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**Dissertations-Kurzfassung**

**Neurofeedback Treatment in Attention Deficit Hyperactivity  
Disorder and Comorbid Aggression**

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The present thesis focused on specificity and long-term effects of slow-cortical potential neurofeedback (SCP-NF) treatment for children with ADHD in a large multicenter randomized controlled trial, on its relation to aggressive behaviors as a common comorbidity of ADHD, and on neuroimaging and psychophysiological subtypes of aggression. We assessed clinical efficacy on ADHD and comorbid aggression in comparison to a semi-active control group which controlled for unspecific effects. The role of self-regulation and learning of SCPs was systematically evaluated. Additionally, we investigated amygdala-specific activity in aggression subtypes in a large multicenter cohort, which might provide a possible putative NF target.

The first two studies assessed 150 children aged 7–9 years diagnosed with ADHD which were randomized to 25 sessions of feedback of SCPs (NF) or feedback of coordination of the supraspinatus muscles (EMG). The primary outcome was the change in ADHD symptoms rated by parents four weeks and six-month after treatment end. Slow-cortical potential neurofeedback showed significant superiority over the semi-active control condition with medium effect sizes four weeks after treatment. This superiority of SCP-NF over the semi-active control group became non-significant 6 months after treatment end. However, taking together all assessments, SCP-NF showed a stable improvement with large effect sizes following treatment and EMG-BF showed worsening of symptoms one month after treatment, with subsequent remission at follow-up, leading to non-significant group differences six months after treatment end. Assessment of self-regulation showed significant ability to self-regulate slow-cortical potential when direct feedback is given and improvement of self-regulation skills indicate specificity of SCP-NF for selected subscales after training, but not at follow-up. In sum, these findings suggest shared specific and unspecific effects contributing to this clinical outcome.

The third study aimed to disentangle aggression-related subtypes at a neural level. In total 177 participants (n=108 cases with aggression-related disorders and n= 69 typically developing peers), aged 8-18 years were assessed across nine sites in Europa during a well-established emotional face-matching fMRI task. Additionally, simultaneous skin conductance recordings were acquired in a subsample (n=64). Children and adolescents with aggression-related problems showed higher amygdala activity in response to negative faces compared to typically developing peers. Further, we showed distinct amygdala activity for subtypes of aggression. Callous-unemotional traits showed to moderate both central (amygdala) and peripheral (SC) responses. These findings increase insights which could be used for personalized diagnostics and treatments.