KU LEUVEN

Center for Excellence

Generalization in Health and Psychopathology

QUARTERLY NEWSLETTER 2016 - ISSUE 2

Dear reader,

Here we are with the latest edition of our Centre of Excellence newsletter. The last couple of months have been packed with activities, so we have a lot to report. Next to the usual overview of new publications and media outreach and the presentation of a featured paper, in the present newsletter we focus in particular on a number of initiatives for outreach and dissemination. We've had a few local high schools visiting our labs and taking part in demonstrations and experiments. More importantly, we present an exciting new initiative, instigated entirely by some of our junior members, to help bridge the perennial gap between scientists and practitioners. It is called Kaffee Kliniek (Clinical Café or Practitioner's Pub, in translation), and it involves a bi-monthly, informal gathering at which one scientist and one practitioner give a presentation on the same topic to prepare the stage for a lively discussion. Attendance is open to anyone interested, but we advertise the event in particular to clinicians and other professionals that deal with the topic at hand. The first edition focused on vaping, or the use of e-cigs, as a means to achieve tobacco harm reduction. Another recent event of importance was our annual Centre of Excellence retreat, which was not just an internal event this year. Our Scientific Advisory Board attended the retreat, listened carefully to the progress report and presentations, and provided valuable feedback on how to proceed for the final stage of the program. Finally, we saw two PhD students defend their dissertations and leave to explore new horizons. More details about all those events in the following pages. We hope you enjoy the newsletter and are eager for your feedback.

Cordially,

Tom

In this issue …

In the media

- Filip Raes on Memory Specificity, mindfulness, rumination, MOOC's.
- Omer Van den Bergh on the need of holidays.
- Bram Vervliet on anxiety after terror attacks.
- Tom Beckers on beta-blockers and anxiety.
- Ilse Van Diest on loneliness.

Publications

International Publications:

Barry, T. J., Vervliet, B. & Hermans, D. (in press). Threat-related gaze fixation and its effects on the speed and generalizability of extinction learning. *Australian Journal of Psychology*.

Beckers, T., De Houwer, J., & Dwyer, D. M. (in press). Reasoning versus association in animal cognition: Current controversies and possible ways forward. *Journal of Comparative Psychology*.

Ceunen, E., Zaman, J., Weltens, N., Sarafanova, E., Arijs, V., Vlaeyen, J., Van Oudenhove, L., & Van Diest, I. (in press). Learned fear of gastrointestinal sensations in healthy adults. *Clinical Gastroenterology and Hepatology*.

Maes, E., Boddez, Y., Alfei, J. M., Krypotos, A. M., D'Hooge, R., De Houwer, J., Beckers, T. (in press). The elusive nature of the blocking effect: 15 failures to replicate, *Journal of Experimental Psychology: General*.

Takano, K., Boddez, Y., & Raes, F. (in press). I sleep with my Mind's eye open: Cognitive arousal and overgeneralization underpin the misperception of sleep, *Journal of Behavior Therapy and Experimental Psychiatry*.

Van Oudenhove, L., Jasper, F., Walentynowicz, M., Witthöft, M., Van den Bergh, O., & Tack, J (in press). The latent structure of the functional dyspepsia symptom complex: A taxometric analysis, *Neurogastroenterology & Motility*.

Walentynowicz, M., Raes, F., Van Diest, I., & Van den Bergh, O. (in press). The specificity of health-related autobiographical memories in patients with Somatic Symptom Disorder, *Psychosomatic Medicine*.

Boyle, S., Roche, B., Dymond, S., & Hermans, D. (2016). Generalization of fear and avoidance along a semantic continuum, *Cognition & Emotion, 30,* 340-352.

Burger, A. M., Verkuil, B., Van Diest, I., Van der Does, W., Thayer, J. F., & Brosschot, J. F. (2016). The effects of transcutaneous vagus nerve stimulation on conditioned fear extinction in humans, *Neurobiology of Learning and Memory, 132*, 49-56.

Deloose, E., Vos, R., Van den Bergh, O., Van Oudenhove, L., Depoortere, I. & Tack, J. (2016). The motilin receptor agonist, erythromycin, stimulates hunger and food intake through a cholinergic pathway, *American Journal of Clinical Nutrition, 103 (3),* 730-737. doi:10.3945/ajcn.115.113456

Lu, H., Rojas, R. R., Beckers, T., & Yuille, A. (2016). A Bayesian theory of sequential causal learning and abstract transfer, *Cognitive Science, 40,* 404-439.

Meulders, A., Franssen, M., Fonteyne, R., & Vlaeyen, J. (2016). Acquisition and extinction of operant pain-related avoidance behavior using a 3 degrees-of-freedom robotic arm, *Pain, 157 (5),* 1094-1104. doi:10.1097/j.pain.0000000000000483

Zaman, J., Weltens, N., Ly, H., Struyf, D., Vlaeyen, J.W.S., Van den Bergh, O., Wiech, K., Van Oudenhove, L., Van Diest, I. (2016). Influence of interoceptive fear learning on visceral perception, *Psychosomatic Medicine, 78,* 248-258.

Chapters in Books:

Boddez, Y., De Houwer, J.n & Beckers, T. (2016). The inferential reasoning theory of causal learning: Towards a multi-proces propositional account. In M. R. Waldmann (Ed.), *The Oxford Handbook of Causal Reasoning ()*.Oxford, UK: Oxford University Press.

Posters

Fonteyne, R., Vervliet, B., & Beckers, T. (2016, March). *The loss of prediction in extinction: The 'neglected' rise of contextual anxiety*. Poster presented at the ECNP Neuroscience and Psychotherapy Meeting, Nice, France.

Zenses, A.-K., Beckers, T., Peigneux, P., & Boddez, Y. (2016, May). *The effect of sleep on fear generalization*. Poster presented at the Sleep and Cognition Event, Amsterdam, The Netherlands.

Article in focus

Title: Generalization of fear and avoidance along a semantic continuum

During the early part of the 20th century behavioural research provided a steady trickle of experiments into the generalisation of fear along both perceptual and conceptual continua which eventually petered out by the 1960's. However, a renewed interest in the generalisation of fear and safety behaviours (i.e. avoidance) along semantic continua was stimulated by a growing body of research into the "transfer" of fear and avoidance across derived stimuli, such as stimulus equivalence relations. These models of what became known as "symbolic generalisation" appeared to explain the earlier demonstrations of semantic generalization of fear. This new literature on the transfer of response functions through derived stimulus relations, was also associated with a literature on the instrumental conditioning of avoidance responses. Thus, almost 60 years after Branca (1957) demonstrated generalisation of fear between conditioned word stimuli and their synonyms, the current study revisited this paradigm to both fill in a "missing link" between research in perceptual generalisation of fear, and contribute to the growing literature on the "transfer" of fear and avoidance through derived stimulus relations, thereby bridging a gap between two traditions.

In this study, participants were first exposed to a differential fear conditioning procedure in which one word (e.g., "broth"; CS+) was followed with brief electric shock (unconditioned stimulus, US) and another was not (e.g., "assist"; CS-). Next, an instrumental conditioning phase taught avoidance in the presence the CS+ but not the CS-. During generalization testing, synonyms of the CS+ (e.g., "soup"; GCS+) and CS- (e.g., "help"; GCS-) were presented in the absence of shock. Conditioned fear and avoidance, measured via skin conductance responses, behavioural avoidance and US expectancy ratings, generalized to the semantically related, but not to the semantically unrelated, synonyms. Findings have implications for how natural language categories and concepts mediate the expansion of fear and avoidance repertoires in clinical contexts.

Reference: Boyle, S., Roche, B., Dymond, S. & Hermans, D. (2016). Generalization of fear and avoidance along a semantic continuum, *Cognition and Emotion, 30(2),* 340-352.

More info: contact Sean at Sean.Boyle.mu@gmail.com.

Center for Excellence retreat 2016

On April 25 and April 26, 2016, the fifth research retreat of the Center for Excellence (CfE) was held at the Leuven Institute for Ireland in Europe. However, this year's research retreat took a special form because it was combined with the second meeting of the scientific advisory board (SAB). Professor Dirk Hermans opened the research retreat and the SAB meeting by welcoming the present SAB members and giving a speech about the CfE's status quo. The scientific program included a presentation by each CfE cluster as well as a scientific poster session. As part of the SAB meeting, the present and the future of the CfE were first separately discussed by the SAB and CfE members before the mutual round-table discussion took place.
Highlights of the program were the SAB keynote lectures by Professor Chris Eccleston on "Exploring the 'neglected' physical senses" and by Professor Irene Tracey on "Advanced neuroimaging of acute and chronic pain mechanisms in humans". The atmosphere of the research retreat and SAB meeting was very pleasant and inspiring, which was certainly also a result of the many interactions and scientific discussions between the SAB and CfE members.

School visit

On March 22, 65 students from 'Sint-Fransiscuscollege' in Heusden-Zolder, all in their fifth or sixth year of secondary education, visited CLEP. Despite the news about the Brussels attacks and several calls from worried parents, the school decided to stay in Leuven and completed a full program. First, Professor Tom Beckers introduced the students to the topics of learning psychology and experimental psychopathology, captivating their attention by illustrating theoretical principles with fragments of the movie 'Inside Out'. In the morning, Ann-Kathrin Zenses and Anastasia Chalkia guided the students through the principles of human psychophysiological research with hands-on experience and Antoine Bilgin introduced them to animal research. They also participated in a generalization experiment of Kim Haesen and Sara Scheveneels and afterwards received a full debriefing of the design and research questions. After having lunch in the student restaurant Alma, Enya Denies from the 'Dienst Onderwijsondersteuning en Studiebegeleiding' provided the students with general information about studying psychology at our faculty. We ended the program with a 'meet-the-students session', in which the students had the opportunity to look into course materials and to meet psychology students from different specializations. Thanks to everyone who was involved in organizing the visit of the school!

KAFFEE KLINIEK

Scientist meets practitioner

Kaffee Kliniek is a new initiative to stimulate the **interaction between clinical practice and scientific research**, organized by the GGP cluster. Each Kaffee Kliniek meeting will be organized around a specific topic that is relevant for clinical practice. A researcher presents recent (clinically relevant) scientific evidence related to the topic. A clinician explains how clinical practice is organized concerning the topic. After the presentations, there is room for a discussion in which all persons present at the meeting can participate. This discussion focuses on two main questions: (1) how research about the topic can become more clinically relevant (i.e., directions for future research) and (2) how research findings can be applied in clinical practice.

On Wednesday May 11 the first edition of Kaffee Kliniek took place at PraxisP about tobacco addiction and the e-cigarette. About 25 people from different specializations were present. The majority of them were tobaccologists, but also a few policy makers and even the owner of a vape shop were present.

After a short introduction of the format by the organizers, Annemie Schoonis talked about her comprehensive experience in counseling for smoking cessation as a head nurse and tobaccologist at the University Hospital Leuven. Subsequently, Dr. Dinska Van Gucht and Professor Frank Baeyens presented a selection of their research on the e-cigarette.

After the presentations, there was room for a discussion moderated by Professor Dirk Hermans. It was a constructive discussion in which several concerns were raised by the clinicians, including long-term consequences of vaping, the continued existence of nicotine dependence, vaping at public places.
The slides of the presentations and extra literature can be found on our website.

To introduce our initiative to clinicians, Kaffee Kliniek organized a workshop (try-out) at the **VVKP studiedag** on Friday May 20. Tine Daeseleire (The Human Link) and Professor Dirk Hermans presented about the clinical practice of exposure therapy and scientific research on extinction and inhibitory learning, respectively. Kris Martens moderated the discussion, which was rather short due to time limits.

From September 2016 onwards, Kaffee Kliniek will be organized bimonthly.

We are still looking for researchers and clinicians who are willing to present at one of our meetings. Suggestions for topics are always welcome.

Interested? Have a look on our website and follow us on Facebook or Twitter!

And the winners are…

Bert Lenaert recently successfully finished his PhD. This is the summary of his research:

Generalization on the basis of prior experience is a central feature of human and non-human behavior. Generalization occurs when a stimulus elicits a change in behavior due to prior experience of a regularity in the environment that did not involve that stimulus. For instance, when a child burns his fingers by touching a hot oven, this learning experience will probably fuel the avoidance of other hot objects in the future. Although adaptive in general, anomalies in generalization can give rise to a wide array of problems, especially when it occurs excessively. For instance, after a biting incident, an individual may react fearfully to the dog that was involved, but also to other, more or less similar dogs, or even to seeing a dog on television, which obviously represents no imminent threat. In such cases, the generalization of fear responses to different stimuli and situations may increasingly compromise daily functioning. Interestingly, elevated levels of generalization have been shown in individuals suffering from an anxiety disorder.

Understanding generalization and its potential maladaptive consequences requires the identification of the underlying mechanisms that influence the extent to which behavior expands to novel stimuli and situations. In this doctoral dissertation, generalization was investigated from a memory perspective. The main focus was on working memory on the one hand, referring to a limited capacity system that provides the temporary storage and manipulation of information that is necessary for performing a wide range of complex tasks, and on autobiographical memory on the other hand, referring to our memory for personally experienced events. With respect to working memory, we found that individuals who are less capable of excluding irrelevant, distracting information from access to working memory showed higher levels of generalization. This may indicate that poor working memory is associated with higher and potentially maladaptive levels of generalization. With respect to autobiographical memory, we found evidence – although not consistently – for higher levels of generalization in individuals who have difficulty retrieving the specific details of personally experienced events from memory. Taken together, we showed that our behavior in novel situations similar to past experience is influenced by the quality and capacity of memory function.

In a second line of research, we set out to investigate whether elevated levels of generalization found in different anxiety disorders should be regarded as antecedents or consequents of anxiety pathology (i.e., vulnerability factor or diagnostic marker). This is an important question because, if elevated levels of generalization put an individual at risk of developing anxiety complaints in the future, screening for individual differences in generalization may foster prediction of anxiety disorders, paving the way for targeted prevention. In a longitudinal study conducted in a large student sample, we found that elevated levels of generalization predicted subclinical levels of anxiety complaints six months later.

Finally, this dissertation also looked at some more or less closely related topics: the recognition of human faces and the conditions that determine when recognition errors occur; the influence of attentional control on diurnal cortisol secretion after exposure to a prolonged psychosocial stressor; and, the implications of null findings in research on anxiety and other mental disorders, which are more often than not characterized by multi-factorial causal complexity.

You can read the dissertation here and contact Bert at bert.lenaert@kuleuven.be.

And last but not least…

Tom Barry also recently successfully finished his PhD. This is the summary of his research:

Models of exposure therapy, the gold standard cognitive-behavioural treatment (CBT) for anxiety disorders, suggest that attention may play an important role in the learning that takes place during treatment, and that this may influence the success of treatment. Treatment requires that people generalize what they learn, to other situations that involve stimuli or situations which previously evoked anxiety. This thesis examines the role of attention in the generalization of this learning in experimental and clinical settings.

First, we review current evidence regarding attention and treatment outcomes following CBT for anxiety disorders. We then present several investigations using experimental models of treatment for anxiety disorders. We explore how individual differences in the focus of attention during treatment, or *extinction* as it is known experimentally, can influence the extent to which fear returns after extinction. In these investigations we assess attention in a number of ways: first, using a questionnaire that measures self-reported differences in how easy it is for people to focus their attention; second, by directly assessing where people look during extinction using eye-tracking technology. Next, we explore whether it is possible to reduce return of fear after extinction by manipulating the focus of attention during extinction. To do this, we ask participants questions about the stimuli they're exposed to, in the same way that a therapist might.

We then turn to the clinic and our investigation of whether individual differences in the focus of attention measured prior to treatment can predict a person's response to treatment for their anxiety disorder. We found that people who have a tendency to engage their attention toward threatening stimuli in an experimental procedure administered before treatment, also responded better to CBT for anxiety disorders. We then present the case for further research in the area of predicting outcomes following CBT for anxiety disorders by using performance in experimental procedures like those presented in this thesis. Then, we present a review of the latest evidence concerning pharmaceutical methods for modifying the way that the brain learns during CBT, to influence the network of neural regions associated with attention and memory. Finally, we integrate the findings from the investigations within this thesis and consider how they might inform our understanding of anxiety disorders and their treatment as well as what we can learn in terms of enhancing treatment.

You can read the dissertation here and contact Tom at tom.barry@kuleuven.be.

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