EEG averaging. The cardiac-field artifact was minimized using independent component analysis and current-source density. Behaviorally, the depressed sample showed less accurate heartbeat perception in comparison to the control group ($p = .011$). The two groups also demonstrated psychophysiological differences, showing that heartbeat-evoked potentials were significantly reduced in depressed patients. Our results suggest that heartbeat evoked potentials are objective markers of altered bodily awareness. Reduced interoception during depression may be linked to alexithymia, as well as to both decreased capacity for decision-making and for cognitive processing. It may be helpful to practice interoceptive awareness to improve depressive symptoms, for example by practicing meditation.

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Stress and the expression of dissociative symptoms in neurodevelopmental and neuropsychiatric disorders

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Dissociative symptoms, including depersonalisation and derealisation, are associated with stress: in some conditions notably postraumatic stress disorder, borderline personality disorder and deliberate self harm, dissociative symptoms are linked to previous traumatic experience and re-exposure to psychological stressors. We are increasingly finding an overexpression of dissociative symptoms not only in conjunction with certain types of epilepsy, but also in autism spectrum conditions, attention deficit hyperactivity disorder and Tourette syndrome. We argue that the expression of dissociative symptoms in these neuropsychiatric and neurodevelopmental disorders relates to underlying characteristics of psychopathology and psychophysiology. These observations reveal mechanisms of relevance to potential biobehavioural interventions, including autonomic biofeedback. At a neurobiological level, we have also combined functional neuroimaging (with fMRI) and virtual reality to examine functional neural substrates of dissociation through the proxy of "disengagement" while immersed in a virtual environment. These studies suggest a role for insula, cingulate and precuneus in dissociative experience. A psychophysiological model is proposed to account for stress-induced psychological detachment, grounded on predictive interoceptive control.

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Symposium B: The music of language: Neural basis of prosody perception
Symposium Chair: Valéria Csépe (Hungary) and Claudia Männel (Germany)

Are superfluous prosodic breaks harder to process than missing ones? ERP data on auditory sentence comprehension

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Prosody, consisting of intonation, rhythm, and pauses in language, can help listeners understand sentences. Prosodic breaks (PBs) consist of a pause in a sentence, preceded by lengthening of the preceding word and a specific intonation on that word. Although neuroimaging research on the role of prosody is relatively scarce, a few ERP studies have shown that listeners can take a prosodic break as an indication of a syntactic break in a sentence, that is, the position where a new syntactic constituent starts (e.g., Bögels et al., 2010; 2011; Steinhauer et al., 1999). Conversely, the absence of a prosodic break potentially indicates continuation of the syntactic constituent. The present ERP study investigates whether a superfluous prosodic break (i.e., a prosodic break not coinciding with a syntactic break, as in (1)) is more difficult to process during auditory sentence comprehension than a missing prosodic break (i.e., the absence of a prosodic break at the position of a syntactic break, as in (2)). A prosodic break is indicated by #.

1. The traveller followed the carrier # and the guide through the area. [SUPERFLUOUS] 2. The traveller followed the carrier and the guide talked about the area. [MISSING] 3. The traveller followed the carrier and the guide through the area. [MATCH] 4. The traveller followed the carrier # and the guide talked about the area. [MATCH] Participants listened to temporarily ambiguous sentences involving a prosody–syntax match (as in (3) and (4)) or mismatch (as in (1) and (2)) while their EEG was measured. In (1) a superfluous prosodic break is present in the middle of a syntactic constituent (the carrier and the guide), whereas in (2) a prosodic break is missing before the start of a new sentence (and the guide…). We looked at ERPs time-locked to the disambiguation of these sentences. In the present experiment, the sentences were always disambiguated by a word (through in (1) and talked in (2)). This contrasts with a related study by Pauker et al. (2011), in which sentences with missing prosodic breaks were disambiguated by a word, whereas sentences with superfluous prosodic breaks were disambiguated by prosody. We found different results for the first and the second half of the experiment, showing that the way listeners use prosody can change over time. This bears consequences for future studies. In the first half of the experiment, listeners showed processing problems, in the form of a P600-like effect, for sentences with a prosody–syntax mismatch as compared to a match (see figure). The processing problems were stronger and longer-lasting for superfluous prosodic breaks (top part) than for missing prosodic breaks (bottom part). These results converge with those of Pauker et al. (2011) and extend them, showing that this pattern holds when the sentences are always disambiguated by a word. In conclusion, the revision or repair involved in processing sentences with superfluous prosodic breaks appears to be more costly than that involved in sentences with missing prosodic breaks. We argue that this can be either a prosodic revision (i.e., mentally deleting or inserting a prosodic break in retrospect) or it could be a syntactic or more conceptual revision.

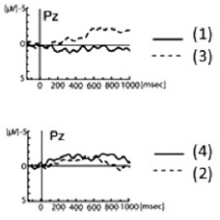

Figure. ERPs for sentences (1) to (4), time-locked to the critical word (in bold).

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ERP of prosody and syntax interaction in embedded sentences

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