

>> CONTINUATION PROMOTIONS

Predictors and stages of very young child EFL learners' English development in China

P H D S T U D E N T

H. Sun

T H E S I S

Predictors and stages of very young child EFL learners' English development in China

P R O M O T O R

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

C O - P R O M O T O R

Dr. R.G.A. Steinkrauss

F A C U L T Y

Arts

Very young foreign language learners are increasing significantly in number worldwide. However, studies on this population are few. The current thesis focuses on Chinese preschooler's English learning in China, exploring their learning behavioural development in class (based on two case studies) and the significant predictors on their English outcomes (based on two group studies). Cutting edge statistical approaches, such as recurrence analysis and Baye's factor analysis, haven been used in the four studies. The case studies demonstrate the rich variations in terms of early English learning behaviour in class at interpersonal and intrapersonal levels. Children vary in the timing and amount of using verbal and nonverbal behaviours in English class, and such huge variation is probably related to their temperament. These findings contradict the widespread misconception in the ELL field that young children are alike and there is no need to investigate their differences. The two group

studies show that both internal factors (e.g., phonological short-term memory) and external factors (e.g., home English literacy environment) play a role in early English acquisition. Compared with internal factors, external factors (or environmental factors) are more crucial in early EFL development. English input and usage should be ample; otherwise, the benefits of early FL programs might be limited. This is in line with the argument of Usage-based Theory that language is constructed during usage events.

He Sun (1984) studied Applied Linguistics. She did her research at the Center for Language and Cognition. She was promoted on October 15, 2015.

Imaging of tumor specific antigens and microenvironment

P H D S T U D E N T

F. Galli

T H E S I S

Imaging of tumor specific antigens and microenvironment

P R O M O T O R S

Prof.dr. A. Signore

Prof.dr. R.A.J.O. Dierckx

C O - P R O M O T O R

Dr. G. Piaggio

F A C U L T Y

Medical Sciences

The events that drive tumour progression and metastatization initiate within the cancer cell itself until accumulated mutations and de-differentiation reaches an unstable stage. However, these events alone are insufficient to

maintain sustained metastasis development and growth. Host support is required to promote angiogenesis and inhibit immune response to kill cancer cells. The sum of these events is the result of the interaction between the tumour and cellular or non-cellular components that surround the cancer cells. This concept has gained more and more attention during recent years due to the possibility to develop a wide range of therapeutic strategies to target those components and pathways involved in the establishment of tumour microenvironment. However, it has been reported that cancer lesions, even within the same patient, may express different markers, thus requiring different therapeutic approaches. This strategy could be accomplished with a non-invasive tool to characterize each lesion before planning the most appropriate therapy, and ideally save money, time and reduce side-effects. In this scenario, nuclear medicine offers a wide set of potential radiopharmaceuticals to image markers expressed by both cancer cells and microenvironment allowing to plan the most appropriate therapy in each patient. In this thesis we present four different strategies to image tumour specific antigens and microenvironment focusing on cancer, the immune system and angiogenesis.

Filippo Galli (1985) studied at the Sapienza University in Rome. Hij did his research at the Center for Medical Imaging, which is part of the Research Institute BCN-BRAIN at the UMCG. The research was financed by the UMCG, AIRC (Italian Association for Cancer Research), Nu.Me.D. and Trophogen Inc. He was promoted on October 28, 2015.

Perceived fatigue and muscle fatigability in persons with multiple sclerosis

P H D S T U D E N T

R. Wolkorte

T H E S I S

Perceived fatigue and muscle fatigability in persons with multiple sclerosis

P R O M O T O R

Prof.dr. H.W.G.M. Boddeke

C O - P R O M O T O R

Dr. C.A.T. Zijdewind

F A C U L T Y

Medical Sciences

Patients with multiple sclerosis (MS) often report increased levels of perceived fatigue, which negatively influence their life. The studies in this thesis approached fatigue in MS patients from various angles. The increased fatigue in MS patients is multifactorial, thus a combination of factors is necessary to explain it. One of these factors is the fatigability of the muscle. Muscle fatigability is caused by both central and peripheral mechanisms. In MS patients the contribution of central factors is larger than in controls, and it seems to be stronger for SPMS patients than RRMS patients. This knowledge may influence future treatments. Muscle fatigability not only affects physical output, but also a concurrent cognitive task. During a dual task we found that the greater the muscle fatigability, the stronger the effect on cognitive performance, especially in MS patients. Also, a more complex bimanual task versus a simple bimanual task reduced performance of MS patients more than that of controls.

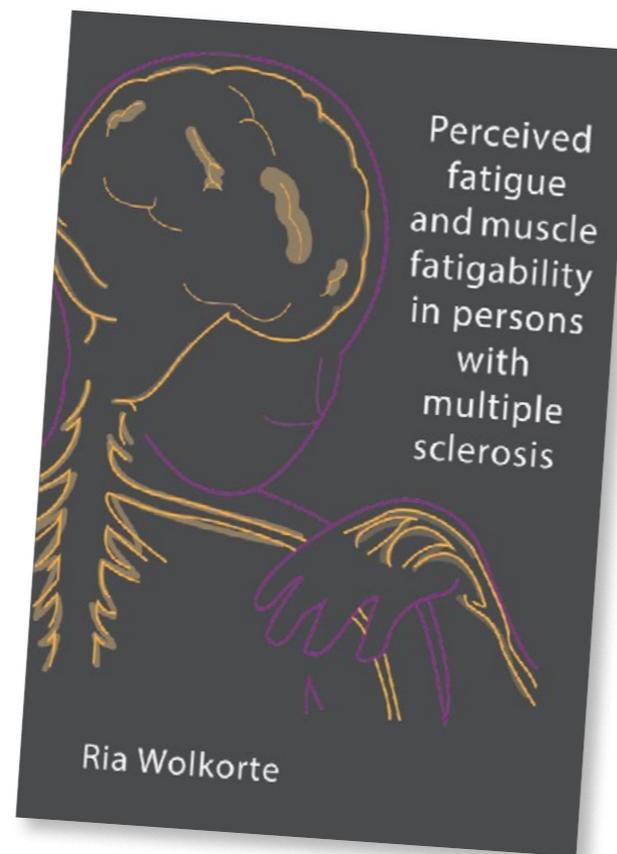
>> CONTINUATION PROMOTIONS



■ PHOTO BY MEREL BEERNINK

Furthermore, we found that dual tasks are executed differently by young and middle-aged participants. Middle-aged participants prepare less, which results in slower but more accurate responses.

Ria Wolkorte (1985) studied Human Movement Sciences at the Radboud University in Nijmegen. She did her research at the Research Institute BCN-BRAIN at the UMCG, with funding from the UMCG. She was promoted on October 28, 2015.



Safe and sound: Soundscape research in special needs care

PHD STUDENT

K.A. van den Bosch

THESIS

Safe and sound: Soundscape research in special needs care

PROMOTORS

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Prof.dr. D. Baskent

CO-PROMOTOR

Dr. T.C. Andringa

FACULTY

Medical Sciences

Better soundscapes can reduce problem behaviour

Problem behaviour in people with profound cognitive and multiple disabilities can be reduced by improving their soundscapes,

according to PhD student Kirsten van den Bosch. She has developed an app for healthcare institution personnel.

People with profound cognitive and often visual disabilities can be bothered by the sounds in their environment because they don't understand where they are coming from and what they mean. In addition, they have little or no control over the often emotional sounds made by their housemates, staff members' voices and music coming from the radio or television. This can make them feel insecure, which may negatively affect their behaviour.

Kirsten van den Bosch (1988) was promoted on October 29, 2015.

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



■ PHOTO BY TACO
OLDENBURGER

> CHEEKY PROPOSITIONS

Knuffelen laat muizen meer van het nachtleven genieten.

> Vincent van der Vinne

Schrijven leer je door te lezen.

> Iris Hovens

Kinderen bezitten het vermogen om vragen te stellen op een manier waar elke wetenschapper nog wat van zou kunnen leren.

> Annemarie Kralt

Het is de kunst om van geluidsoverlast een buurtfeestje te maken.
- Loesje

> Kirsten van den Bosch

Mijnwerkers die een kanarie meedroegen ter detectie van gevaarlijke gassen maakten al gebruik van het concept 'bio-marker'.

> Joost van Oostrom

Deadlines zijn een goede remedie voor perfectionisme.

> Ria Wolkorte

> COLOPHON

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