Editorial to the special issue *Neuronus*

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Did you visit the *Neuronus* conferences in the years 2012 and 2013 in Kraków? If not, then you certainly should have a close examination of this special issue including this introduction to at least have a glimpse of an idea of the highly interesting topics in the field of cognitive neuroscience that were presented at these conferences. If you were there, it is for sure a good choice to focus on this special issue as well, first to refresh your minds (we know our memories are far from perfect), but especially to see what happened with research of the presenters at these conferences.

The *Neuronus* conference is traditionally situated in the beautiful town of Kraków in the south of Poland and is hosted at the Jagiellonian University. The organizers of this conference have a very good feeling for inviting interesting speakers, as you can see below. The conference is especially meant for students and young researchers in this highly interdisciplinary field but the conference is also well visited by older researchers. *Neuronus* has been supported by both the International Brain Research Organization (IBRO) and the International Research Universities Network (IRUN), a consortium of European universities founded by the Radboud University from Nijmegen in the Netherlands. In the last two years several hundreds of people participated in the conferences, and not only about 120 talks, but also approximately 135 posters were presented. As a consequence, the research reported in this special issue represents only a small part of the highly interesting materials presented at these meetings.

During the conference in 2012, it was announced that there would be a possibility of contributing to a special issue related to this meeting. It was indicated that this issue would be published in the journal *Advances in Cognitive Psychology* (another special issue devoted to a precursor of this conference appeared in the *International Journal of Psychophysiology*, Volume 85, Issue 1). After the conference, it appeared that 10 authors in total were able to submit their papers before the final deadline. After a rigorous reviewing procedure, four papers could finally be accepted for publication. Having attended to the memorial session devoted to Adolf Beck in 2013, we additionally decided to invite the contributors to submit a paper covering the major issues in this session, which after being submitted to a review procedure could be added as final paper of this special issue. Before shortly focusing on the contents of the papers in this special issue, we decided to inform you on some of the other very interesting contributions to these conferences, of which related materials were published in several journals.

In a plenary lecture on Friday the 20th of April 2012, Kenneth Hugdahl from the University of Bergen, Norway, informed us on a basic paradigm that he has been using for many years, which is based on an auditory laterality effect. Namely, when employing a dichotic listening task with different verbal stimuli simultaneously presented to both ears, the common observation is that the proportion of correct responses for stimuli presented to the right ear is higher as compared to the left. This effect is known as the *right ear advantage* and appears to be a robust indicator of a left hemispheric specialization for speech.

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perception. In the same year, Hugdahl and colleagues (2012) published a paper in which the common right ear advantage was used in a more applied setting. Namely, they employed their paradigm to check the hypothesis that auditory verbal hallucinations can best be described as deviant speech perception. They argued that a consequence of these hallucinations would be that they also interfere with the processing of speech. This might show up in reduced sensitivity to external speech sounds when presented to the right ear, but not when presented to the left ear. Indeed, acquired hallucination scores correlated with correct responses with verbal stimuli presented to the right ear but not when presented to the left ear. Specifically, a higher hallucination score showed a reduction in correct responses for right ear stimuli. These findings support the idea that auditory verbal hallucinations can best be viewed as aberrant speech perception due to a malfunction of language areas in the left hemisphere.

In the cognitive session on Saturday the 21st of April, 2012, Mateusz Gola informed us on the observation that the EEG (electroencephalographic) beta band may be indicative of top-down attention. This issue was further detailed in a recent paper by Gola and colleagues (Gola, Magnuski, Szumska, & Wróbel, 2013). Although the EEG beta band is mostly related to motoric processes, as beta power decreases while preparing and executing voluntary movements, motor behavior is often accompanied with attentional processes. As a consequence, it may be the case that the observed activity is related to attentional rather than motor processes. As several studies reported that performance on attentional tasks is deteriorated in elderly, this might also show up in changes in posterior beta power. In an earlier study by Gola and colleagues (Gola, Kaminski, Brzezicka, & Wróbel, 2012), it was observed that lower beta band power over occipital sites in elderly was accompanied with decreased performance, but these results might possibly be due to the use of different strategies. In the recent 2013 paper, these issues were controlled for by using an adaptive procedure that enabled maintaining a similar level of performance for different age groups. The elderly group was further separated in a group with high and low performance. Interestingly, when comparing EEG activity between correct trials and trials without responses, it was observed that power in the beta band was higher for correct trials for the young and high performing elderly group, but not for the elderly group with low performance. These observations suggest that high beta power is indicative of good attentive performance, but also that elderly participants with low performance may have deficits in the underlying processes.

During the cognitive session on hemispheric asymmetry of language and vision on the 20th of April, 2012, Marcin Szwed presented evidence for cortical changes induced by the acquisition of reading skills (for a related publication, see Szwed, Ventura, Ouerdo, Cohen, & Dehaene, 2012). He showed that observation of normal words compared to scrambled words was associated with higher activity in the visual word form area (VWFA), which is located in the left ventral occipito-temporal cortex. Interestingly, comparing intact letters with degraded letters also resulted in higher bilateral activity in early visual areas including V1, V2, V3, and V4. This pattern of activation seems specific for observing orthographic materials as it was not detected in control conditions in which objects consisting of line drawings were compared with scrambled objects. Szwed suggested that the letter-specific effect in early visual areas stems from perceptual learning of the specific shapes comprising the alphabet, as we all have to read fluently and fast in nowadays societies. During the next Neuronomus conference in 2013, Szwed gave us an update on his previous talk, by describing the results obtained from two epileptic patients with electrodes implanted in the VWFA. The neurons within VWFA were found to respond 10 times stronger to letter stimuli than to other visual stimuli like landscapes, objects, or faces. These results further confirm the view that acquiring a highly specific skill like reading has a major impact on the development of specific brain areas like the VWFA.

In 2013, a plenary lecture on Friday the 10th of May, was given by Adrian Owen on disorders of consciousness. In this talk, he focused on circumstances in which neuroimaging data can be used to infer consciousness in the absence of behavioral responses. In a paper by Fernández-Espejo et al. (2012), coauthored by Owen, interest was focused on the possible relation between changes in functional and structural connectivity in patients with disorders of consciousness. Research focusing on functional connectivity within cortico-cortical and thalamo-cortical areas of the default mode network shows reduced connectivity for patients in a vegetative state as compared with patients in a minimally conscious state, which might be related to structural changes. The latter issue was explored by using diffusion tensor imaging (DTI) analysis to assess the structural integrity of the default mode network. A large group of patients from several hospitals was examined, including patients classified as being vegetative or being in a minimally conscious state. By employing DTI, it was possible to reconstruct the thalamo-cortical and cortico-cortical pathways connecting the major parts of the default mode network. It was observed that patients with consciousness disorders showed a clear impairment in these pathways relative to age-matched controls. Most interestingly, it was also observed that severity of the consciousness disorder correlated with the impairment of the structural connections. These findings additionally mark the crucial role of the default mode network for the emergence of awareness. Furthermore, these findings suggest that reduced structural connectivity is likely to be related to a loss in functional connectivity.

Two other highly interesting plenary lectures were presented on Saturday the 11th of May, 2013. Peter Hagoort focused on data supporting the Memory, Unification, and Control (MUC) model as a neurobiological model of language. In a recent paper, Hagoort (2013) argued that this model overcomes the limitations of the old Wernicke-Lichtheim-Geschwind model, which assumes a strict division between frontal and temporal regions in language production and language comprehension, respectively. For example, one major problem of this old model is that damage in frontal areas not only deteriorates language production but also impairs language comprehension. The MUC model distinguishes a memory component in temporal cortex, and the angular gyrus in parietal cortex that encompasses the knowledge representations that store information including phonological word forms, morphological information, and syntactic templates associated with nouns, verbs, and adjectives, and also so-called semantic...
and beta bands. With regard to schizophrenia, a reduction in gamma areas, which might involve lower frequencies within the theta, alpha, and beta bands. Furthermore, some effects were observed on the LPS that were not visible in the commonly employed analyses, or right attended locations by focusing on so-called lateralized power spectra (LPS), which can be computed by using wavelet analyses. It was revealed that commonly observed lateralized components in the cue-target interval were accompanied with lateralized changes in the theta, alpha, and beta bands. Furthermore, some effects were observed on the LPS that were not visible in the commonly employed analyses, which seemed related to either inter-individual differences or intertrial fluctuations. In the fourth paper of this special issue, Strykowiec and Szczepanowski (2013) used reaction time distributions to examine whether the position-based stimulus response correspondence (SRC) effect, the classical Simon effect, and the motion-based SRC effect are likely to either or not have a common origin. On the basis of results of four experiments it was concluded that these phenomena are likely to be due to different underlying mechanisms as the position-based SRC effect showed a reduction for slower responses while the motion-based effect showed an increased effect for slower responses. In the fifth and final paper of this special issue, Coenen and Zayachkivska (2013) directed our attention back in the 19th century to Adolf Beck (1863–1942), who seemed forgotten for some time but actually can be considered as...
one of the founders of electroencephalography together with Richard Caton (1842-1926) and Hans Berger (1873-1941).

In conclusion, the recent Neuronus meetings in Kraków in 2012 and 2013 showed highly interesting talks on a variety of topics. With regard to the forthcoming issue in 2014, it can be assured that the organizers will again do their best to provide us with highly interesting plenary lectures, talks, and posters, and we would like to invite you to the next meeting in 2014 that will take place from 25th to 27th of April in Kraków. For more details and updates, see http://neuronusforum.pl

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