

# Dyslexia & Background Noise

**“We examined whether the characteristic impairments of dyslexia are due to a deficit in excluding external noise or a deficit in taking advantage of repeated stimulus presentation...The poor readers had higher thresholds than non-impaired readers in the presence of high external noise, but not in the absence of external noise. The results support the hypothesis that an external noise exclusion deficit, not a perceptual anchoring deficit, impairs reading for adults”.**

**Beattie RL, Lu Z-L, Manis FR (2011) Dyslexic Adults Can Learn from Repeated Stimulus Presentation but Have Difficulties in Excluding External Noise. PLoS ONE 6(11): e27893. doi:10.1371/journal.pone.0027893.**

# Dyslexia & Phonemic/Auditory Processing

**Dyslexics appear to have difficulty in “auditory sampling, the initial stage of processing the sound rhythms of phonemes in the left hemisphere. Researchers found that dyslexics have a reduced bias for phonological processing in the left hemisphere. The researchers continued, “This deficit correlates with measures of phonological processing and rapid naming. We further observed enhanced cortical entrainment at rates beyond 40 Hz in dyslexics and show that this particularity is associated with a verbal memory deficit. These data suggest that a single auditory anomaly, i.e., phonemic oversampling in left auditory cortex, accounts for three main facets of the linguistic deficit in dyslexia”. (p. 1080)**

**Lehongre, K., Ramus, F., Villiermet, N., Schwartz, D., Giraud, A-L. (December 22, 2011). Altered Low-Gamma Sampling in Auditory Cortex Accounts for the Three Main Facets of Dyslexia, Neuron, 72(6), 1080-1090.**

# ADHD & Tryptophan

**Tryptophan uses the same transport systems in both fibroblasts and at the blood brain barrier (BBB). Hence, a decreased transport capacity of tryptophan implies that less tryptophan is being transported across the BBB in the ADHD group. This could lead to deficient serotonin access in the brain that might cause disturbances in both the serotonergic and the catecholaminergic neurotransmitter systems, since these systems are highly interconnected.**

**Johansson et al. (2011). Altered Tryptophan and Alanine Transport in Fibroblasts From Boys with Attention-Deficit/Hyperactivity Disorder (ADHD): An in Vitro Study. Behavioral and Brain Functions, 7(40), 1-7. From Website: <http://www.behavioralandbrainfunctions.com/content/7/1/40> .**

# ADHD & Amygdala/Frontal Lobe

**“Our findings demonstrate that in adolescents with ADHD, a neural substrate of fear processing is atypical, as is the connectivity between the amygdala and LPFC (lateral prefrontal cortex, sic.). These findings suggest possible neural substrates for the emotional reactivity that is often present in youths with ADHD, and provide putative neural targets for the development of novel therapeutic interventions for this condition”. (p. 828)**

**Posner, J. Nagel, B.J., Maia, T.V., Oh, M., Wang, Z., and Peterson, B.S. (August 2011). Journal of the American Academy of Child & Adolescent Psychiatry, 50(8), 828-837.**

# ADHD Girls and Boys in Social Interaction

**“Although boys and girls with ADHD experienced difficulties in all areas, girls with ADHD, especially the inattentive subtype, were more negatively affected in academics and peer relationships. Inattentive girls were less popular and more likely to be bullied than girls without ADHD, whereas inattentive boys were not. The social isolation experienced by many girls with ADHD deserves greater attention”. (p. 532)**

**Elkins, I.J., Malone, S., Keves, M., Lacono, W.G., and McGue, M., (2011). The Impact of Attention-Deficit/Hyperactivity Disorder on Preadolescent Adjustment May Be Greater for Girls Than Boys. Journal of Clinical Child and Adolescent Psychology, 40(4), 532-545.**

# AD/HD and Developmental Coordination Disorder (DCD)

**“Significantly poorer perceptual reasoning ability was seen in DCD and ADHD+DCD groups but not in the ADHD group. The findings provide evidence that a deficit in visuo-spatial ability may underlie DCD but not ADHD. These findings revealed different cognitive profiles for ADHD and/or DCD, thus the current study does not lend support to the common aetiology hypothesis in understanding the basis of ADHD and DCD comorbidity”. (p. 1260).**

Loh, P.R., Piek, J.P., and Barret, N.C. (2011). Comorbid ADHD and DCD: Examining Cognitive Functions Using the WISC-IV. Research in Developmental Disabilities, 32(4), 1260-1269.

# Stages of Memory

**“Memory is a three stage process: First come the learning or encoding of the experience; then the storage or consolidation of the information over many hours, days and months; and last, the retrieval of that memory when you later retrieve it”. (p. 27)**

Chen, I. (January/February, 2012). A Feeling for The Past. Scientific American Mind, 22(6), 24-31.

# Memory and Fear

**“...the amygdala, a structure buried deep within the brain, orchestrates the memory-boosting effects of fear. For instance, if you suddenly glimpse a snake...your amygdala instantly reacts...this region signals your cortex to boost its visual and perceptual processing to confirm that the snake is real directing your attention to it. Second the amygdala triggers the release of stress hormones that set you heart racing and pupils dilating...”**



# Memory and Fear

**“...The same hormones spur the hippocampus, the memory encoding center to start storing or consolidating your perceptions into a neural record. Over the long run, sensory details of the memory are believed to migrate into areas of the cortex for vision, hearing and movement. Later, when you remember the snake, the amygdala and hippocampus are again involved, reintegrating the emotional and sensory dimensions of the memory”. (p. 27)**

**Chen, I. (January/February, 2012). A Feeling for The Past. Scientific American Mind, 22(6), 24-31.**

# More About Memory

- Memory can also be paired with the pleasure centers of the brain so it will be recalled a pleasant event.
- When you sleep your brain makes calculations about what you want to remember and forget.
- Sleep will often cause emotionally laden memories to be amplified. However, during sleep stress hormones are not secreted and the brain can make decisions of what to remember and forget without the emotional component.

Chen, I. (January/February, 2012). A Feeling for The Past. Scientific American Mind, 22(6), 24-31.

# More About Memory

One can tone down negative feeling about an emotional memory and enhance the accuracy of the memory by cognitive reappraisal. A cognitive behavioral technique to reframe the event.

Chen, I. (January/February, 2012). A Feeling for The Past. Scientific American Mind, 22(6), 24-31.

# The Gift of Forgetting

**“In recent years researchers have amassed evidence for our ability to willfully forget...New evidence suggests that the ability to repress is quite useful. Those who cannot do this well tend to let their thoughts stick in their mind. They ruminate, which can pave a path to depression. Weak restraints on memory may similarly impede the recovery of trauma victims. Lacking breaks on mental...”**

# The Gift of Forgetting

**“...intrusions, individuals with attention-deficit/hyperactivity disorder (ADHD) are more likely to be among the forgetless (to coin a term). In short, memory—and forgetting—can shape your personality”. (p. 34).**

Wickelgren, I. (2012). Trying To Forget. Scientific American Mind, 22(6), p. 32-39.

# Actively Forgetting

**“...the researchers associated memory suppression with greater activity in two regions of the prefrontal cortex—the aforementioned region devoted to planning and oversight—and diminished activity in the hippocampus, an area responsible for both binding components of a memory together and reactivating it...Items that were later remembered produced more activity in the hippocampus than did items that would be forgotten, a pattern that forecast which pairs were successfully suppressed...”**

# Actively Forgetting

**“...Meanwhile the engagement of the prefrontal cortex foretold the likelihood of forgetting in an individual: more activation meant more inhibitory power”. (pp. 35-36)**

**Wickelgren, I. (2012). Trying To Forget. Scientific American Mind, 22(6), p. 32-39.**

# Actively Forgetting

- **There is some evidence that people are better at repressing emotional memories than neutral ones.**

Wickelgren, I. (2012). Trying To Forget. Scientific American Mind, 22(6), p. 32-39.



# AD/HD and Active Forgetting

- ADHD people appear to have more difficulty actively forgetting than the non-impaired because their prefrontal cortex is under activated when forgetting. Hence, their amygdali and hippocampus' are not blocked and record the memories. Thus they have less control of their memories. As a result, they are more susceptible to distracting thoughts.

Wickelgren, I. (2012). Trying To Forget. Scientific American Mind, 22(6), p. 32-39.

# Erasing Memories

- **“...Research now suggests that reminding a person of something makes that recollection temporarily revert to an insecure state, in which it can be modified, even erased”. (p. 42)**
- **New medication may be able to block or modify memories of past trauma.**

Piore, A. (January/February, 2012). Totaling Recall. Scientific American Mind, 22(6), 40-45.

# More on Sluggish Cognitive Tempo (SCT)

**“Confirmatory factor analyses (CFA) supported the presence of three separate, but correlated factors (SCT, inattention, and hyperactivity/impulsivity) in both parent and teacher ratings. As expected, SCT symptoms were greatest in youth with ADHD Inattentive type, but were also found in non-ADHD clinical groups. SCT symptoms were related to inattention, internalizing, and social problems across both parent and teacher informants; for parent reports, SCT was also related to more externalizing problems. Findings support the statistical validity of the SCT construct, but its clinical utility is still unclear” (p. 1097).**

**Garner, A.A., Marceaux, S.M., Patterson, C., and Hodges, B., (November 2010). Dimensions and Correlates of Attention Deficit Hyperactivity Disorder and Sluggish Cognitive Tempo.. Journal of Abnormal Child Psychology, 38(8), 1097-1107.**

# Sluggish Cognitive Tempo

**“Children with the truly inattentive type of ADHD, rather than being distractible, may instead be easily bored, their problem being more in motivation (under-arousal) than in inhibitory control. Much converging evidence points to a primary disturbance in the striatum (a frontal–striatal loop) in the combined type of ADHD. It is proposed here that the primary disturbance in truly inattentive-type ADHD (ADD) is in the cortex (a frontal–parietal loop). Finally, it is posited that these are not two different types of ADHD, but two different disorders with different cognitive and behavioral profiles, different patterns of comorbidities, different responses to medication, and different underlying neurobiologies.**

**Diamond, A. (2005). Attention-deficit disorder (attention-deficit/hyperactivity disorder without hyperactivity): A neurobiologically and behaviorally distinct disorder from attention-deficit/hyperactivity disorder (with hyperactivity). Developmental Psychopathology, 17(3), 805-825.**

# ASD Prevalence

**“More people than ever before are being diagnosed with an ASD. It is unclear how much of this increase is due to a broader definition of ASDs and better efforts in diagnosis. However, a true increase in the number of people with an ASD cannot be ruled out. We believe the increase in ASD diagnosis is likely due to a combination of these factors”.**

Centers for Disease Control and Prevention(June 12, 2012). Autism Spectrum Disorders: Research. From website: <http://www.cdc.gov/ncbddd/autism/research.html>.

# ASD, Vaccines & The CDC

**“Many studies have looked at whether there is a relationship between vaccines and autism spectrum disorders (ASDs)”.**

Centers for Disease Control and Prevention(June 12, 2012). Autism Spectrum Disorders: Research. From website:

<http://www.cdc.gov/ncbddd/autism/research.html>.

# Medical Test for ADHD?

**“Many high-prevalence neurological disorders involve dysfunctions of oculomotor control and attention, including attention deficit hyperactivity disorder (ADHD), fetal alcohol spectrum disorder (FASD), and Parkinson’s disease (PD). Previous studies have examined these deficits with clinical neurological evaluation, structured behavioral tasks, and neuroimaging. Yet, time and monetary costs prevent deploying these evaluations to large at-risk populations, which is critically important for earlier detection and better treatment. We devised a high-throughput, low-cost method where participants simply watched television while we recorded their eye movements. We combined eye-tracking data from patients and controls with a computational model of visual attention to extract 224 quantitative features. Using machine learning in a workflow inspired by microarray analysis, we identified critical features that differentiate patients from control subjects...”**

# Medical Test for ADHD? (Continued)

**“...With eye movement traces recorded from only 15 min of videos, we classified PD versus age-matched controls with 89.6 % accuracy (chance 63.2 %), and ADHD versus FASD versus control children with 77.3 % accuracy (chance 40.4 %). Our technique provides new quantitative insights into which aspects of attention and gaze control are affected by specific disorders. There is considerable promise in using this approach as a potential screening tool that is easily deployed, low-cost, and high-throughput for clinical disorders, especially in young children and elderly populations who may be less compliant to traditional evaluation tests”.**

**Tseng, P.-H., Cameron, I.G.M., Pari, G., Reynolds, J.N., Munoz, D.P., Itti, L. (August, 2012). High-Throughput Classification of Clinical Populations From Natural Viewing Eye Movements. Journal of Neurology, DOI: 10.1007/s00415-012-6631-2.**