



***Developmentally Disconnected:  
Evidence-Based Tools for  
Transforming Social  
Competence***  
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**Update**

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# Neurobiofeedback and ADHD

**“One hundred four children were randomly assigned to receive neurofeedback, CT, or a control condition and were evaluated 6 months postintervention. A 3-point growth model assessed change over time across the conditions on the Conners 3–Parent Assessment Report (Conners 3-P), the Behavior Rating Inventory of Executive Function Parent Form (BRIEF), and a systematic double-blinded classroom observation (Behavioral Observation of Students in Schools). Analysis of variance assessed community-initiated changes in stimulant medication.**

**RESULTS: Parent response rates were 90% at the 6-month follow-up. Six months postintervention, neurofeedback participants maintained significant gains on Conners 3-P (Inattention effect size [ES] = 0.34, Executive Functioning ES = 0.25, Hyperactivity/Impulsivity ES = 0.23) and BRIEF subscales including the Global Executive Composite (ES = 0.31), which remained significantly greater than gains found among children in CT and control conditions...”**

# Neurobiofeedback and ADHD

**“...Children in the CT condition showed delayed improvement over immediate postintervention ratings only on Conners 3-P Executive Functioning (ES = 0.18) and 2 BRIEF subscales. At the 6-month follow-up, neurofeedback participants maintained the same stimulant medication dosage, whereas participants in both CT and control conditions showed statistically and clinically significant increases (9 mg [ $P = .002$ ] and 13 mg [ $P < .001$ ], respectively).**

**CONCLUSIONS: Neurofeedback participants made more prompt and greater improvements in ADHD symptoms, which were sustained at the 6-month follow-up, than did CT participants or those in the control group. This finding suggests that neurofeedback is a promising attention training treatment for children with ADHD.**

# Reference

**Steiner, J.N., et al. (February 17, 2014). In-School Neurofeedback Training for ADHD: Sustained Improvements From a Randomized Control Trial. Pediatrics. DOI: 10.1542/peds.2013-2059.**

# Amygdala Abnormality in AD/HD

**“Higher EL (emotional lability, sic) ratings were associated with greater positive iFC (intrinsic functional connectivity, sic) between the amygdala and rostral anterior cingulate cortex in youth with ADHD. EL scores were also negatively associated with iFC between bilateral amygdala and posterior insula/superior temporal gyrus. Patterns of amygdala-cortical iFC in ADHD participants with low EL were not different from the comparison group, and the effect sizes for these comparisons were smaller than those for the trend-level differences observed between the high-EL and TDC (typical developing children, sic.) groups...”**

# Amygdala Abnormality in AD/HD

**“... In children with ADHD and a range of EL, deficits in emotion regulation were associated with altered amygdala–cortical iFC. When comparing groups that differed on ADHD status but not EL, differences in amygdala iFC were small and nonsignificant, highlighting the specificity of this finding to emotional deficits, independent of other ADHD symptoms” (P. 351).**

# Reference

**Hulvershorn, L.A., et al. (March, 2014).  
Abnormal Amygdala Functional Connectivity  
Associated With Emotional Lability in  
Children With Attention-Deficit/Hyperactivity  
Disorder. Journal of the American Academy  
of Child and Adolescent Psychiatry, 53(3),  
351-361. DOI: 10.1016/j.jaac.2013.11.012**

# AD/HD and Obesity

**“Child CD (conduct disorder, sic.) symptoms associated with indices of adolescent obesity. Reduced physically active play in childhood predicted adolescent inattention... Childhood ADHD and CD symptoms were linked with physical inactivity in adolescence..., but not binge eating. Physical inactivity mediated the associations...Children with ADHD or CD symptoms are at increased risk for becoming obese and physically inactive adolescents. Physical activity may be beneficial for both behavior problems and obesity”.**

# Reference

**Khalife, N., et al (February 3, 2014). Childhood Attention-Deficit/Hyperactivity Disorder Symptoms Are Risk Factors for Obesity and Physical Inactivity in Adolescence. Journal of the American Academy of Child and Adolescent Psychiatry. Available Online at: <http://www.journals.elsevier.com/journal-of-the-american-academy-of-child-and-adolescent-psychiatry/recent-articles/>.**

# Percent of Military with AD/HD

**“Estimated 30-day prevalence was 15.0% for any internalizing disorder, 18.4% for any externalizing disorder, and 25.1% for any disorder . The most prevalent disorders were IED (intermittent explosive disorder, sic.)(11.2%), PTSD (8.6%), and ADHD (7.0%), with other disorders much less common (3.3%-5.7%)...However, knowledge that new recruits have high externalizing disorder rates (even if denied in recruitment interviews) might be useful to the Army in developing targeted outreach-intervention programs for new soldiers such as interventions for ADHD and for problems with anger management.”**

# Reference

**Kessler, R.C., et al. (March 3, 2014). Thirty-Day Prevalence of *DSM-IV* Mental Disorders Among Nondeployed Soldiers in the US Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry. DOI: 10.1001/jamapsychiatry.2014.28.**

# AD/HD and Childhood Abuse

**“There were 7 times higher odds of ADD/ADHD among those who reported they had been abused after controlling for several potential mediating factors, including age, race, gender, and 3 other types of adverse childhood experiences (parental divorce, parental addictions, and long-term parental unemployment) in comparison to those who were not abused. The results of this analysis show a strong link between childhood abuse and ADD/ADHD, an association that requires further study. (p. 188).”**

# Reference

**Fuller-Thomson, et al. (March 3, 2014).  
Establishing a Link Between Attention Deficit  
Disorder/Attention Deficit Hyperactivity  
Disorder and Childhood Physical Abuse. Journal  
of Aggression, Maltreatment & Trauma, 23(2),  
188-198. DOI: 10.1080/10926771.2014.873510.**

# Acetaminophen (Tylenol) & ADHD

**“Maternal acetaminophen use during pregnancy is associated with a higher risk for HKDs and ADHD-like behaviors in children. Because the exposure and outcome are frequent, these results are of public health relevance but further investigations are needed.”**

**Liew, Z. (February 24, 2014). Acetaminophen Use During Pregnancy, Behavioral Problems, and Hyperkinetic Disorders. JAMA Pediatrics. DOI: 10.1001/jamapediatrics.2013.4914. [Epub ahead of print]**

# Parental Smoking and AD/HD

**“Using a mouse model we show that prenatal nicotine exposure produces hyperactivity, selective decreases in cingulate cortical volume, and radial thickness, as well as decreased dopamine turnover in the frontal cortex. The hyperactivity occurs in both male and female offspring and peaks during the “active” or dark phase of the light/dark cycle. These features of the mouse model closely parallel the human ADHD phenotype, whether or not the ADHD is associated with prenatal nicotine exposure. A single oral, but not intraperitoneal, administration of a therapeutic equivalent dose (0.75 mg/kg) of methylphenidate decreases the...”**

# Parental Smoking and AD/HD

**“... hyperactivity and increases the dopamine turnover in the frontal cortex of the prenatally nicotine exposed mice, once again paralleling the therapeutic effects of this compound in ADHD subjects. Collectively, our data suggest that the prenatal nicotine exposure mouse model has striking parallels to the ADHD phenotype not only in behavioral, neuroanatomical, and neurochemical features, but also with respect to responsiveness of the behavioral phenotype to methylphenidate treatment. The behavioral, neurochemical, and anatomical biomarkers in the mouse model could be valuable for evaluating new therapies for ADHD and mechanistic investigations into its etiology” (P. 9410).**

# Reference

**Zhu, J., et al. (July 4, 2012). Prenatal Nicotine Exposure Mouse Model Showing Hyperactivity, Reduced Cingulate Cortex Volume, Reduced Dopamine Turnover, and Responsiveness to Oral Methylphenidate Treatment . Journal of Neuroscience, 32(27), 9410-9418. DOI: 10.1523/JNEUROSCI.1041-12.2012.**

# Grandparent Smoking and AD/HD

**“Recent evidence suggests that environmental influences on the brain and behavior may be transmitted from one generation to the next. We used a prenatal nicotine exposure (PNE) mouse model of ADHD to test the hypothesis that PNE-induced hyperactivity, a proxy for human ADHD phenotype, is transmitted from one generation to the next. Our data reveal transgenerational transmission of PNE-induced hyperactivity in mice via the maternal but not the paternal line of descent. We suggest that transgenerational transmission is a plausible mechanism for propagation of environmentally induced ADHD phenotypes in the population (p. 2768).**

# Reference

**Zhu, J., et al. (February 19, 2014).  
Transgenerational Transmission of  
Hyperactivity in a Mouse Model of ADHD.  
Journal of Neuroscience, 34(8), 2768-2773.  
DOI: 10.1523/JNEUROSCI.4402-13.2014**

# Proper Dosing of Medication and Behavioral Treatments with ADHD Children

**“Results illustrate the importance of taking dosage/intensity into account when evaluating combined treatments; there were no benefits of combined treatments when the dosage of either treatment was high but combination of the low-dose treatments produced substantial incremental improvement over unimodal treatment.**

Pelham, W.E., et al. (January, 2014). A Dose-Ranging Study of Behavioral and Pharmacological Treatment in Social Settings for Children with ADHD. Journal of Abnormal Child Psychology. DOI: 10.1007/s10802-013-9843-8.