
The Vermont Family Based Approach: Addressing Children's Emotional- Behavioral Health

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Professor of Psychiatry, Medicine and Pediatrics

Thomas M. Achenbach Chair of Developmental Psychopathology

Director of The Vermont Center for Children, Youth, and Families

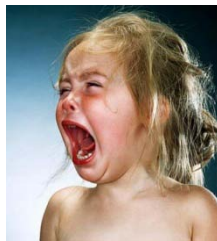
Professor of Psychiatric Genetics

Vrije, University, Amsterdam, The Netherlands

Visiting Professor Erasmus University, The Netherlands

The Mission of The Vermont Center for Children, Youth, and Families (VCCYF).

- We wish to contribute to the celebration of a child's strengths. In order to meet this goal we have developed strategies to promote good family health, prevent the development of emotional problems and when present, treat emotional behavioral problems using a family based approach.



Vermont Center for Children, Youth and Families Clinical Team



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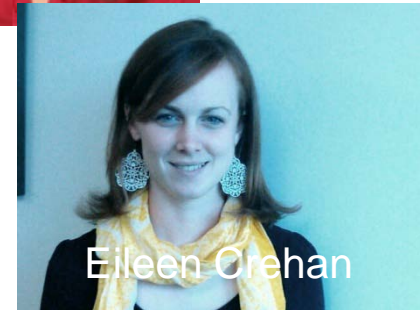
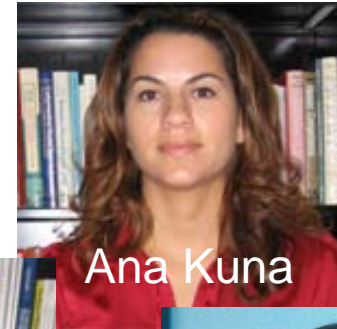
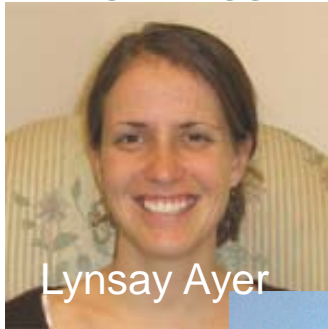
Cynthia LaRiviere, Ph.D.



Jim Tallmadge, Ph.D.



Vermont Center for Children, Youth and Families Research Team



VCCYF Research Collaborators



Dorret Boomsma



Eco de Geus

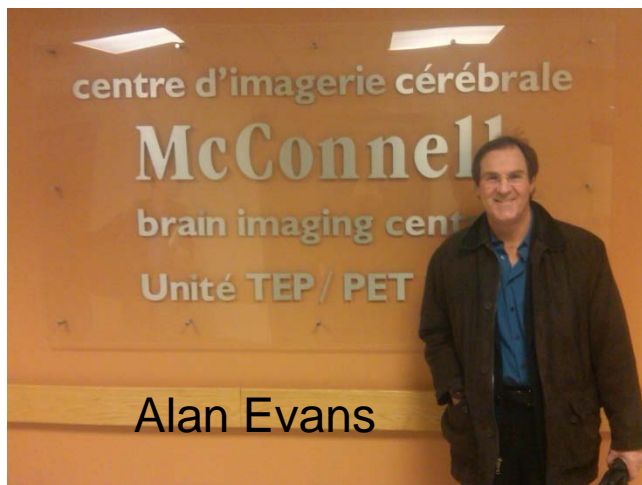


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Tiemeier

**Vermont Center for
Children Youth & Families**
Vermont Family Based Approach



Goals of Presentation:

- I. Discuss why we are here – bridge the gap between neuroscience and genetics research in developmental psychopathology and **CLINICAL PRACTICE**.
- II. Discuss principles of genetics and developmental neurobiology and psychopathology.
- III. Describe our Genetically Informed Family Based **WELLNESS** Approach inspired by current (and past) research.



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Developmental Psychopathology and Wellness

Genetic and Environmental Influences

Developmental Psychopathology and Wellness
Genetic and Environmental Influences

Hudziak

APPI

EDITED BY
James J. Hudziak, M.D.



*Vermont Center for
Children Youth & Families*
Vermont Family Based Approach

Genetically Informative Designs in the Study of Resilience in Developmental Psychopathology

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^b*Department of Psychiatry, University of Vermont, College of Medicine, Given B229, Burlington, VT 05405, USA*

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Some children apparently suffer from emotional or behavioral problems, beginning with conception and continuing their entire life, whereas other children are affected at times and are well at other times. Epidemiologic studies show that the majority of the children are free of emotional/behavioral problems at any given time. Emerging evidence from longitudinal studies suggests that within this group of well children, many have always been well, whereas others may have been ill at one point but are relatively well at others. It is not clear what factors influence the shift from illness to wellness or why some children recover from illness and remain well. The study of resilience, defined here as the ability to recover from a prior illness or the capacity to remain well in the face of extraordinary genetic or environmental risk factors, is the focus of this article.

We believe that to study resilience in the domain of developmental psychopathology it is necessary to use genetically informative strategies. In this era of genomic medicine, it is important to accept that genetic and environmental factors place children at risk for developmental

This work was supported by the National Institute of Mental Health (NIMH, RO1, MH58799-03) and The Netherlands Organization for Scientific Research (NWO 575-25-006, NWO/SPI 56-464-14192, and NWO 463-06-001). Dr Bartels is financially supported by NWO (VENI: 451-04-034).

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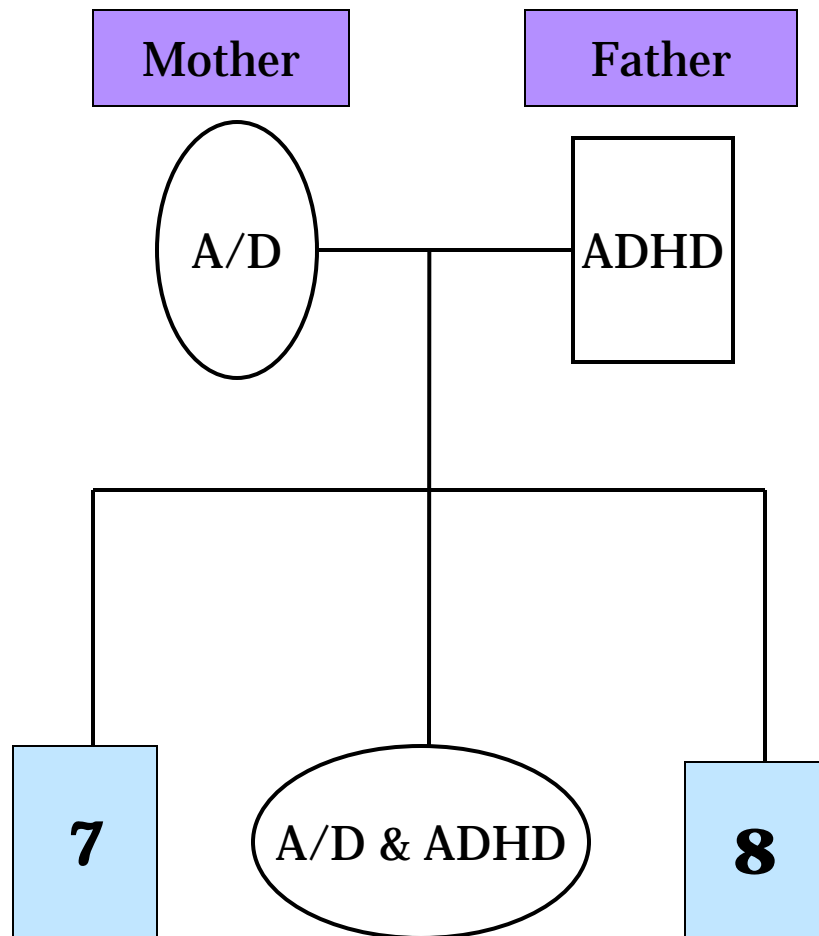
Why the Family Based Approach?

All (yes all) of the child psychopathologies:

- ❑ Are influenced by genetic factors
- ❑ Are influenced by environmental factors
- ❑ Are probably influenced by their interaction
- ❑ Run in families, e.g. parents of children with emotional behavioral illness are more likely to have emotional behavioral illness (correlated with or in association to the burden of suffering).
- ❑ Parental psychopathology can affect the environment that the child comes up in.
- ❑ Changing genetic expression is (probably possible) through treating the environment a child is raised in.
- ❑ Thus the Family Based (G-E) Approach.



Family-Based Approach: The Argument



If Mother suffers from
Anxious Depression
(50/50),

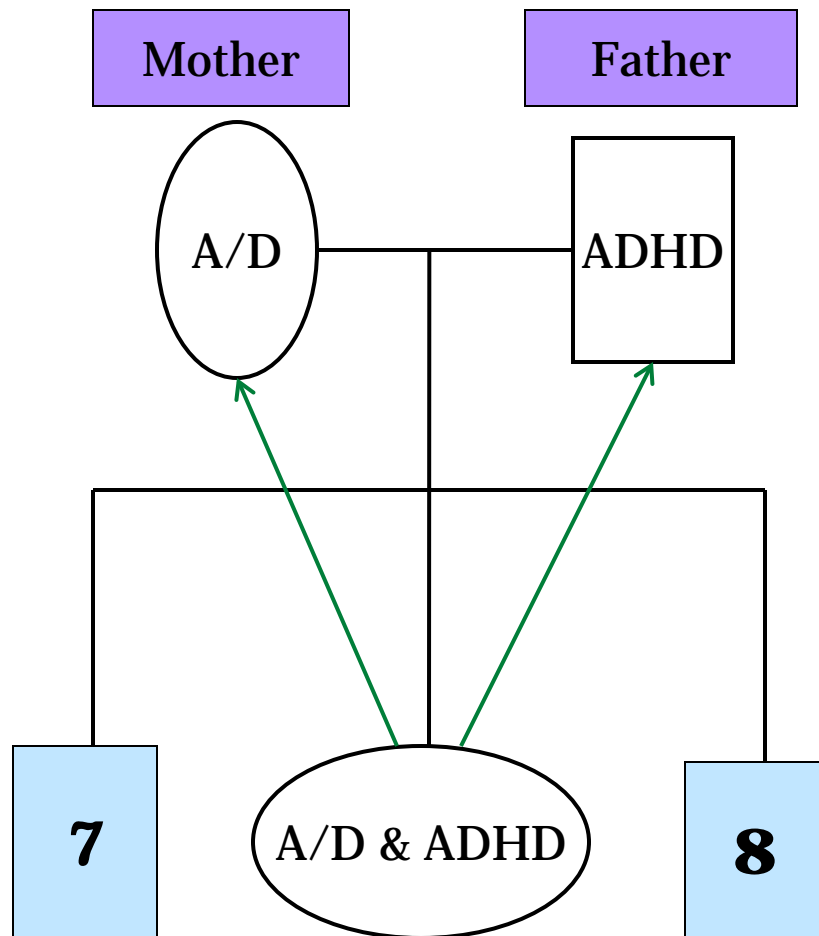
If Father suffers from
ADHD (70/30),

Then the child is at
increased risk for both.
Should he/she have either:

Does it make sense to treat
only the child when it is
clear that environment
contributes as much to risk
as genes?



Family-Based Approach: The Argument



If Mother suffers from
Anxious Depression
(50/50),

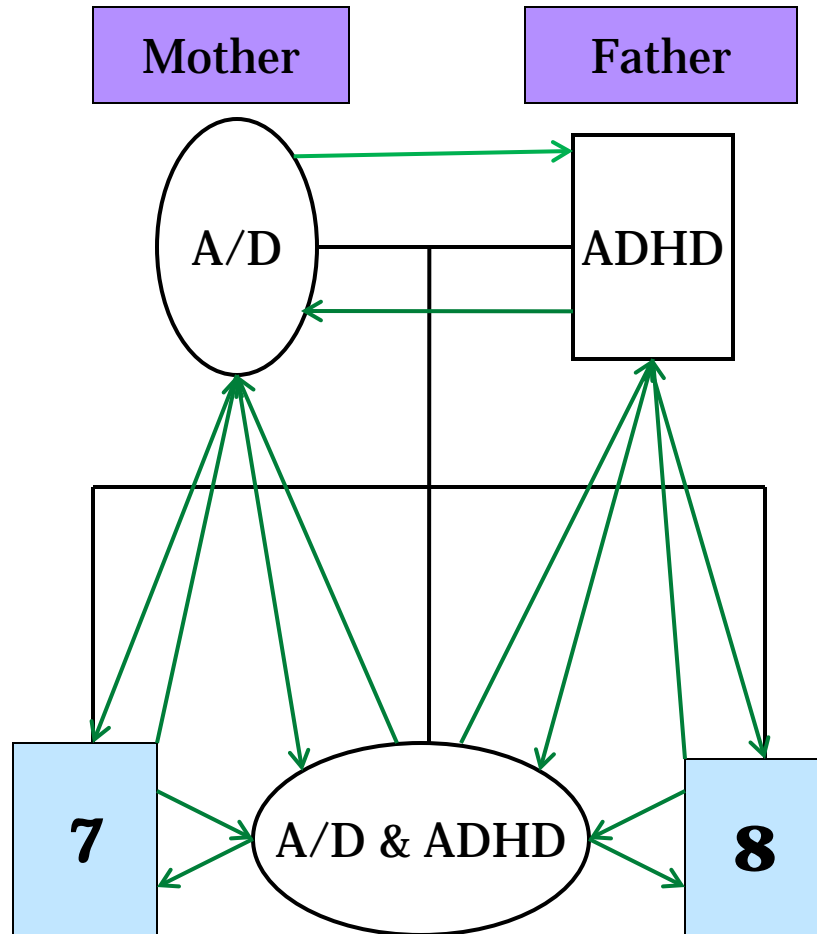
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Family-Based Approach: The Argument



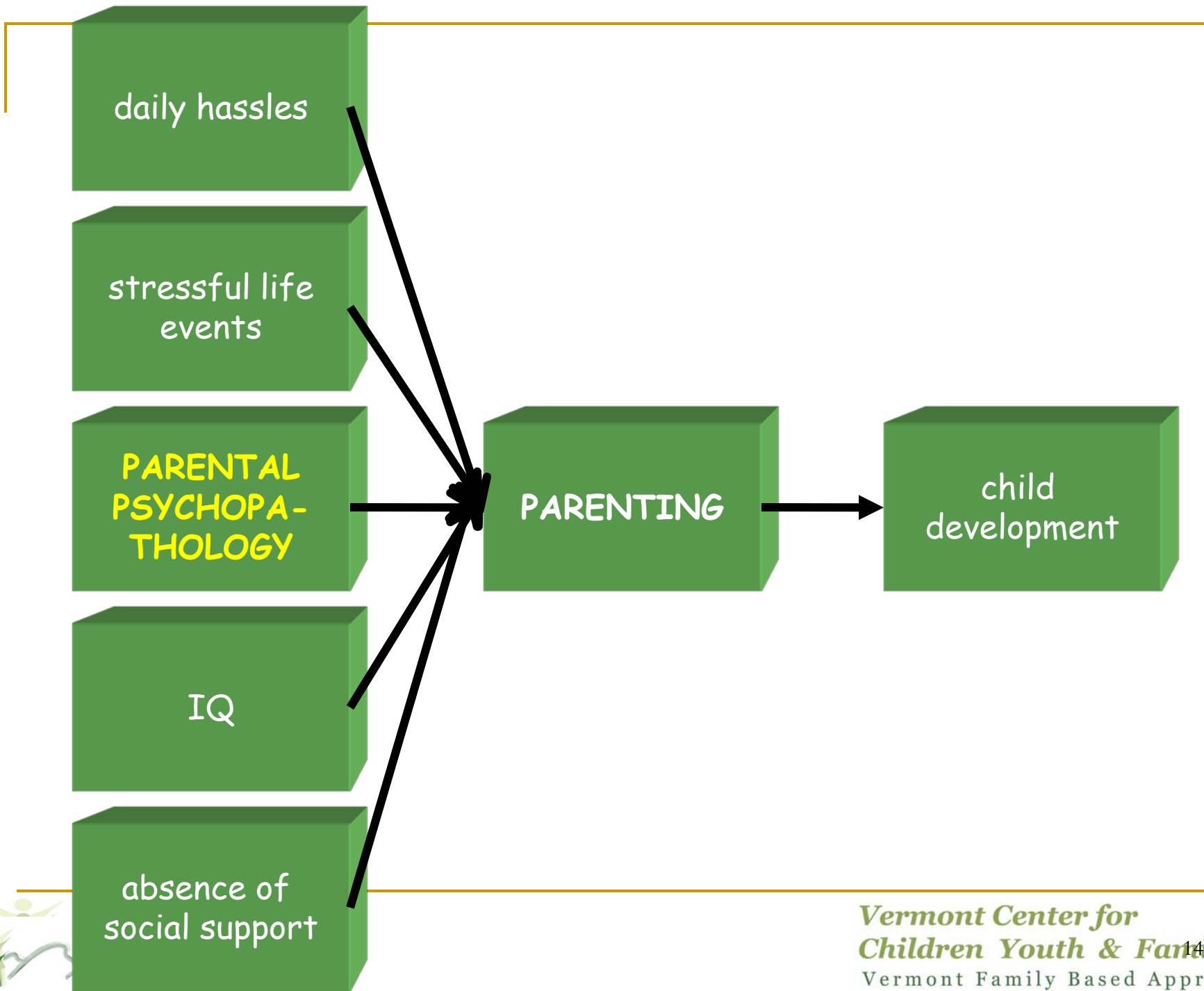
If Mother suffers from Anxious Depression (50/50),

If Father suffers from ADHD (70/30),

Then the child is at increased risk for both. Should he/she have either:

Does it make sense to treat only the child when it is clear that environment contributes as much to risk as genes?





daily hassles

stressful life events

PARENTAL PSYCHOPATHOLOGY

IQ

absence of social support

PARENTING

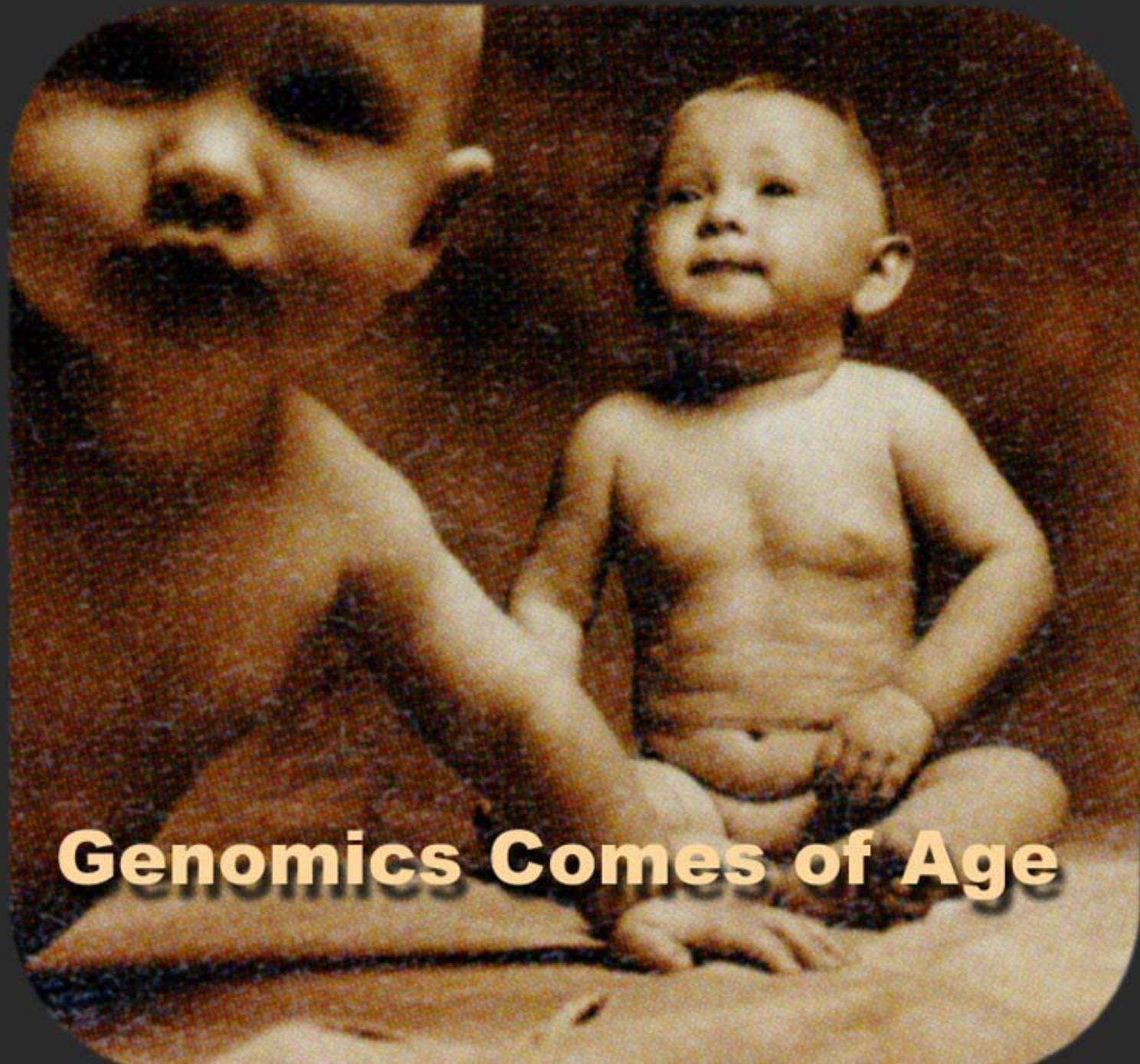
child development



Goals of Presentation:

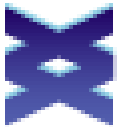
- I. Discuss why we are here – bridge the gap between neuroscience and genetics research in developmental psychopathology and **CLINICAL PRACTICE.**
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Genomics Comes of Age

The White House - June 26, 2000



The News.....

- The Genome is sequenced
- Genetic iteration in diagnoses
- Genomics and Society



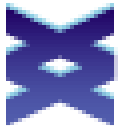
How can we use the new genetics in psychiatry?

- First – what is the “New Genetics” versus the “Old Genetics”?
- Discuss the Human Genome project
- How might genetics change psychiatry and societal views.



The Human Genome Project

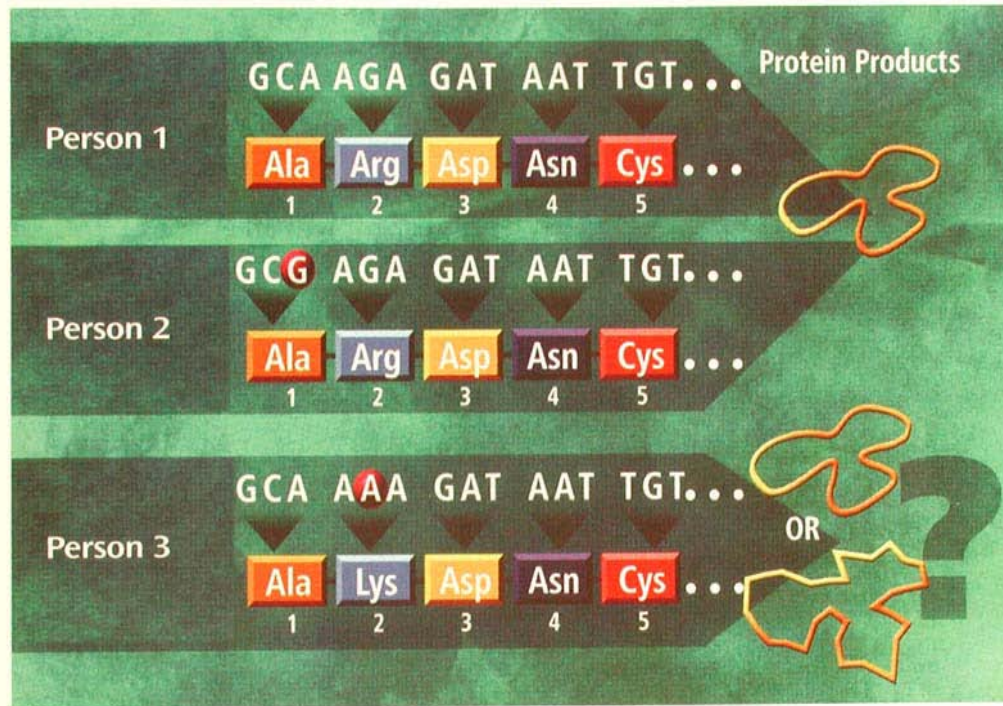
- The human genome consists of about 3.15 billion chemical bases
- It would fill 150,000 telephone book pages with A's, C's, G's and T's
- Disease is often caused by a single variation in the three billion bases - one letter in the 150,000 pages
- Our challenge is partly one of scale



Images in Neuroscience

Carol A. Tamminga, M.D., Editor

The Human Genome



The image shows how DNA sequence variation in a gene can change the protein produced by the genetic code. The nucleotide triplet codon at position 1 in the gene depicted is different in person 1 and person 2, but the codon difference does not change the amino acid sequence. In person 3, the nucleotide triplet codon at position 2 is different from that in person 1 and person 2, and the codon change results in production of a different amino acid at position 2 in person 3.



Midbrain dopamine and prefrontal function in humans: interaction and modulation by *COMT* genotype

Andreas Meyer-Lindenberg^{1,2}, Philip D Kohn^{1,2},
Bhaskar Kolachana², Shane Kippenhan^{1,2},
Aideen McInerney-Leo³, Robert Nussbaum³,
Daniel R Weinberger² & Karen Faith Berman^{1,2}

Using multimodal neuroimaging in humans, we demonstrate specific interactions between prefrontal activity and midbrain dopaminergic synthesis. A common V(108/158)M substitution in the gene for catecholamine-*O*-methyltransferase (COMT), an important enzyme regulating prefrontal dopamine turnover, predicted reduced dopamine synthesis in midbrain and qualitatively affected the interaction with prefrontal cortex. These data implicate a dopaminergic tuning mechanism in prefrontal cortex and suggest a systems-level mechanism for cognitive and neuropsychiatric associations with COMT.



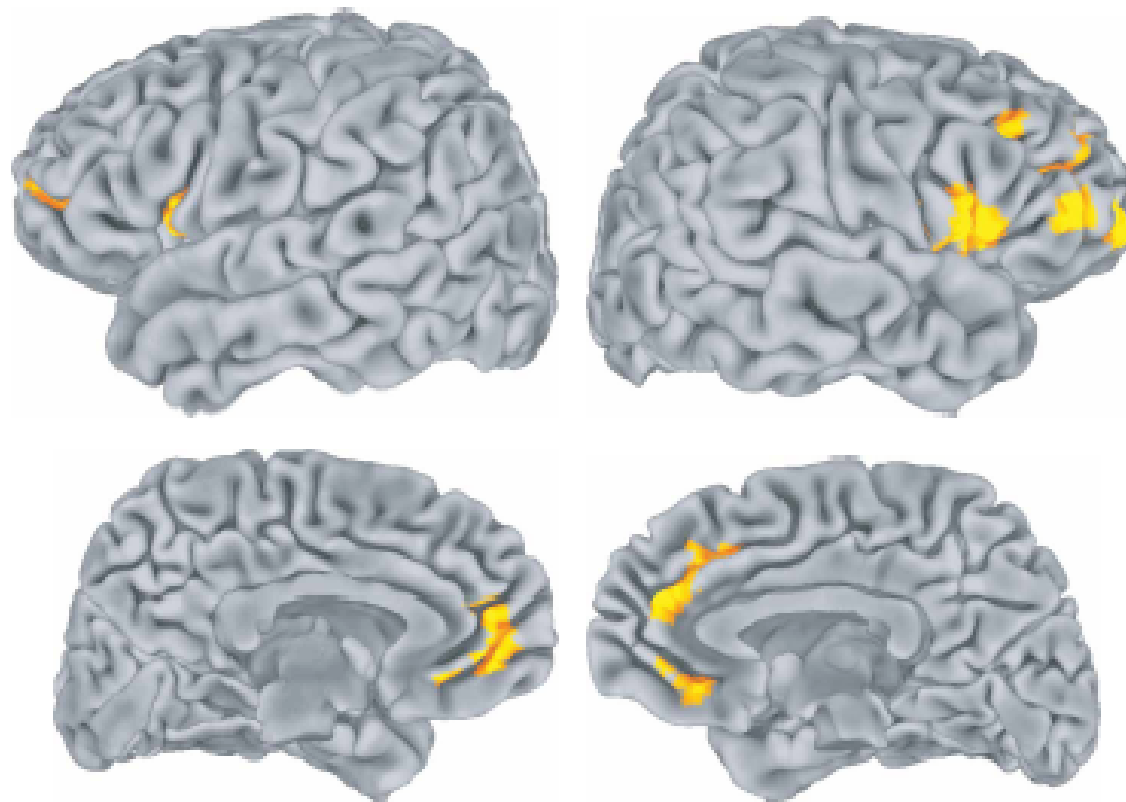


Figure 2 Interactions of cortical rCBF with midbrain dopamine. Significant ($P < 0.001$, uncorrected; $P < 0.05$, corrected, cluster-level) correlations of 0-back blood flow with midbrain F-DOPA uptake K_i , by *COMT* genotype (contrasting valine carriers with methionine homozygotes) were observed. See **Supplementary Table 4** online for coordinates and region labels.



ORIGINAL ARTICLE

Catechol O-Methyltransferase Gene Variant and Birth Weight Predict Early-Onset Antisocial Behavior in Children With Attention-Deficit/Hyperactivity Disorder

*Anita Thapar, MD; Kate Langley, BA; Tom Fowler, PhD; Frances Rice, PhD; Darko Turic, BSc;
Naureen Whittinger, BSc; John Aggleton, PhD; Marianne Van den Bree, PhD;
Michael Owen, MD; Michael O'Donovan, MD*



Context: Early-onset antisocial behavior accompanied by attention-deficit/hyperactivity disorder is a clinically severe variant of antisocial behavior that is associated with a particularly poor outcome. Identifying early predictors is thus important. Genetic and prenatal environmental risk factors and prefrontal cortical function are thought to contribute. Recent evidence suggests that prefrontal cortical function is influenced by a valine/methionine variant in the catechol O-methyltransferase (COMT) gene.

Objective: To test the a priori hypothesis that this genetic variant predicts early-onset antisocial behavior in a high-risk sample and further examine the effects of birth weight, an environmentally influenced index of prenatal adversity previously linked to childhood disruptive behaviors and genotype \times birth weight interaction.

Design, Setting, and Participants: A family-based genetic study was undertaken between 1997 and 2003. Participants were prospectively recruited from child and adolescent psychiatry and child health clinics in the United Kingdom and included 240 clinic children who met di-

agnostic criteria for attention-deficit/hyperactivity disorder or hyperkinetic disorder. Participants underwent comprehensive standardized assessments including measures of antisocial behavior and IQ.

Main Outcome Measure: DSM-IV symptoms of childhood-onset conduct disorder rated by trained interviewers using a standard diagnostic interview.

Results: The results show main effects of the COMT gene variant ($P=.002$), birth weight ($P=.002$), and a significant gene \times environment (COMT \times birth weight) interaction ($P=.006$).

Conclusions: Early-onset antisocial behavior in a high-risk clinical group is predicted by a specific COMT gene variant previously linked with prefrontal cortical function and birth weight, and those possessing the val/val genotype are more susceptible to the adverse effects of prenatal risk as indexed by lower birth weight.

Arch Gen Psychiatry. 2005;62:1275-1278



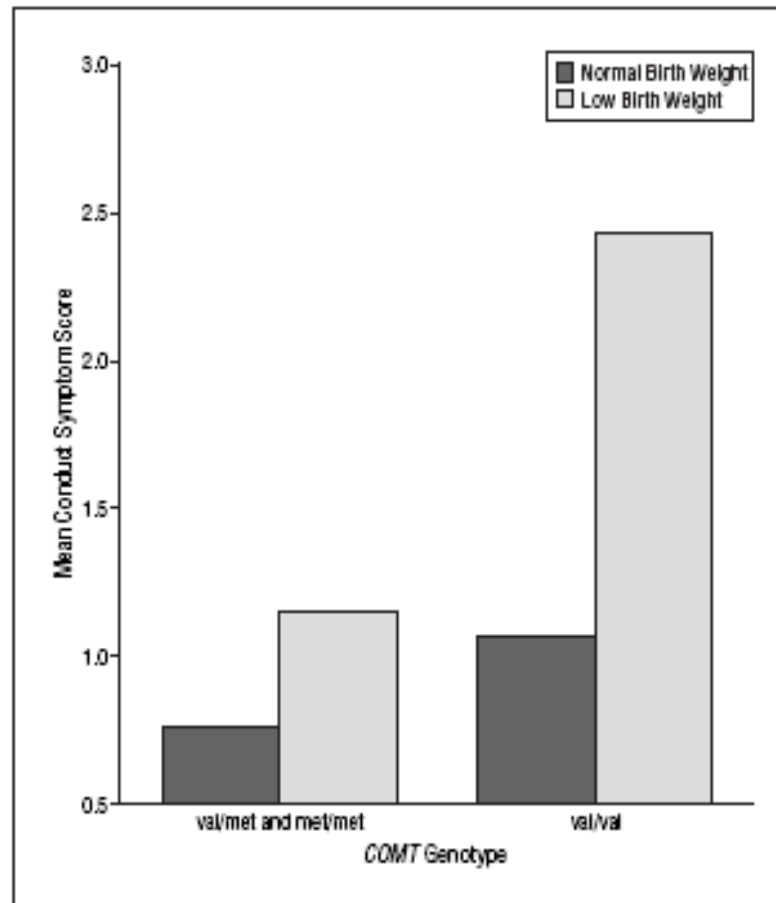


Figure. Mean number of *DSM-IV* conduct symptoms by genotype and birth weight. Association with catechol *O*-methyltransferase (*COMT*) genotype using categorically defined low birth weight (birth weight <2500 g): normal birth weight, valine (val)/methionine (met) and met/met, n=161; val/val, n=44; $\beta=0.099$; $t=1.4$; $P=.16$ and clinically defined low birth rate, val/met and met/met, n=26; val/val, n=7; $\beta=0.34$; $t=2.0$; $P=.05$.



Moderation of the Effect of Adolescent-Onset Cannabis Use on Adult Psychosis by a Functional Polymorphism in the Catechol-O-Methyltransferase Gene: Longitudinal Evidence of a Gene X Environment Interaction

Avshalom Caspi, Terrie E. Moffitt, Mary Cannon, Joseph McClay, Robin Murray, HonaLee Harrington, Alan Taylor, Louise Arseneault, Ben Williams, Antony Braithwaite, Richie Poulton, and Ian W. Craig

Background: Recent evidence documents that cannabis use by young people is a modest statistical risk factor for psychotic symptoms in adulthood, such as hallucinations and delusions, as well as clinically significant schizophrenia. The vast majority of cannabis users do not develop psychosis, however, prompting us to hypothesize that some people are genetically vulnerable to the deleterious effects of cannabis.

Methods: In a longitudinal study of a representative birth cohort followed to adulthood, we tested why cannabis use is associated with the emergence of psychosis in a minority of users, but not in others.

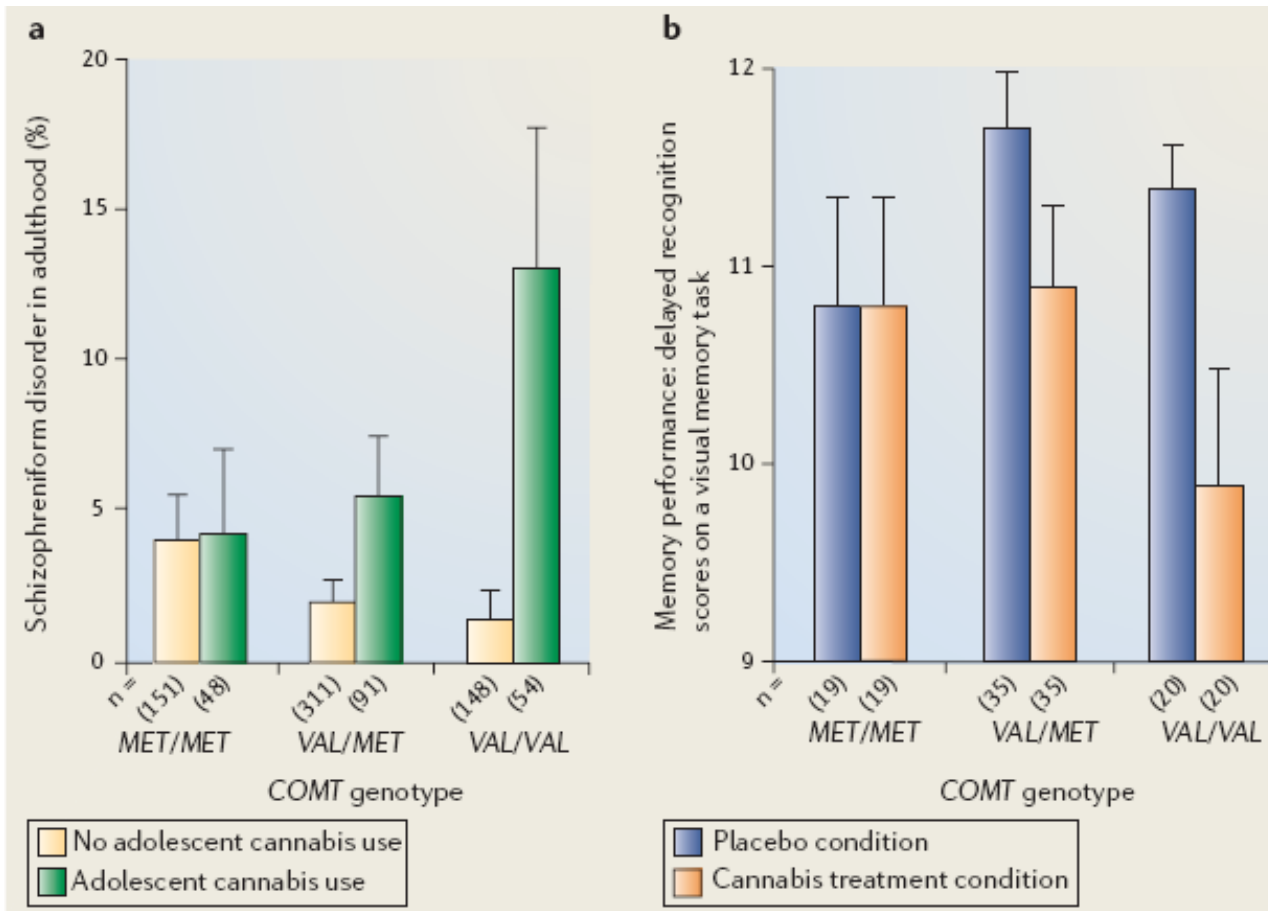
Results: A functional polymorphism in the catechol-O-methyltransferase (COMT) gene moderated the influence of adolescent cannabis use on developing adult psychosis. Carriers of the COMT valine¹⁵⁸ allele were most likely to exhibit psychotic symptoms and to develop schizophreniform disorder if they used cannabis. Cannabis use had no such adverse influence on individuals with two copies of the methionine allele.

Conclusions: These findings provide evidence of a gene \times environment interaction and suggest that a role of some susceptibility genes is to influence vulnerability to environmental pathogens.

Key Words: Cannabis, catechol-O-methyltransferase, gene-environment interaction, psychosis

BIOL PSYCHIATRY 2005;57:1117-1127
© 2005 Society of Biological Psychiatry





Caspi *et al.* *Nature Reviews Neuroscience* **7**, 583–590 (July 2006) | doi:10.1038/nrn1925

nature
REVIEWS NEUROSCIENCE



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Principles of Developmental Neurobiology and Psychopathology.

The brain is changing.....

.....and so is behavior.



In Utero Maps of Development

WM

GM

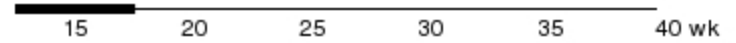


Image Courtesy of Alan Evans at McGill University



II - In vivo fetal MRI

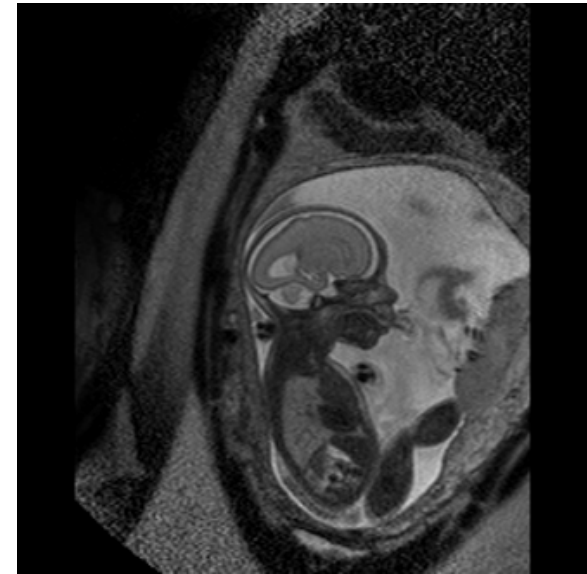
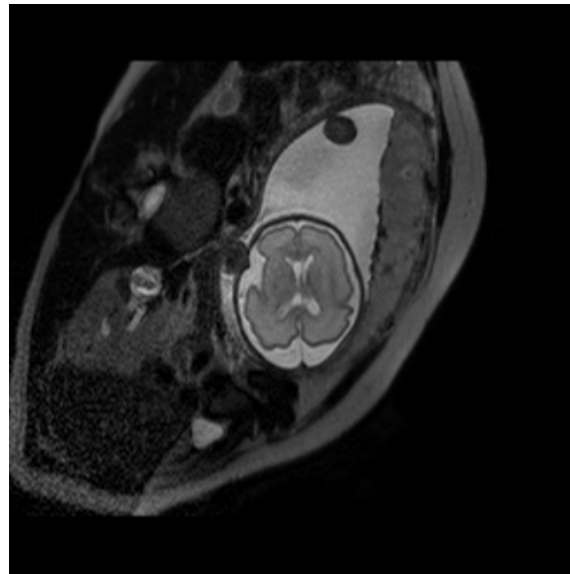
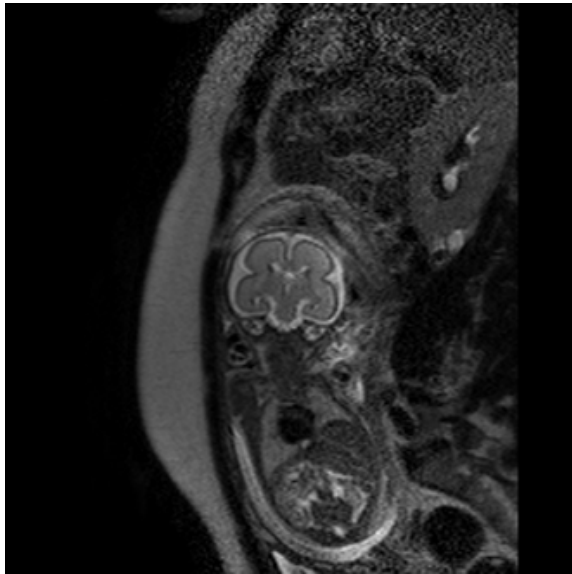
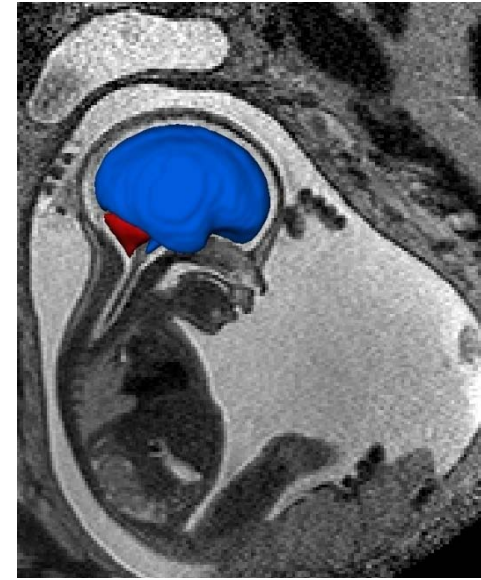
Robust automatic method to measure fetal brain growth
Measure fetal brain development in 2nd/3rd trimester

Acquisition: time, quality (Jiang *et al.*, 2007)

Maternal/fetal motion impact on image reconstruction (Rousseau *et al.*, 2006)

Brain orientation and extraction

3D and inter-slice intensity inhomogeneity (Guizard *et al.*, 2008)



sagittal



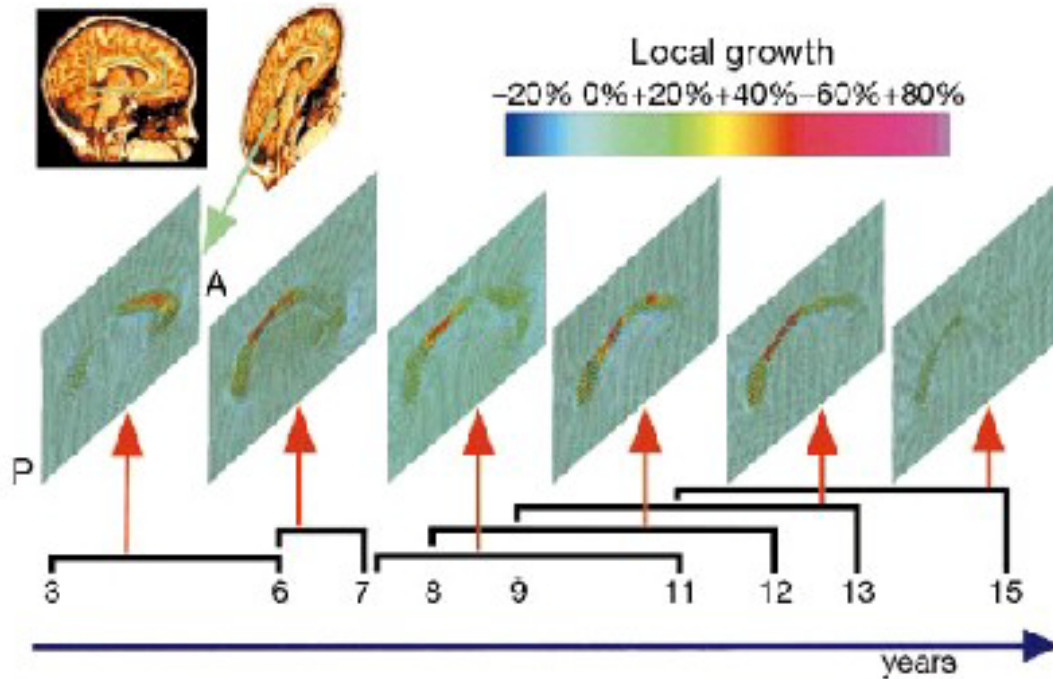
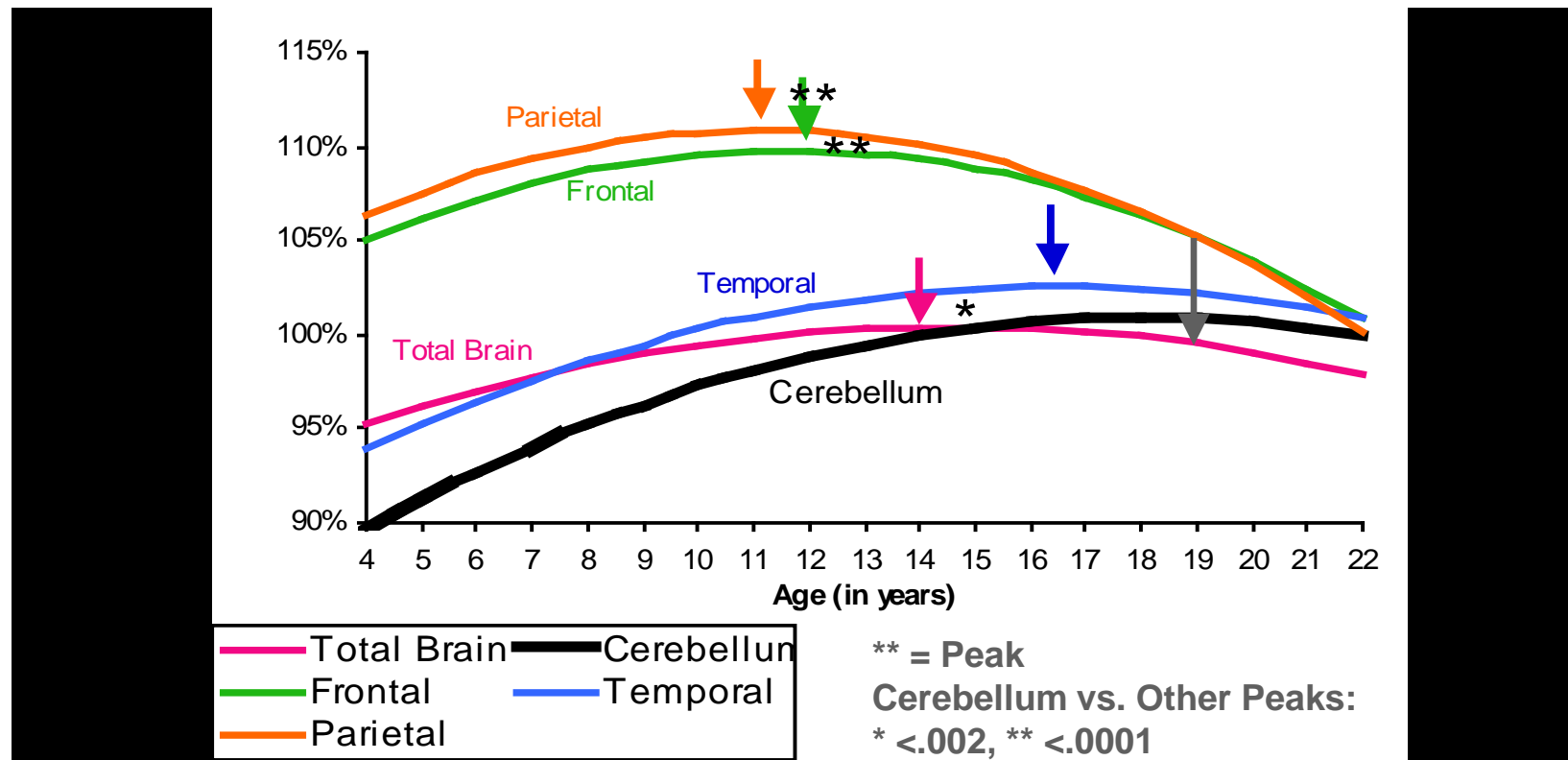


Figure 1 Growth patterns in the developing human brain detected at ages 3–15 years. A rostro-caudal wave of peak growth rates is detected in young normal subjects scanned repeatedly across time spans of up to four years. Between ages 3 and 6 years, peak growth rates (red colours; 60–80% locally) were detected in the frontal circuits of the corpus callosum, which sustain mental vigilance and regulate the planning of new actions. Older children displayed fastest growth at the callosal isthmus, which innervates temporo-parietal systems supporting spatial association and language function. Between ages 11–15 years, growth rates still peak at the isthmus, but are attenuated.



Cerebellar Development for 145 Children & Adolescents (Ages 4-22) Based on 243 Brain MRI Scans



Castellanos et al, 2004



Developmental Mapping of the Child Cortex

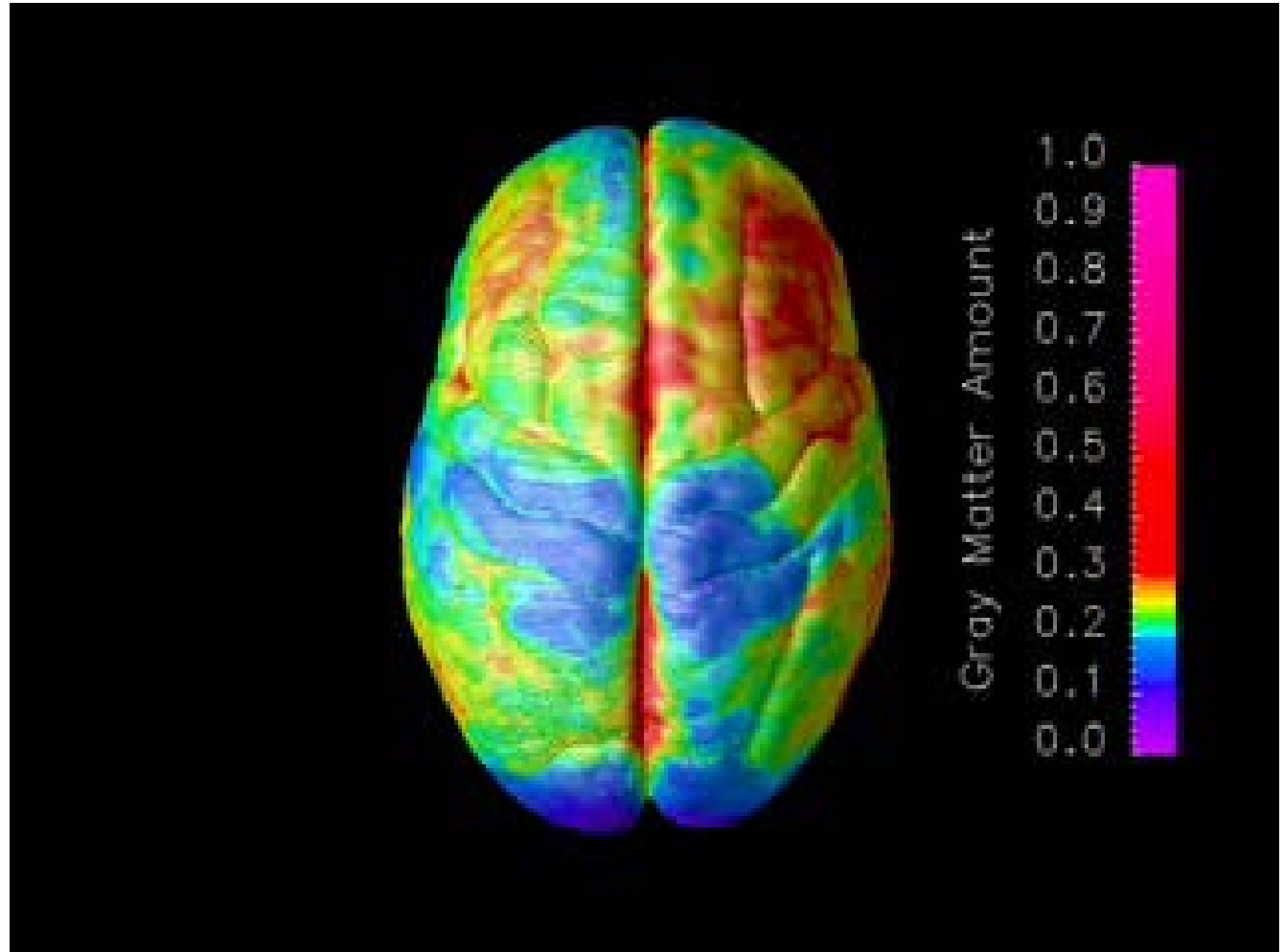


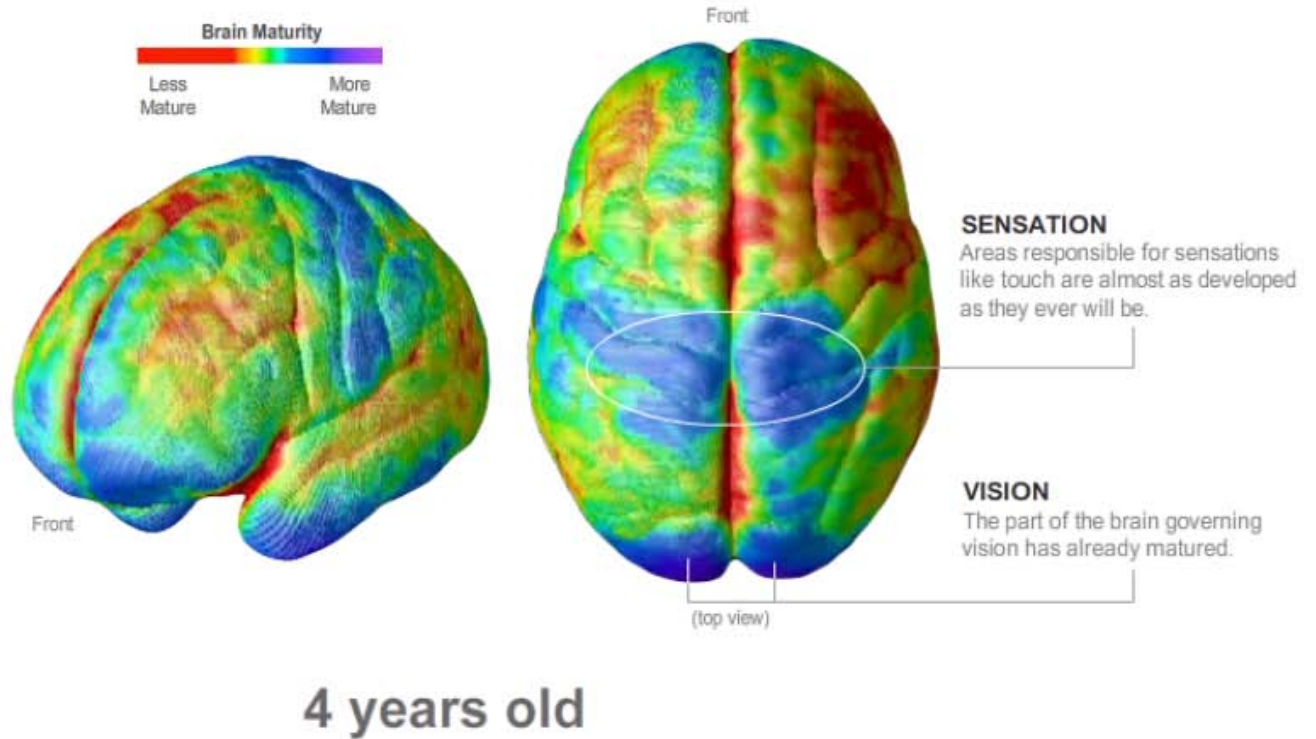
Image courtesy of Paul Thompson, 2007



Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

EARLY DEVELOPMENT

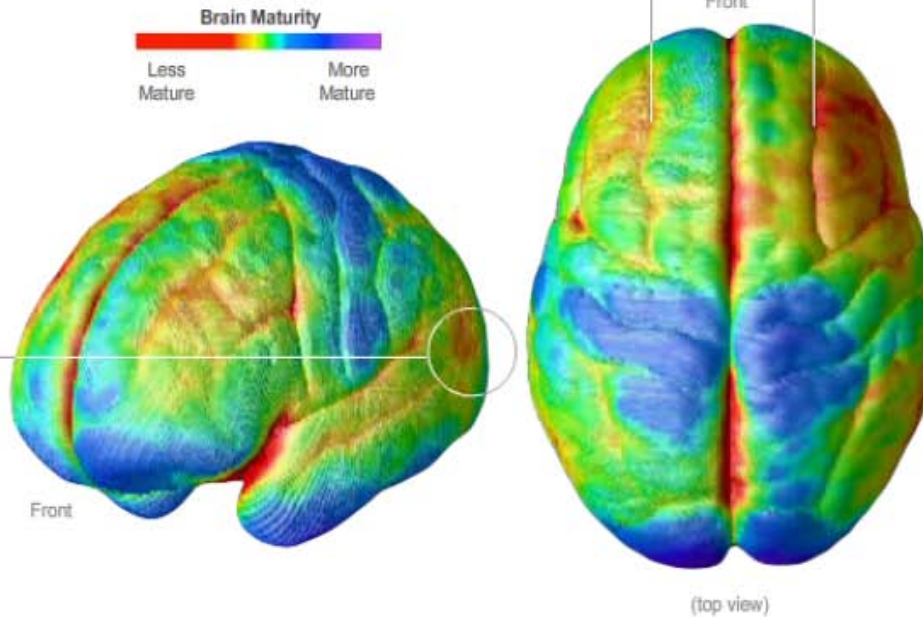
In the first few years of life, areas of the brain devoted to basic function change at a rapid pace. By age 4, primary senses and basic motor skills are almost fully developed. The child can walk, hold a crayon and feed himself.



Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

LANGUAGE

The area of the brain governing language is immature, as indicated in orange, but continues to develop rapidly in children through age 10. The brain already has begun a "pruning" process, eliminating redundant neural links. This will accelerate in later years, one reason why learning a new language is easy for children and virtually impossible for many adults.



REASON

The dappled yellow and red areas of the prefrontal cortex indicate that this part of the brain, which affects abstract thinking, reasoning skills and emotional maturity, has yet to develop. This lack of maturity is one reason young children can't juggle a lot of information and throw tantrums when presented with too many choices.

6 years old



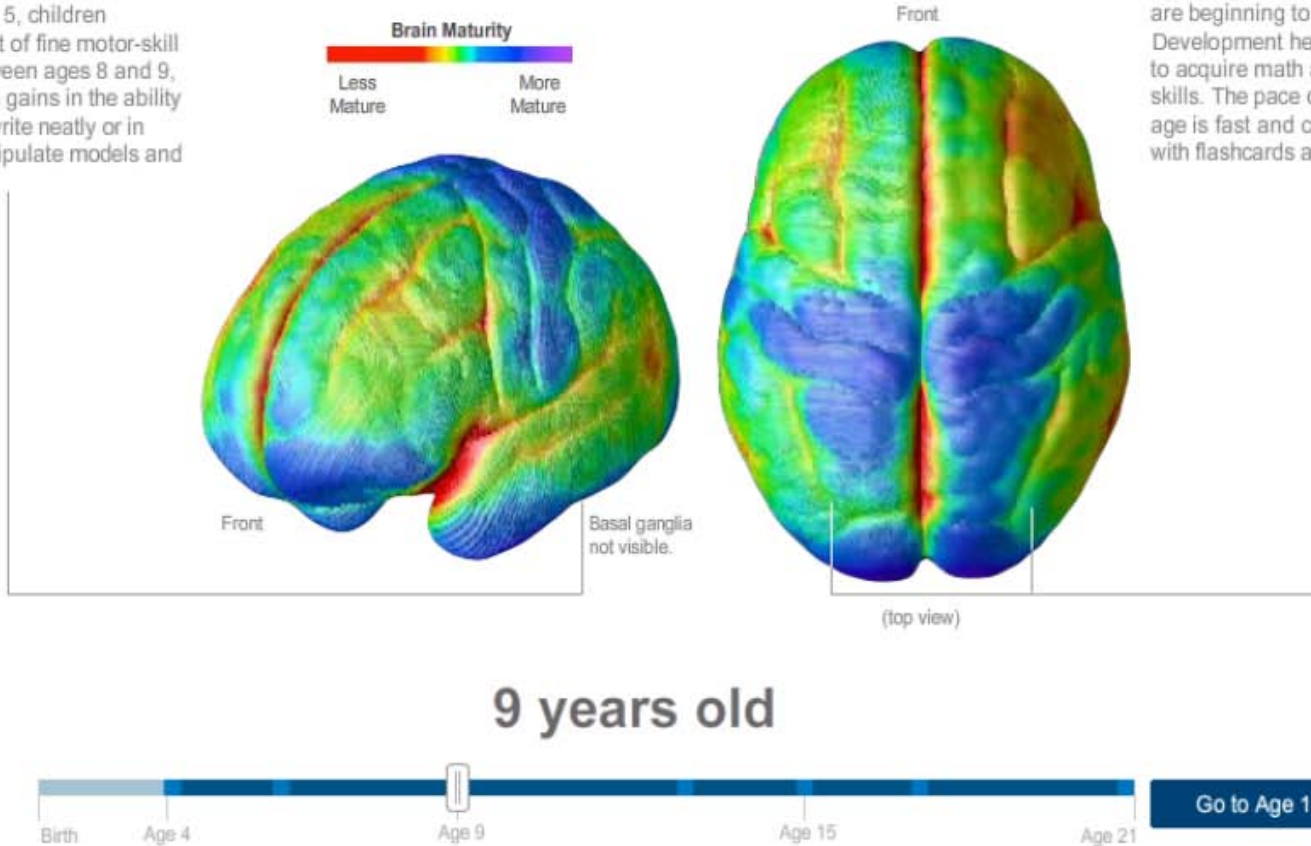
Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

FINE MOTOR SKILLS

While basic motor skills are well developed by age 5, children experience a burst of fine motor-skill development between ages 8 and 9, helping to explain gains in the ability to use scissors, write neatly or in cursive, and manipulate models and craft projects.

MATHEMATICS

By the age of 9, the parietal lobes are beginning to mature. Development here allows children to acquire math and geometry skills. The pace of learning at this age is fast and can be enhanced with flashcards and math drills.



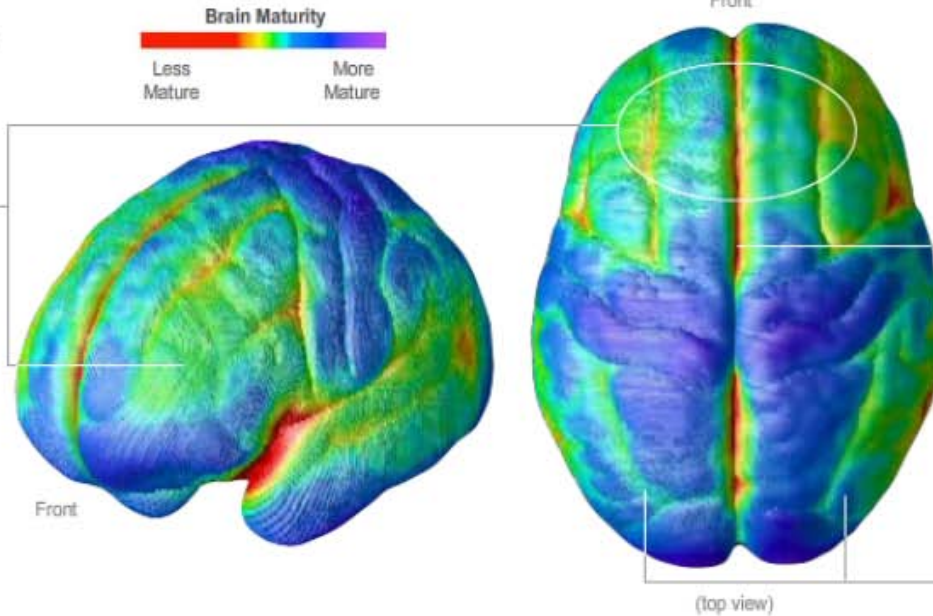
Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

JUDGMENT

The prefrontal cortex is among the last areas to mature. Until it does, children lack the ability to adequately judge risk or make long-term plans. Ask kids at this age what they want to be when they grow up, and the answer is likely to change often.

EMOTION

Deep in the limbic system, a capacity for creating emotion increases. As yet, this capacity is unrestrained by the prefrontal cortex, which lags behind. That's why some teens can seem emotionally out of control.



LOGIC

The parietal lobes are developing rapidly at this age, as shown here in blue. The child's intelligence and analytical abilities are expanding.

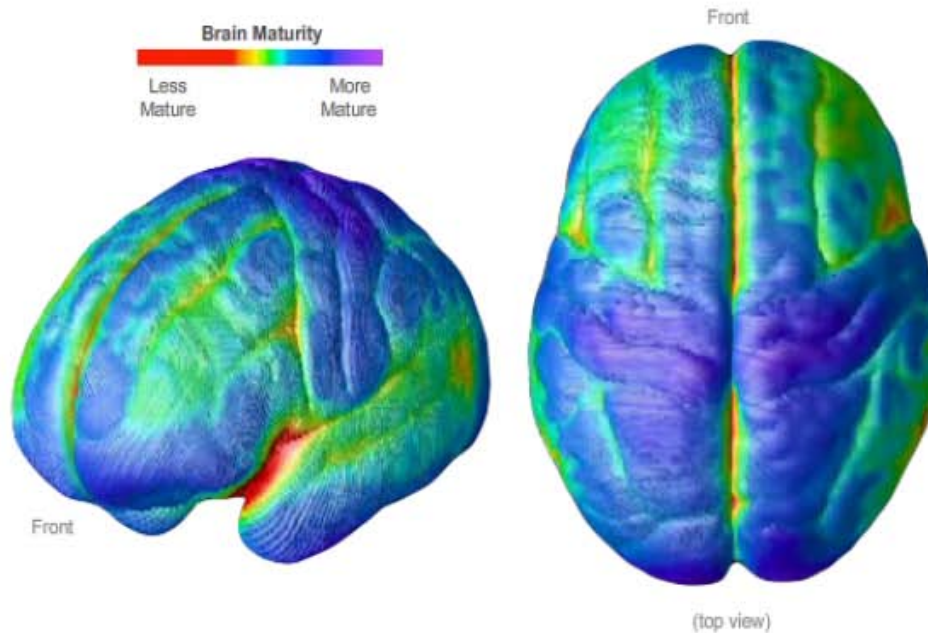
13 years old



Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

SPECIALIZATION

In the teen years, an abundance of neural links continue to be discarded. Underused connections will die to help more active connections thrive. As a result, the child's brain will become more specialized and efficient.



15 years old

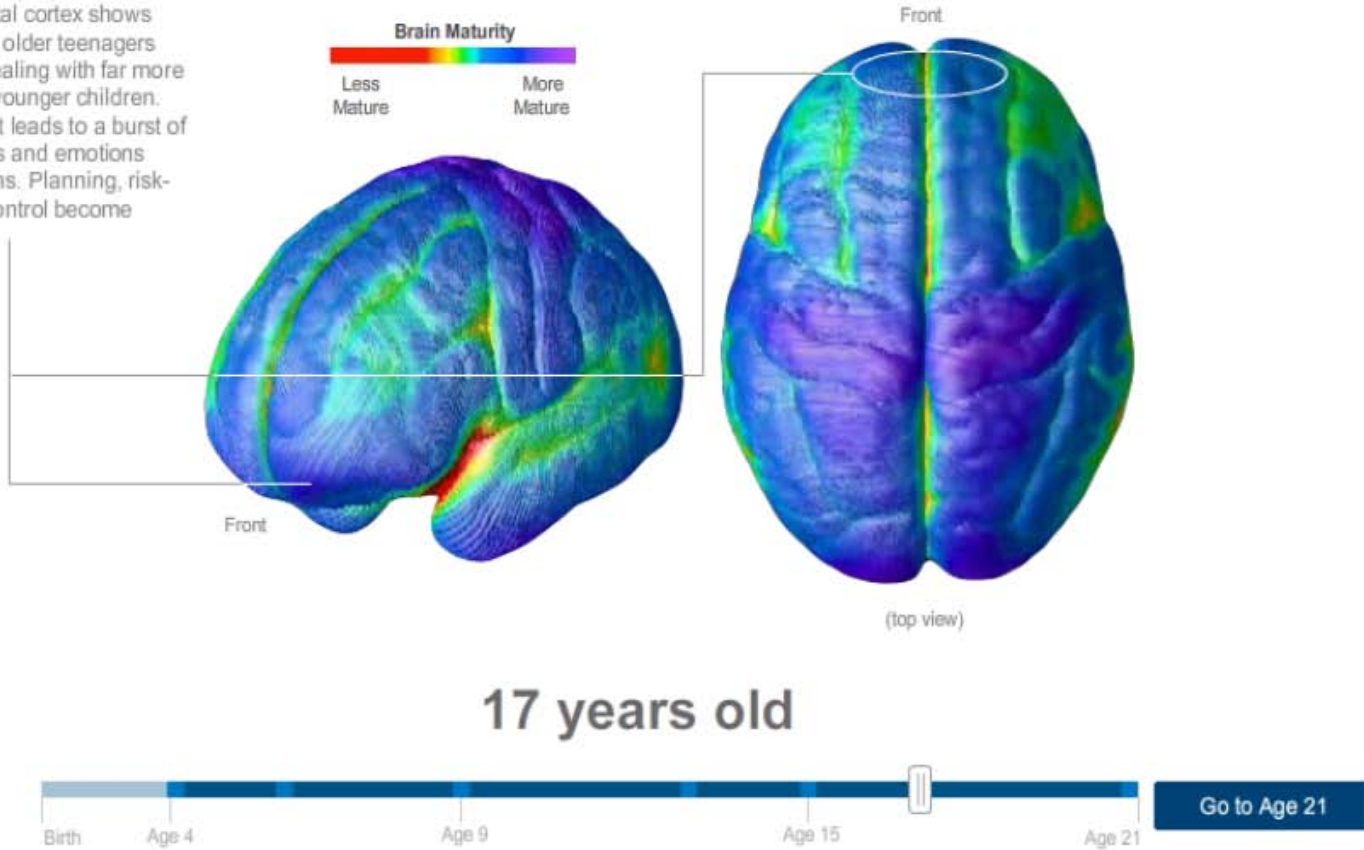


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Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

ABSTRACT THOUGHT

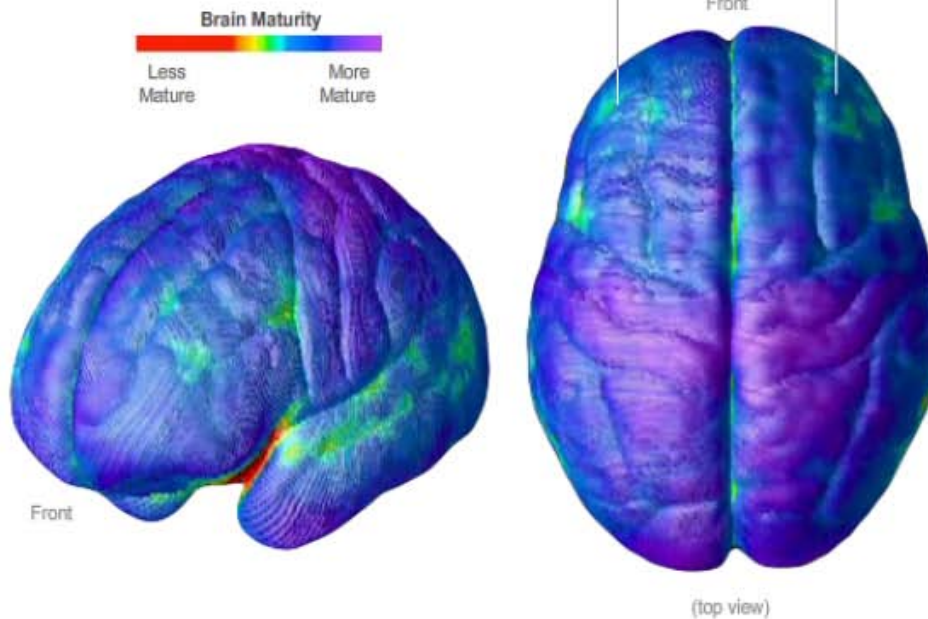
The deep blue and purple of the maturing prefrontal cortex shows why the brains of older teenagers are capable of dealing with far more complexity than younger children. This development leads to a burst of social interactions and emotions among older teens. Planning, risk-taking and self-control become possible.



Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times

EXECUTIVE FUNCTIONS

Although the brain appeared to be almost fully developed by the teen years, the deepening blue and purple areas here show that tremendous gains in emotional maturity, impulse control and decision-making continue to occur into early adulthood.



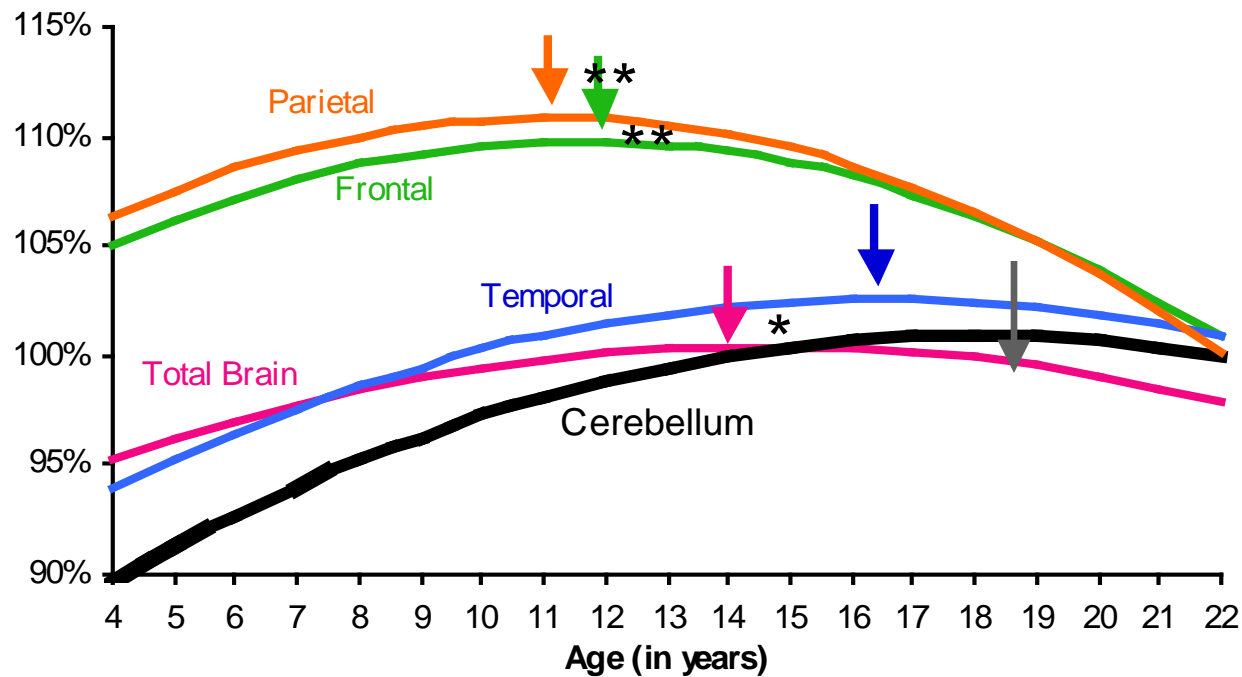
MATURATION

The 21-year-old brain is mostly mature, but the areas of green show that even at the threshold of legal adulthood, there is still room for increases in emotional maturity and decision-making skills, which will come in the next few years.

21 years old



Cerebellar Development for 145 Children & Adolescents (Ages 4-22) Based on 243 Brain MRI Scans



— Total Brain — Cerebellum
— Frontal — Temporal
— Parietal

**** = Peak**
Cerebellum vs. Other Peaks:
 * <.002, ** <.0001

Castellanos et al, 2004



-
- So what evidence is there that the environment affects the genes.....
 - And brain development.....



ORIGINAL ARTICLE

Stress-induced changes in primate prefrontal profiles of gene expression

AM Karssen^{1,6}, S Her^{1,6,7}, JZ Li², PD Patel³, F Meng³, WE Bunney Jr⁴, EG Jones⁵, SJ Watson³, H Akil³, RM Myers², AF Schatzberg¹ and DM Lyons¹

¹Department of Psychiatry and Behavioral Sciences, Stanford University, Stanford, CA, USA; ²Stanford Human Genome Center and the Department of Genetics, Stanford University, Stanford, CA, USA; ³Molecular and Behavioral Neuroscience Institute and the Department of Psychiatry, University of Michigan, MI, USA; ⁴Department of Psychiatry and Human Behavior, University of California, Irvine, CA, USA and ⁵Center for Neuroscience, University of California, Davis, CA, USA

Stressful experiences that consistently increase cortisol levels appear to alter the expression of hundreds of genes in prefrontal limbic brain regions. Here, we investigate this hypothesis in monkeys exposed to intermittent social stress-induced episodes of hypercortisolism or a no-stress control condition. Prefrontal profiles of gene expression compiled from Affymetrix microarray data for monkeys randomized to the no-stress condition were consistent with microarray results published for healthy humans. In monkeys exposed to intermittent social stress, more genes than expected by chance appeared to be differentially expressed in ventromedial prefrontal cortex compared to monkeys not exposed to adult social stress. Most of these stress responsive candidate genes were modestly downregulated, including ubiquitin conjugation enzymes and ligases involved in synaptic plasticity, cell cycle progression and nuclear receptor signaling. Social stress did not affect gene expression beyond that expected by chance in dorsolateral prefrontal cortex or prefrontal white matter. Thirty four of 48 comparisons chosen for verification by quantitative real-time polymerase chain reaction (qPCR) were consistent with the microarray-predicted result. Furthermore, qPCR and microarray data were highly correlated. These results provide new insights on the regulation of gene expression in a prefrontal corticolimbic region involved in the pathophysiology of stress and major depression. Comparisons between these data from monkeys and those for ventromedial prefrontal cortex in humans with a history of major depression may help to distinguish the molecular signature of stress from other confounding factors in human postmortem brain research.

Molecular Psychiatry (2007) 12, 1089–1102; doi:10.1038/sj.mp.4002095; published online 25 September 2007

Keywords: mood disorders; cortisol; hypothalamic-pituitary-adrenal axis; oligonucleotide microarray; squirrel monkey



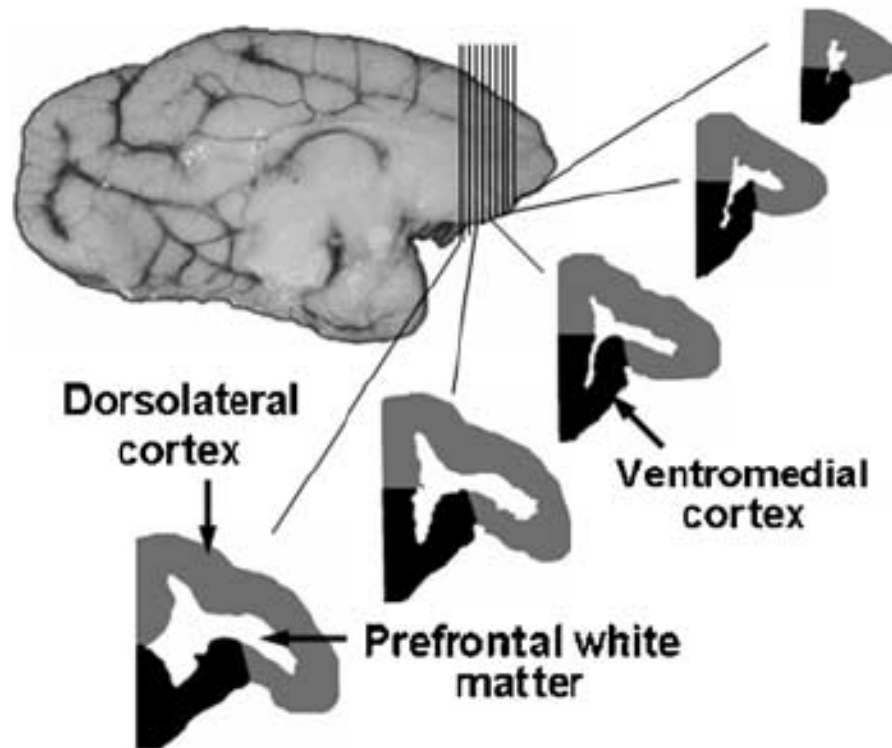


Figure 2 Prefrontal regions on serial sections from the left cerebral hemisphere of a hemisected squirrel monkey brain.



Table 1 Biological, cellular and molecular GO terms identified in both RMA and dChip data as overrepresented in ventromedial compared to dorsolateral prefrontal cortex

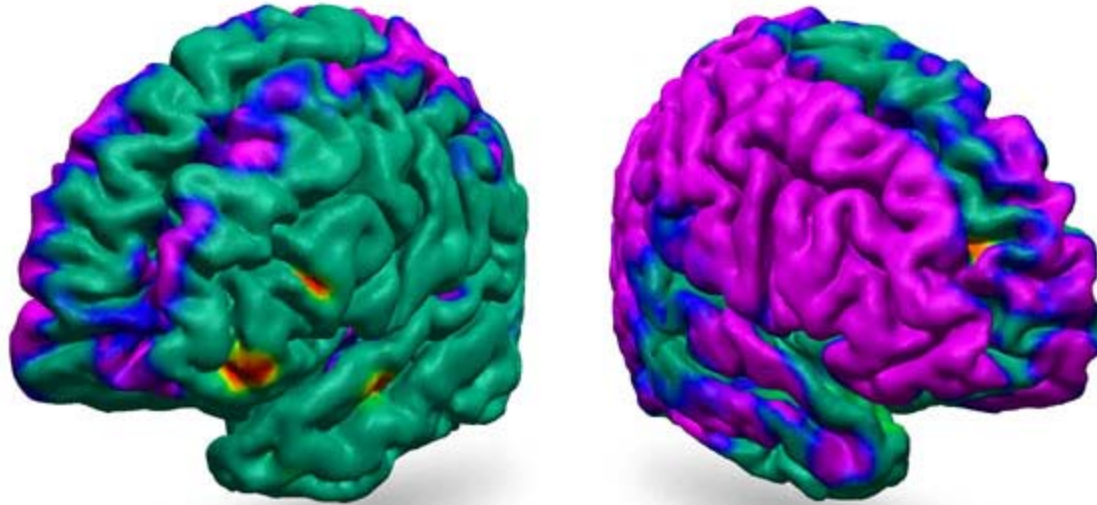
Class	Family	Gene set GO term	Number of genes	RMA, P-value	dChip, P-value	
Biological process	Synapse	GO:0043062	Extracellular structure organization and biogenesis	38	0.004	0.000
		GO:0048169	Regulation long-term neuronal synaptic plasticity	8	0.002	0.000
		GO:0030198	Extracellular matrix organization and biogenesis	38	0.004	0.000
		GO:0048168	Regulation of neuronal synaptic plasticity	14	0.000	0.011
		GO:0050803	Regulation of synapse structure and function	25	0.000	0.038
	Axonogenesis	GO:0007416	Synaptogenesis	14	0.046	0.018
		GO:0048489	Synaptic vesicle transport	27	0.037	0.018
		GO:0000902	Cellular morphogenesis	223	0.000	0.009
		GO:0048468	Cell development	154	0.027	0.014
		GO:0048699	Neurogenesis	149	0.000	0.000
		GO:0030182	Neuron differentiation	131	0.010	0.002
		GO:0048666	Neuron development	105	0.026	0.009
		GO:0007417	Central nervous system development	102	0.022	0.021
		GO:0048667	Neuron morphogenesis during differentiation	85	0.030	0.020
		GO:0031175	Neurite morphogenesis	85	0.030	0.020
	Cell growth	GO:0007409	Axonogenesis	72	0.043	0.004
		GO:0007420	Brain development	52	0.025	0.020
		GO:0048675	Axon extension	8	0.045	0.016
		GO:0000902	Cellular morphogenesis	223	0.000	0.009
		GO:0040007	Growth	110	0.000	0.000
		GO:0040008	Regulation of growth	85	0.000	0.000
		GO:0008361	Regulation of cell size	79	0.008	0.004
		GO:0016049	Cell growth	78	0.008	0.004
		GO:0001558	Regulation of cell growth	67	0.000	0.004
		GO:0007599	Hemostasis	36	0.000	0.020
		GO:0050878	Regulation of body fluids	45	0.000	0.000
		GO:0016477	Cell migration	120	0.030	0.009
Other	GO:0016568	Chromatin modification	79	0.015	0.029	
	GO:0006338	Chromatin remodeling	27	0.033	0.047	
	GO:0007186	G-protein coupled receptor protein signaling	225	0.028	0.045	
	GO:0015698	Inorganic anion transport	57	0.033	0.031	
	GO:0007269	Neurotransmitter secretion	35	0.021	0.019	
	GO:0046578	Regulation of Ras protein signal transduction	10	0.018	0.029	
	GO:0051046	Regulation of secretion	20	0.038	0.000	
	GO:0042060	Wound healing	47	0.011	0.009	
	GO:0019898	Extrinsic to membrane	31	0.025	0.008	
	GO:0019897	Extrinsic to plasma membrane	27	0.029	0.022	
Cellular component	Membrane	GO:0005834	Heterotrimeric G-protein complex	18	0.020	0.018
		GO:0000892	Cytoskeletal protein binding	188	0.000	0.014
Molecular function	Binding	GO:0042802	Protein self binding	76	0.000	0.007
		GO:0003682	Chromatin binding	51	0.021	0.012
		GO:0008201	Heparin binding	38	0.040	0.014
		GO:0051015	Actin filament binding	16	0.049	0.045
	Transcriptional repression	GO:0016564	Transcriptional repressor activity	111	0.026	0.023
		GO:0003714	Transcription corepressor activity	64	0.045	0.016

Abbreviations: GO, gene ontology; RMA, robust multiarray average.

All 6450 genes called present on at least one array are included in the analysis. The number of genes for each GO term is provided, and GO terms grouped into families are part of the same GO tree.



Study Links Depression to Thinning of Brain's Cortex



Dr. Bradley S. Peterson/Columbia University

Images of the right and left hemispheres of the brain, as viewed from the side. The colors represent the differences in cortical thickness between the high-risk group, which has a family history of depression, and the low-risk group, which has no known risk. Blue and purple represent the thinning of the cortex, with purple regions having the greatest thinning. Green areas show no significant differences between the two groups.



Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse

Patrick O McGowan^{1,2}, Aya Sasaki^{1,2}, Ana C D'Alessio³, Sergiy Dymov³, Benoit Labonté^{1,4}, Moshe Szyf^{2,3}, Gustavo Turecki^{1,4} & Michael J Meaney^{1,2,5}

Maternal care influences hypothalamic-pituitary-adrenal (HPA) function in the rat through epigenetic programming of glucocorticoid receptor expression. In humans, childhood abuse alters HPA stress responses and increases the risk of suicide. We examined epigenetic differences in a neuron-specific glucocorticoid receptor (*NR3C1*) promoter between postmortem hippocampus obtained from suicide victims with a history of childhood abuse and those from either suicide victims with no childhood abuse or controls. We found decreased levels of glucocorticoid receptor mRNA, as well as mRNA transcripts bearing the glucocorticoid receptor 1_F splice variant and increased cytosine methylation of an *NR3C1* promoter. Patch-methylated *NR3C1* promoter constructs that mimicked the methylation state in samples from abused suicide victims showed decreased NGFI-A transcription factor binding and NGFI-A-inducible gene transcription. These findings translate previous results from rat to humans and suggest a common effect of parental care on the epigenetic regulation of hippocampal glucocorticoid receptor expression.



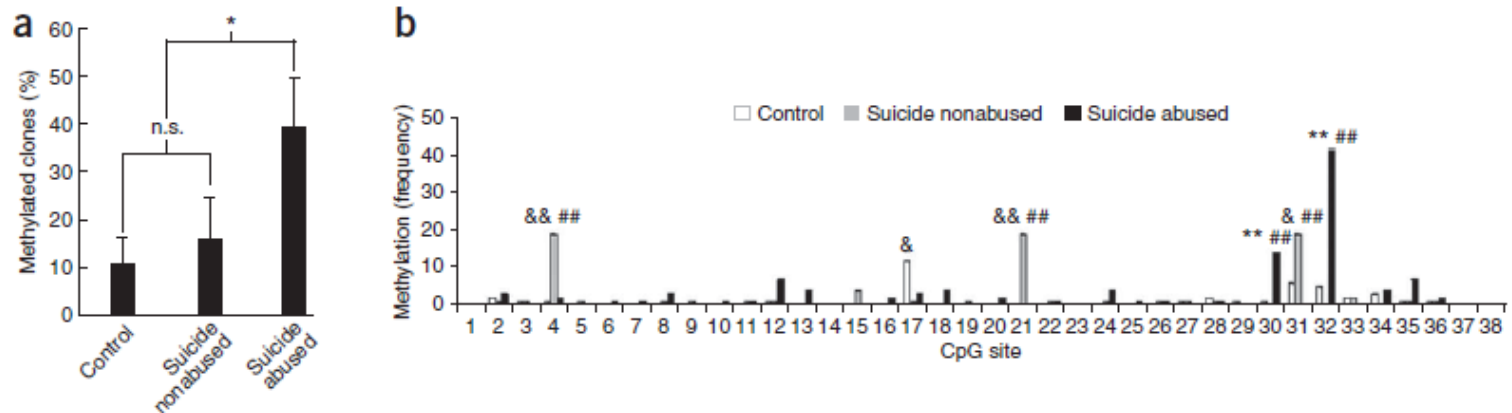


Figure 2 Methylation of the *NR3C1* promoter in the hippocampus. Twenty clones were sequenced for each subject for methylation mapping. (a) Mean \pm s.e.m. percentage of methylated clones for suicide victims with a history of childhood abuse ($n = 12$), suicide victims without a history of childhood abuse ($n = 12$) and controls ($n = 12$). The methylation percentage was calculated as the number of clones with at least one methylated CpG site divided by the total number of clones (* indicates $P \leq 0.05$; n.s. indicates not statistically significant). (b) Methylation of the *NR3C1* promoter region, showing the frequency of methylation observed at each CpG site for suicide victims with a history of childhood abuse, suicide victims with no history of childhood abuse and control subjects (* $P < 0.05$, ** $P < 0.001$, abused suicides versus controls; & $P < 0.05$, && $P < 0.001$, non-abused suicides versus controls; # $P < 0.05$, ## $P < 0.001$, abused suicides versus non-abused suicides; Bonferroni *post hoc* comparisons).



So we know the bad, what about the
good news.....



Development/Plasticity/Repair

Musical Training Shapes Structural Brain Development

Krista L. Hyde,¹ Jason Lerch,² Andrea Norton,⁴ Marie Forgeard,⁴ Ellen Winner,³ Alan C. Evans,¹ and Gottfried Schlaug⁴

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The human brain has the remarkable capacity to alter in response to environmental demands. Training-induced structural brain changes have been demonstrated in the healthy adult human brain. However, no study has yet directly related structural brain changes to behavioral changes in the developing brain, addressing the question of whether structural brain differences seen in adults (comparing experts with matched controls) are a product of “nature” (via biological brain predispositions) or “nurture” (via early training). Long-term instrumental music training is an intense, multisensory, and motor experience and offers an ideal opportunity to study structural brain plasticity in the developing brain in correlation with behavioral changes induced by training. Here we demonstrate structural brain changes after only 15 months of musical training in early childhood, which were correlated with improvements in musically relevant motor and auditory skills. These findings shed light on brain plasticity and suggest that structural brain differences in adult experts (whether musicians or experts in other areas) are likely due to training-induced brain plasticity.



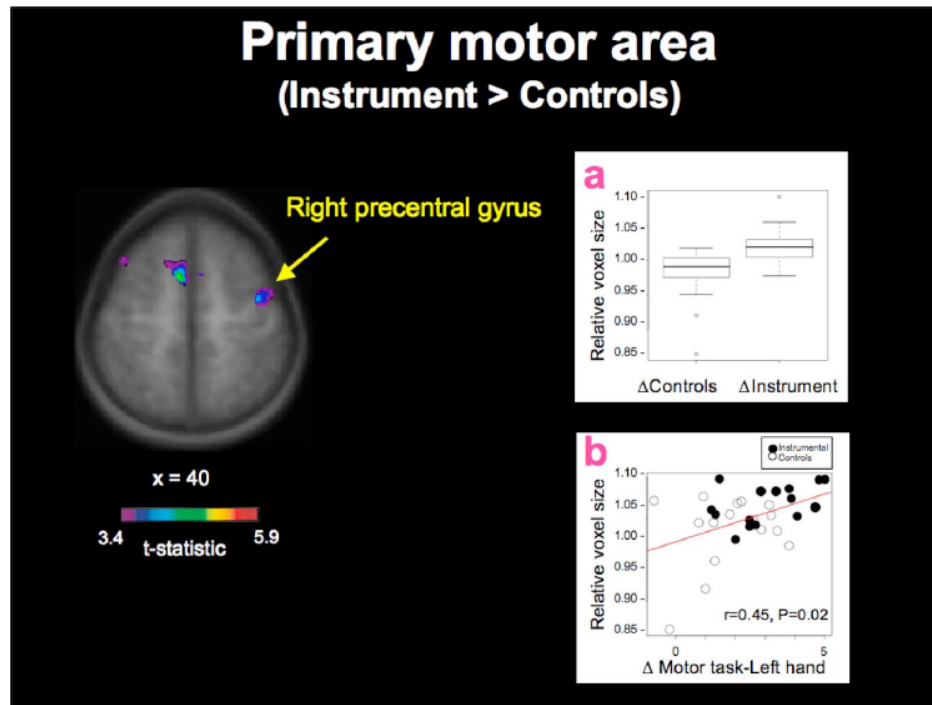


Figure 1. Longitudinal group brain deformation differences and brain–behavioral correlations in primary motor area. The brain image (a horizontal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in terms of a t -statistical color map of the significant clusters superimposed on an average MR image of all children ($n = 31$). The yellow arrow points to the primary motor area (right precentral gyrus). To illustrate the group differences, the relative voxel size (expressed as the mean by the horizontal dark black line, 25% and 75% quartiles by the top and bottom lines of the box, SDs by the errors bars, and outliers by circles) is plotted for each group at the most significant (peak) voxel in the right precentral gyrus ($x = 40, y = -7, z = 57; t = 4.2, p < 0.05$ at whole-brain cluster threshold) (a). A voxel with a relative voxel size of 1 indicates no brain deformation change from time 1, values >1 indicate voxel expansion, and values <1 indicate voxel contraction. For example, a value of 1.1 at voxel X indicates a 10% expansion from time 1, whereas 0.9 indicates a 10% contraction (this also applies to Figs. 2, 3). The significant positive correlation of relative voxel size with behavioral difference scores (from time 1 to time 2) of each child on the left-hand motor test that was found at the peak voxel in the right precentral gyrus is shown in b.



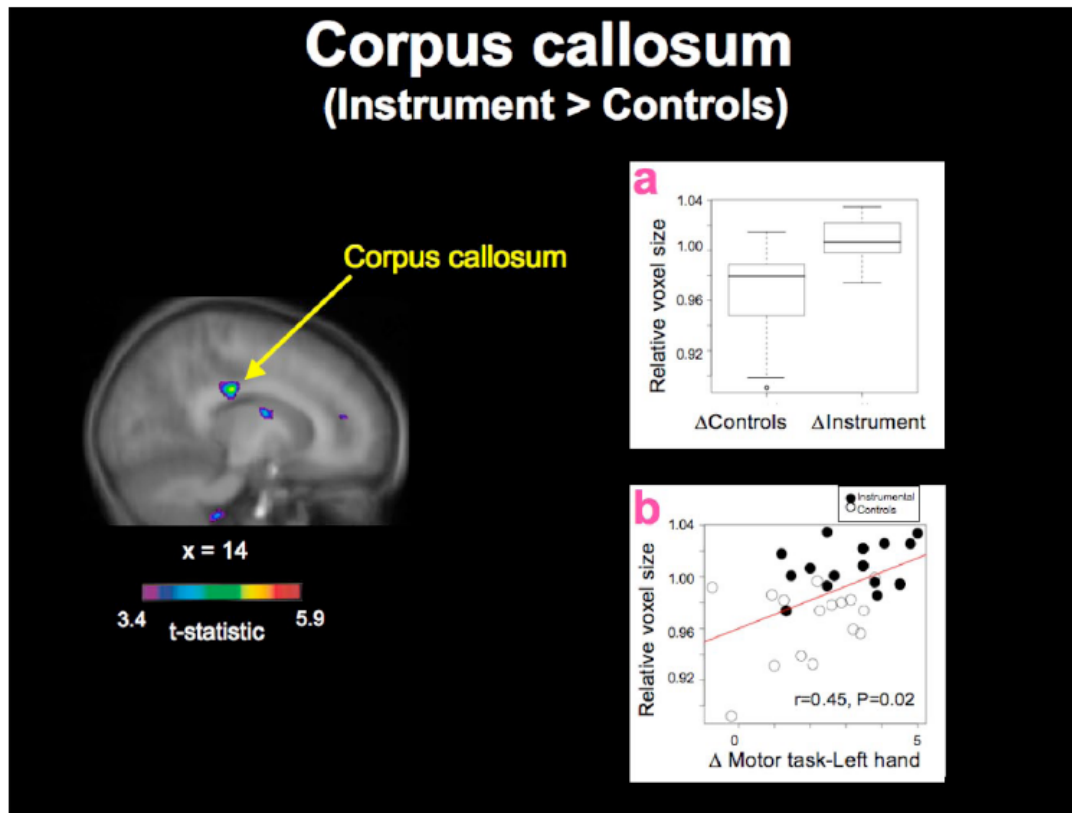


Figure 2. Longitudinal group brain deformation differences and brain–behavioral correlations in the corpus callosum. The brain image (a sagittal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in terms of a t -statistical color map of the significant clusters superimposed on an average MR image of all children ($n = 31$). The yellow arrow points to the corpus callosum. To illustrate the group differences, the relative voxel size is plotted for each group at the most significant (peak) voxel in the corpus callosum ($x = 14, y = -24, z = 30; t = 5.2, p < 0.05$ at whole-brain cluster threshold) (a). The significant positive correlation of relative voxel size with behavioral difference scores (from time 1 to time 2) of each child is shown for the left-hand motor test at the peak voxel in the corpus callosum (b).



Primary auditory area (Instrument > Controls)

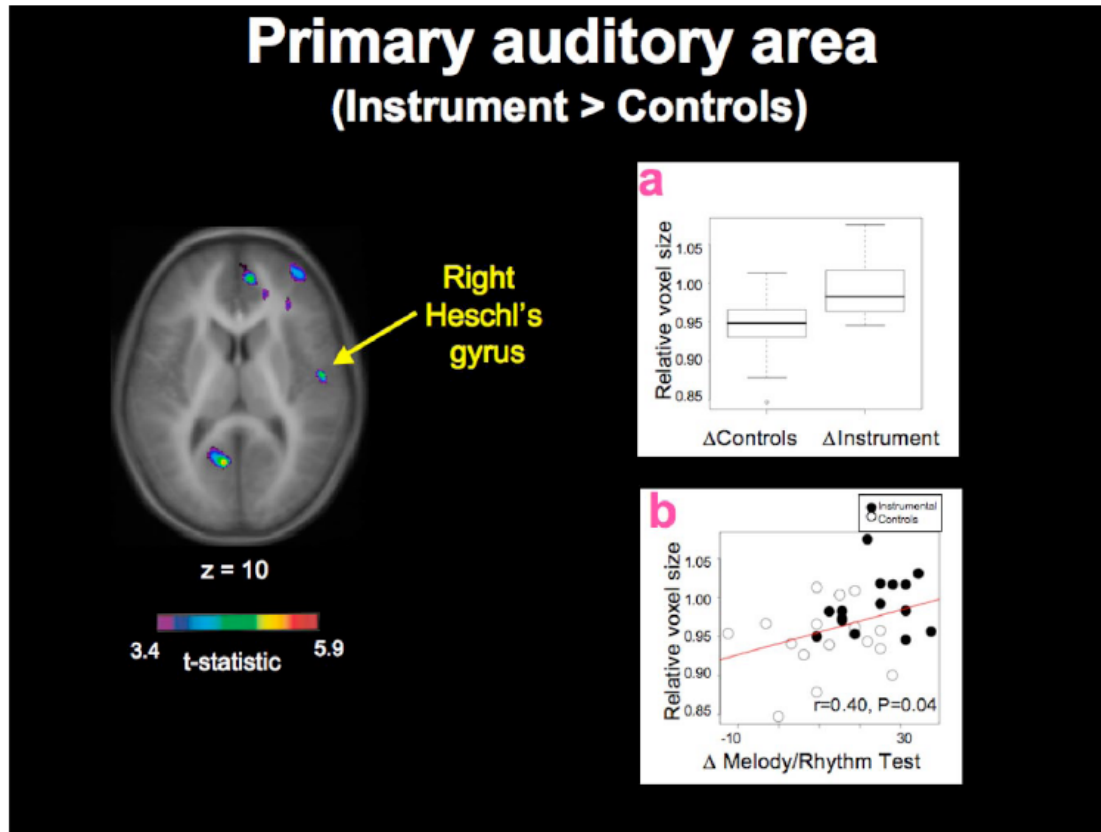


Figure 3. Longitudinal group brain deformation differences and brain–behavioral correlations in right primary auditory area. The brain image (a horizontal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in terms of a t -statistical color map of the significant clusters superimposed on an average MR image of all children ($n = 31$). The yellow arrow points to the right primary auditory region (lateral aspect of Heschl's gyrus). To illustrate the group differences, the relative voxel size is plotted for each group at the most significant (peak) voxel in the right primary auditory region ($x = 55, y = -8, z = 10; t = 4.9, p < 0.1$ at a priori cluster threshold) (a). The significant positive correlations of relative voxel size with behavioral difference scores (from time 1 to time 2) of each child is shown for the melody/rhythm test at the peak voxel in the right primary auditory area (b).



Does Singing Promote Well-Being?: An Empirical Study of Professional and Amateur Singers during a Singing Lesson

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LARS-OLOF HANSSON,⁴ MATS ERICSON,⁵
AND TÖRES THEORELL^{1,2}

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²*Division for Psychosocial Factors and Health, Department of Public Health Sciences,
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³*Department of Psychology, Stockholm University*

⁴*Department of Clinical Chemistry, Karolinska Hospital*

⁵*Department of Industrial Economics, Royal Institute of Technology, Stockholm, Sweden*

This study explored the possible beneficial effects of singing on well-being during a singing lesson. Eight amateur (2m, 6f, age 28–53 yrs) and eight professional (4m, 4f, age 26–49 yrs) singers who had been attending singing lessons for at least six months were included. Continuous ECG was recorded and computerized spectral analysis was performed. Serum concentrations of TNF-alpha, prolactin, cortisol, and oxytocin were measured before and 30 min after the lesson. Five visual analogue scales (VAS, sad-joyful, anxious-calm, worried-elated, listless-energetic, and tense-relaxed) were scored before and after the lesson. In addition, a semi-structured interview was performed.

Heart rate variability analyses showed significant changes over time in the two groups for total power, and low and high frequency power. Power increased during singing in professionals, whereas there were no changes in amateurs. This indicates an ability to retain more “heart-brain connection,” i.e., more cardio-physiological fitness for singing in professional singers, compared to amateur singers. Serum concentration of TNF-alpha increased in professionals after the singing lesson, whereas the concentration in amateurs decreased. Serum concentrations of prolactin and cortisol increased after the lesson in the group of men and vice versa for women. Oxytocin concentrations increased significantly in both groups after the singing lesson. Amateurs reported increasing joy and elatedness (VAS), whereas professionals did not. However, both groups felt more energetic and relaxed after the singing lesson. The interviews showed that the professionals were clearly achievement-oriented, with focus on singing technique, vocal apparatus and body during the lesson. The amateurs used the singing lessons as a means of self-actualization and self-expression as a way to release emotional tensions. In summary, in this study, singing during a singing lesson seemed to promote more well-being and less arousal for amateurs compared to professional singers, who seemed to experience less well-being and more

GRAPE ET AL.

Integrative Physiological & Behavioral Science, January–March 2003, Vol. 38, No. 1, 65–74.



Amateur singers:

“I feel happy when I sing. In the beginning of the lesson, I feel blue. Then it changes, quite dramatically.”

“Singing lessons are a necessity for me, they make me feel like a whole person.”

“I want to feel who I am in a way. My voice is a vital part of me, and I want to express myself as much as possible by means of it.”

Conclusions

The results indicated marked differences between professionals and amateurs with regard to physiological and emotional states. The professionals were more physiologically fit for singing, but did not experience the same well-being as amateurs seemed to do. The amateurs experienced more well-being and were clearly more enthusiastic. They also reported increased joy after the lesson, which the professionals did not.



Dyslexia: A New Synergy Between Education and Cognitive Neuroscience

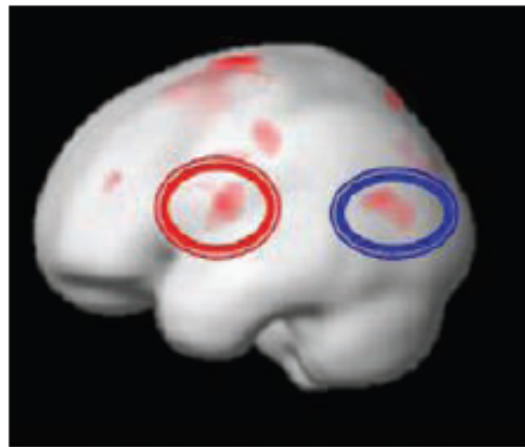
John D. E. Gabrieli

Reading is essential in modern societies, but many children have dyslexia, a difficulty in learning to read. Dyslexia often arises from impaired phonological awareness, the auditory analysis of spoken language that relates the sounds of language to print. Behavioral remediation, especially at a young age, is effective for many, but not all, children. Neuroimaging in children with dyslexia has revealed reduced engagement of the left temporo-parietal cortex for phonological processing of print, altered white-matter connectivity, and functional plasticity associated with effective intervention. Behavioral and brain measures identify infants and young children at risk for dyslexia, and preventive intervention is often effective. A combination of evidence-based teaching practices and cognitive neuroscience measures could prevent dyslexia from occurring in the majority of children who would otherwise develop dyslexia.

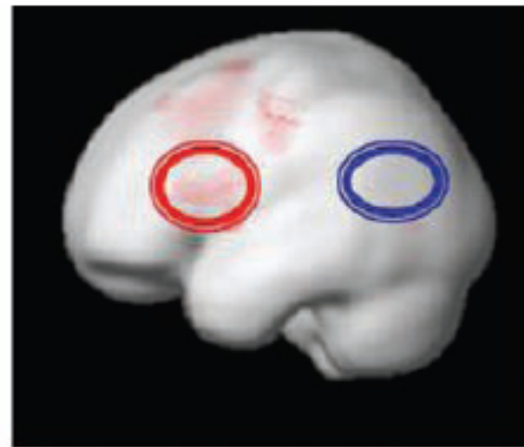
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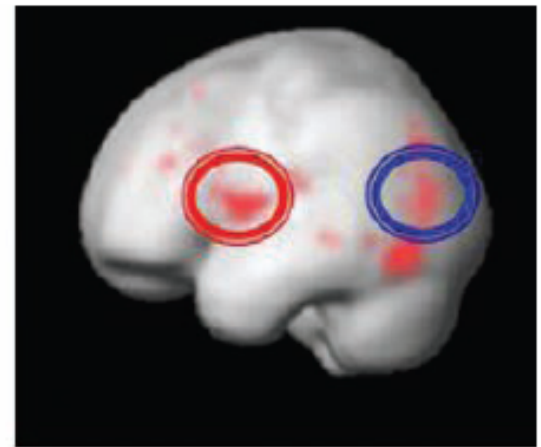
*Vermont Center for
Children Youth & Families*
Vermont Family Based Approach



Typically reading children



Children with dyslexia before remediation

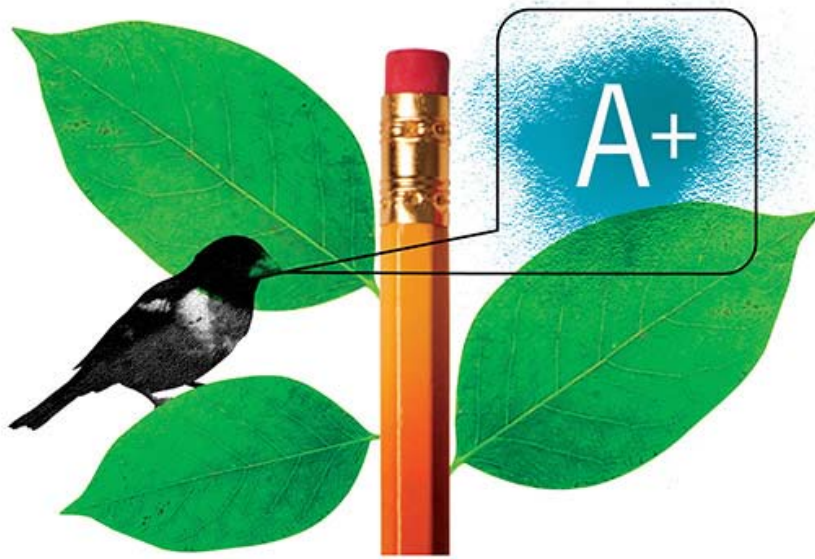


Children with dyslexia after remediation

Fig. 1. Brain activation differences in dyslexia and its treatment [from (36)]. Functional magnetic resonance imaging activations shown on the left hemisphere for phonological processing in typically developing readers (**left**), age-matched dyslexic readers (**middle**), and the difference before and after remediation in the same dyslexic readers (**right**). Red circles identify the frontal region, and blue circles identify the temporo-parietal region of the brain. Both regions are hypoactivated in dyslexia and become more activated after remediation.



The 3 R's? A Fourth Is Crucial, Too: Recess



Stuart Bradford

The best way to improve children's performance in the classroom may be to take them out of it.

New research suggests that play and down time may be as important to a child's academic experience as reading, science and math, and that regular recess, fitness or nature time can influence behavior, concentration and even grades.



School Recess Improves Behavior



Children at the International Community School in Decatur, Ga., playing kickball during recess. (Nicole Bengiveno/The New York Times)

Children who misbehave at school are often punished by having to stay inside at recess. But new research shows that giving children recess actually helps solve behavioral problems in class.



Summary: Debunking and Demystifying Misconceptions

- Brain development can now be studied and it is clear that the structure and function of the brain changes with development.
- Brain anatomy and physiology can be modified by genetic and environmental stresses.
- **How to study genetic and environmental stressors in childhood behavior: the need for a family based developmental approach.**



ESCAP 2009

“It is time for us to admit that although we do not know exactly how, we do have evidence that genes and environment do work together”.

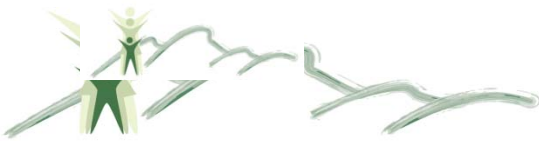
Sir Professor Michael Rutter

ESCAP Opening Lecture, 2009

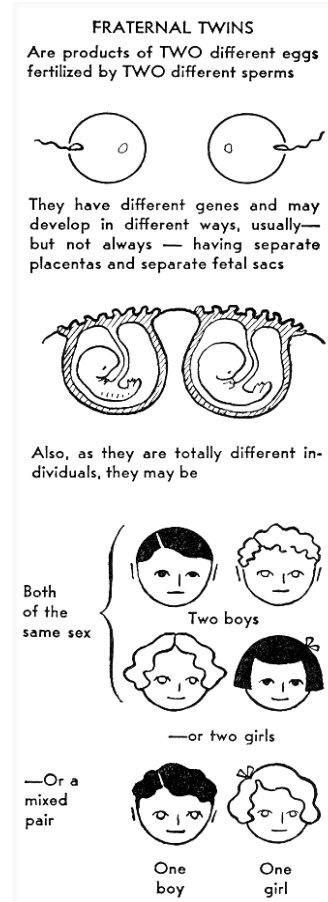
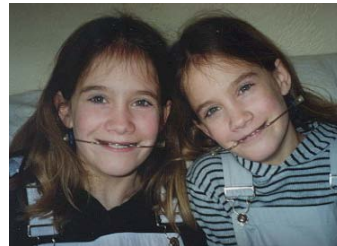
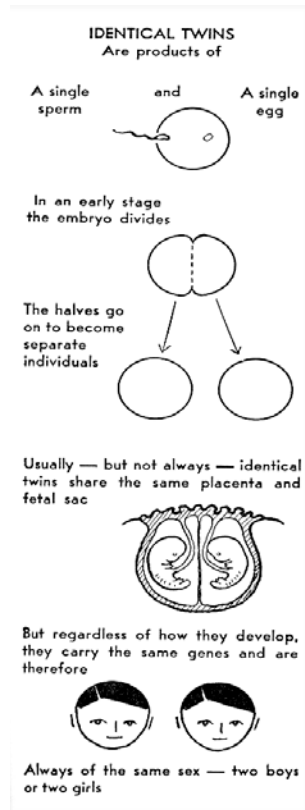


How Have We Contributed to This Knowledge?

- Twin Studies
- Family Studies
- Molecular Genetic Studies
- Taxonomic Studies



The Classical Twin Design



The difference in relatedness between MZ and DZ twin pairs gives information about the strength of the genetic and environmental influences



Why Are Twins Different? Genes? Environmental Factors? Or their interaction?

Where's Mama?



It would be so cool to jump from here...



Birth

> 30,000 pairs, born after 1986

age 2

Motor development, parental smoking, growth

age 3

CBCL both parents

age 5

DCB both parents

age 7

CBCL/TRF/Connors parents & teachers

age 10

CBCL/TRF/Connors parents & teachers

age 12

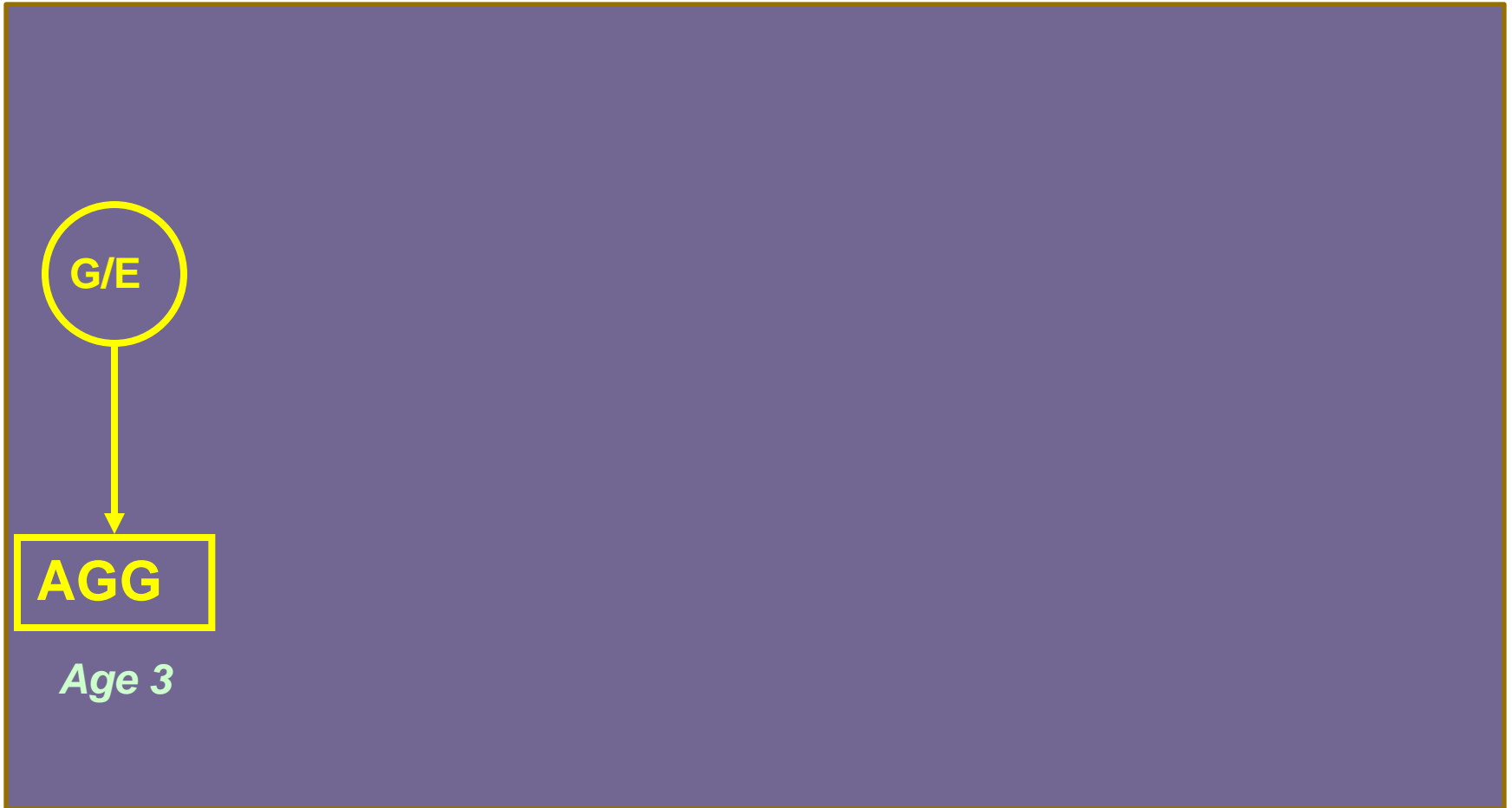
CBCL/TRF/Connors parents & teachers

age 14,16,18

YSR & DHBQ



Developmentally Sensitive Analysis



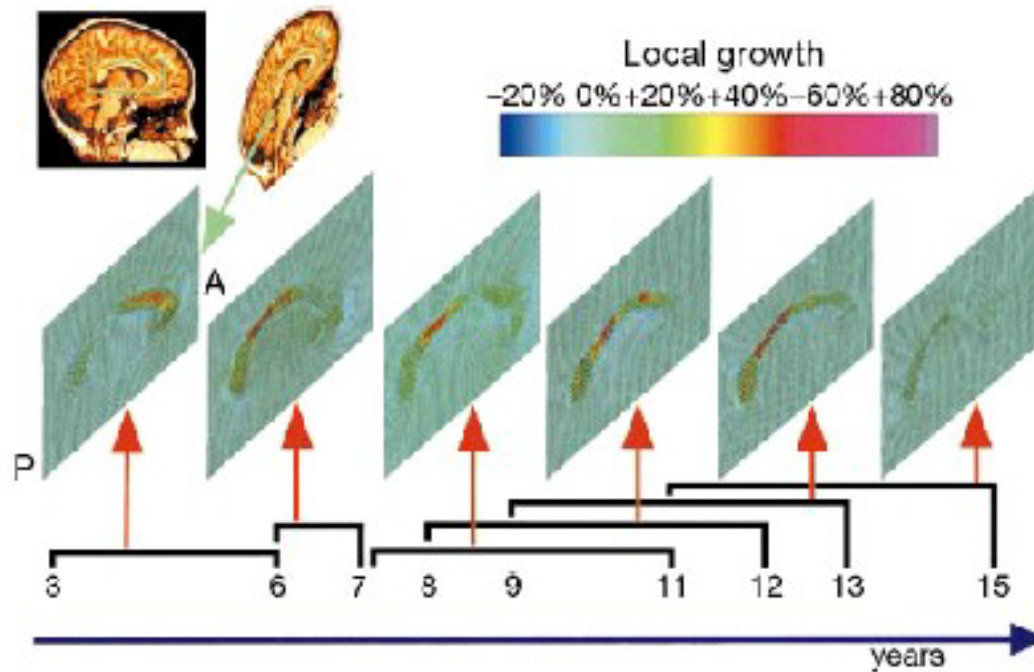
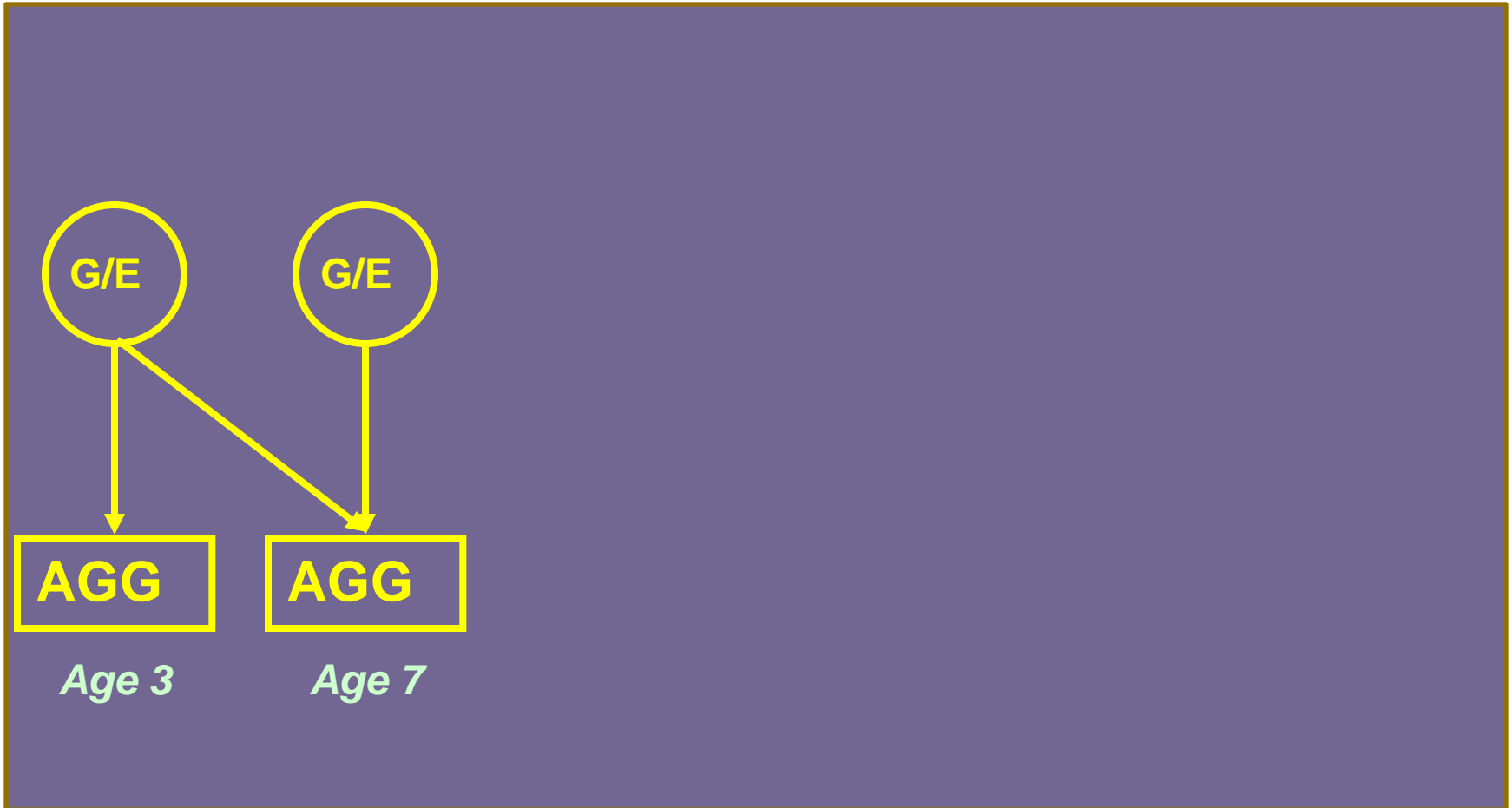


Figure 1 Growth patterns in the developing human brain detected at ages 3–15 years. A rostro-caudal wave of peak growth rates is detected in young normal subjects scanned repeatedly across time spans of up to four years. Between ages 3 and 6 years, peak growth rates (red colours; 60–80% locally) were detected in the frontal circuits of the corpus callosum, which sustain mental vigilance and regulate the planning of new actions. Older children displayed fastest growth at the callosal isthmus, which innervates temporo-parietal systems supporting spatial association and language function. Between ages 11–15 years, growth rates still peak at the isthmus, but are attenuated.

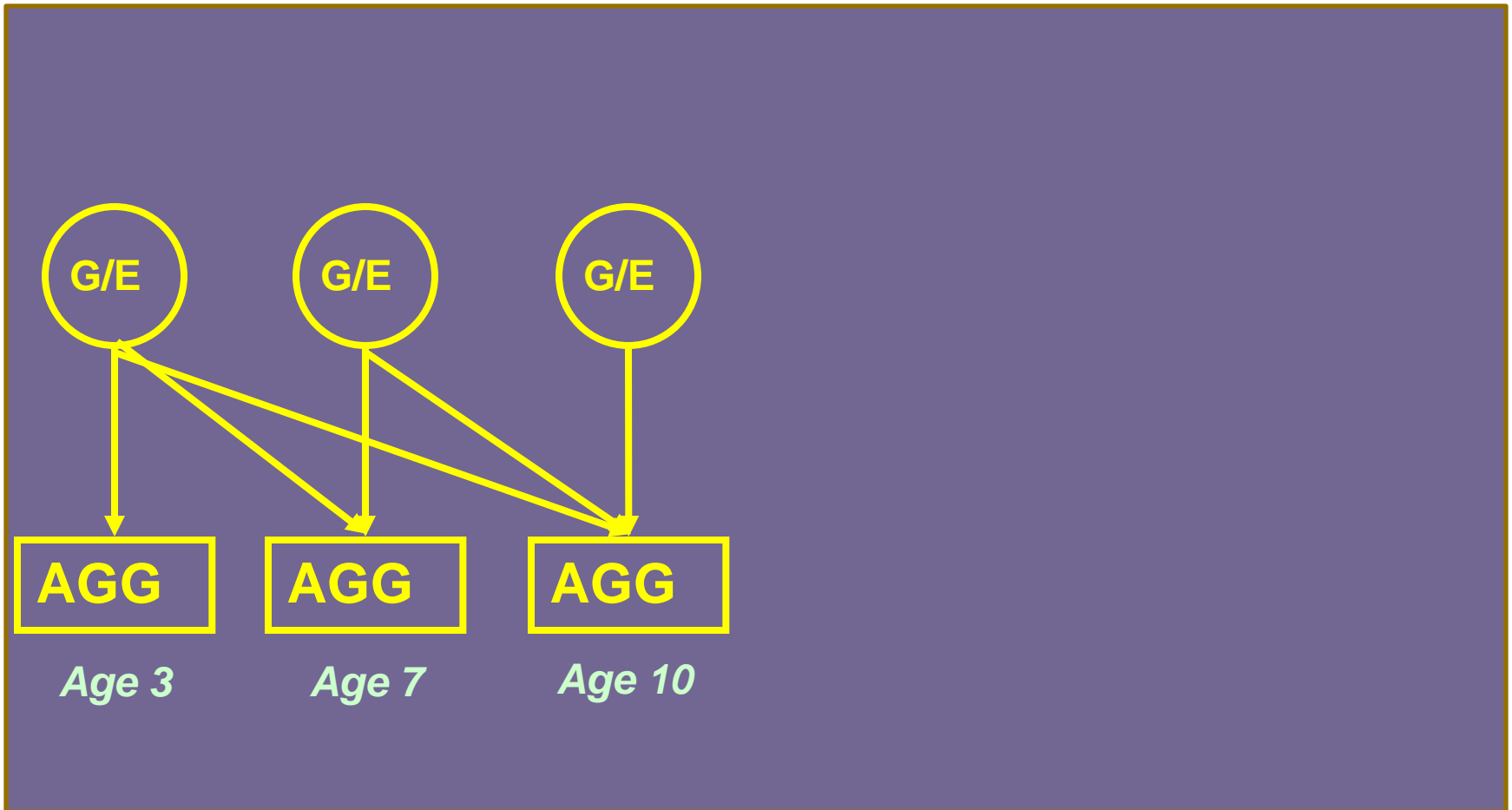
Thompson et al., 2000; *Nature* 484:190-193



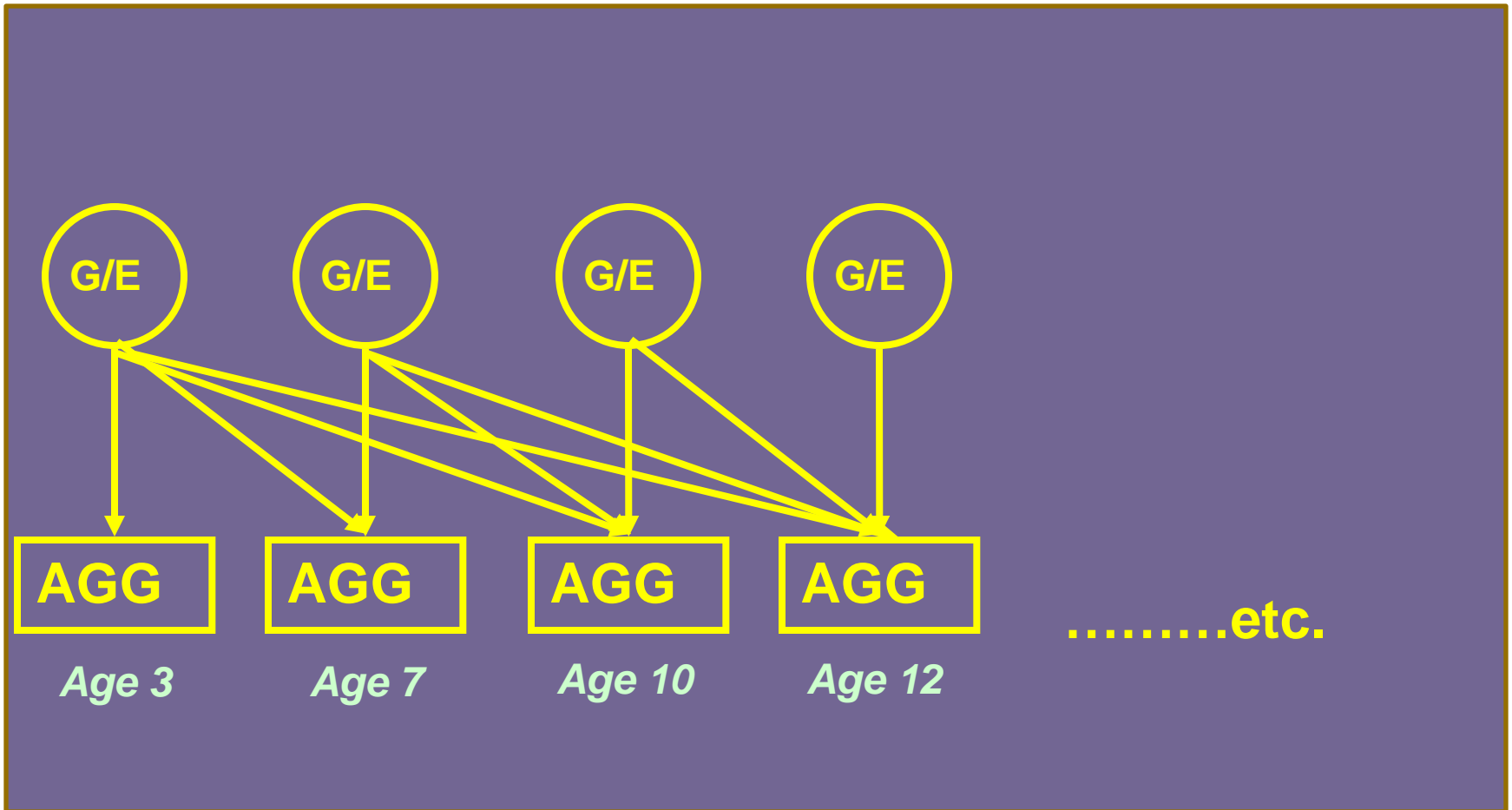
Developmentally Sensitive Analysis



Developmentally Sensitive Analysis



Developmentally Sensitive Analysis



Summary of our genetic studies of ADHD, OCD, Anxiety, Depression, Aggression, and Bipolar Illness

- We have shown that all emotional disorders are influenced by both genetic and environmental influences.
- We should search for genes and risk and protective factors that may put individuals at risk for or protect them from psychiatric disorders.
- We are now doing these studies.

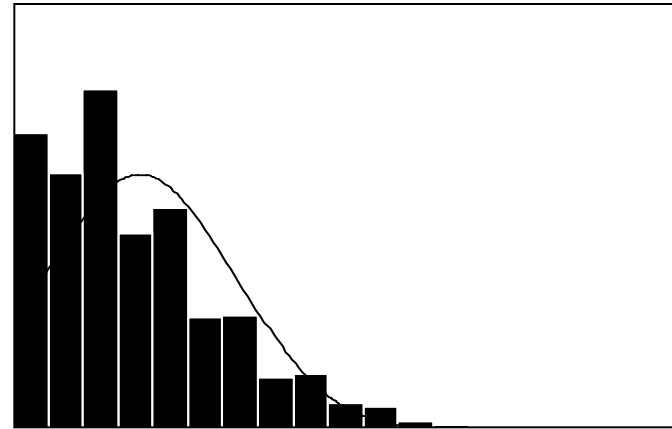


Moving to Wellness and The Business of Environment

- How to measure it?
- What is it?
- Why do we care?



Wellness



"Wellness"

Normal
Behavior

Problem
Behavior

65%

35%

25%

40%

35%



The Dutch Health and Behavior Questionnaire (DHBQ)

Happiness (Lyobomirsky & Lepper, 1999)

Life satisfaction (Horley, 1984)

Self-esteem (Kajita et al., 2002)

Sports participation/physical activity (Babyak, 2000)

Diet/eating habits (Stokes & Frederick-Recascino, 2003)

Academic performance and leisure time (Wilens et al., 2002)

Religiosity



“Environmental” Measures

The Dutch Health and Behavior Questionnaire (DHBQ)

1. **Zipcode/SES**
2. **Medication**
3. **Peer smoking/drinking**
4. **Family Relation** (Family Assessment Device)
5. **Family Conflict** (Gezinsklimaatschaal)
6. **Living situation** (with both parents?)
7. **Family size**
8. **Family situation** (divorce/parental death)
9. **Life events**



The Role of Familial Conflict in Adolescent AGG: Preliminary Results from the DHBQ

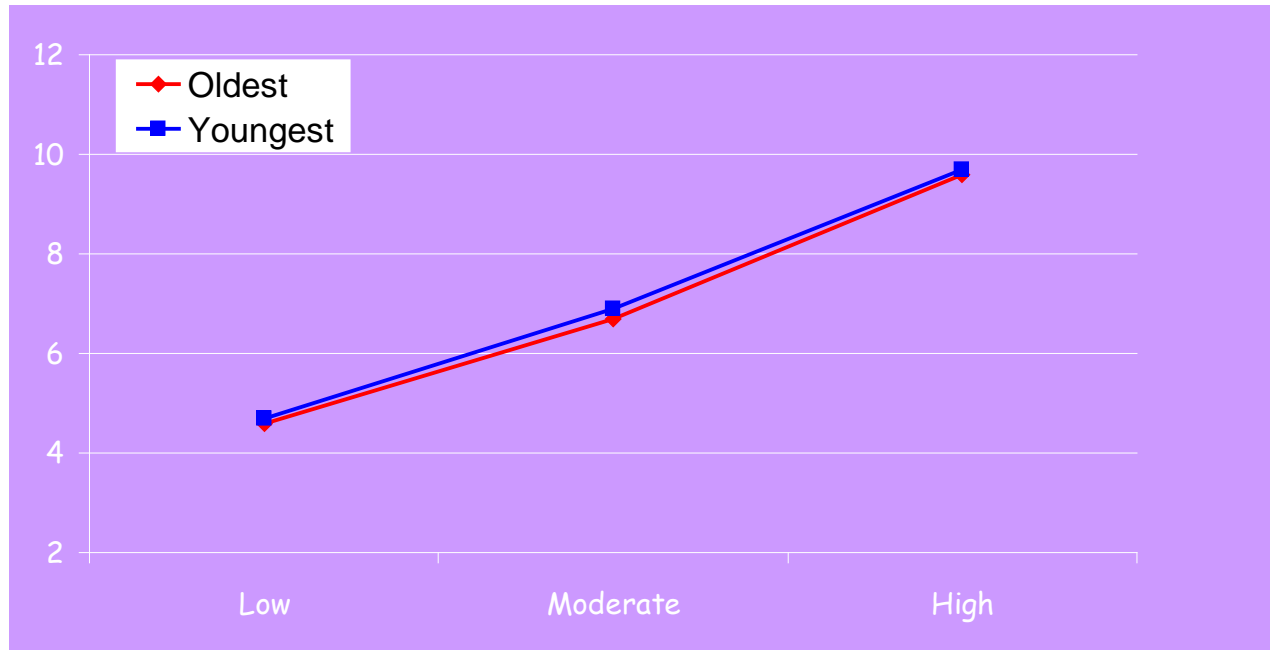
I. Are levels of AGG higher in adolescents from families with moderate to high levels of Familial Conflict?

II. Does the heritability of AGG vary by the level of Familial Conflict → Is there evidence for a G-E interaction of Familial Conflict and AGG?



Preliminary Results

I. Main effect of familial conflict on adolescent AGG: significantly higher levels of AGG in families with high family conflict than low family conflict ($p= 0.00$).



Preliminary Results

II. Different Heritabilities of AGG at Different Levels of Family Conflict

	r_{MZ}	r_{DZ}	Results
Low	.52	.17	Genetic
Moderate	.43	.16	50/50
High	.37	.23	Environment

Evidence for GxE !



Protective Factors: Sports Participation

69.9% of the **adolescent girls** participate in sports regularly.

These girls generally:

- * report better general health (p=.000)
- * have later onset of smoking (p=.010)
- * smoke less (p=.000)
- * show less use of soft drugs (p=.000)
- * have less smoking (p=.020) and/or soft drugs using friends (p=.001)
- * report less incidents of being drunk (p=.005)
- * show less Rule-Breaking behavior (p=.000)
- * are happier (p=.020)
- * are more satisfied with their lives (p=.040)
- * report a higher quality of life (p=.018).



Protective Factors: Sports Participation

76.6 % of the **adolescent boys** regularly participate in sports.

These boys generally:

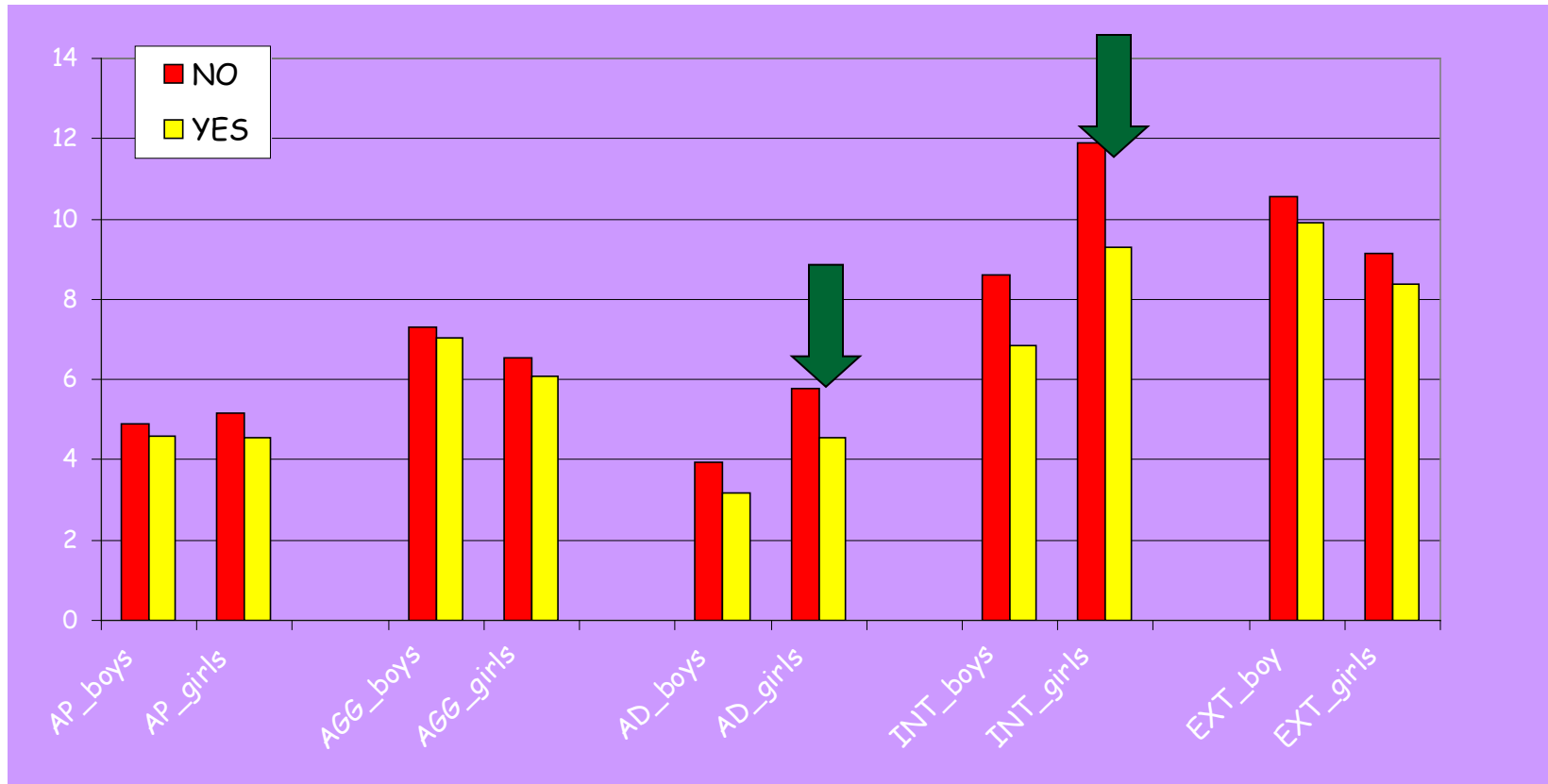
- * feel healthier (p=.000)
- * feel happier (p= .020)
- * report a higher quality of life (p=.006).
- * trend towards a lower frequency of smoking (p=.063)
- * trend towards less incidents of being drunk the last month (p=.094).



Preliminary Results of Adolescents Data

(The Dutch Health and Behavior Questionnaire)

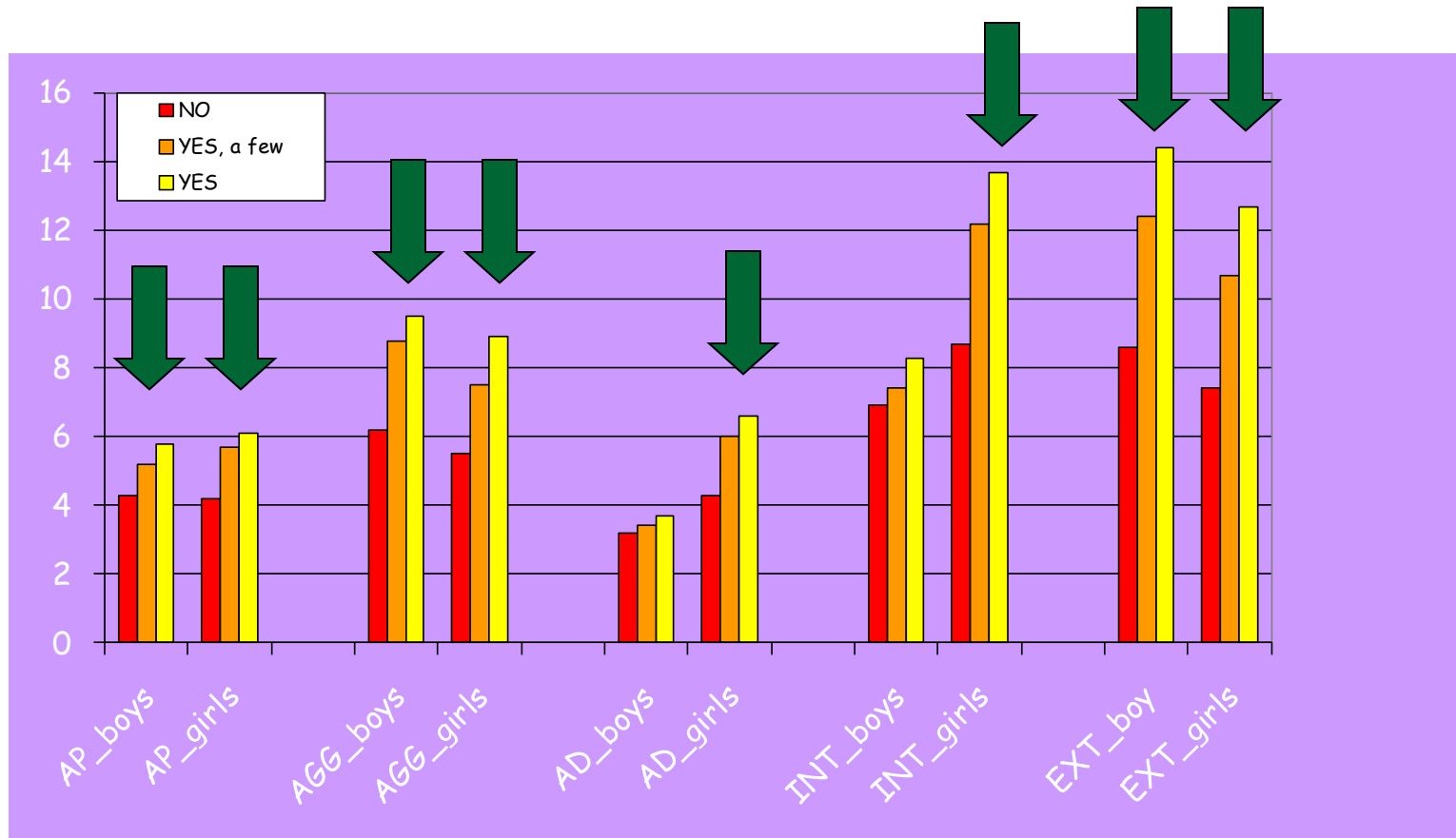
Exercise Behavior and Psychopathology



Preliminary Results of Adolescents Data

(The Dutch Health and Behavior Questionnaire)

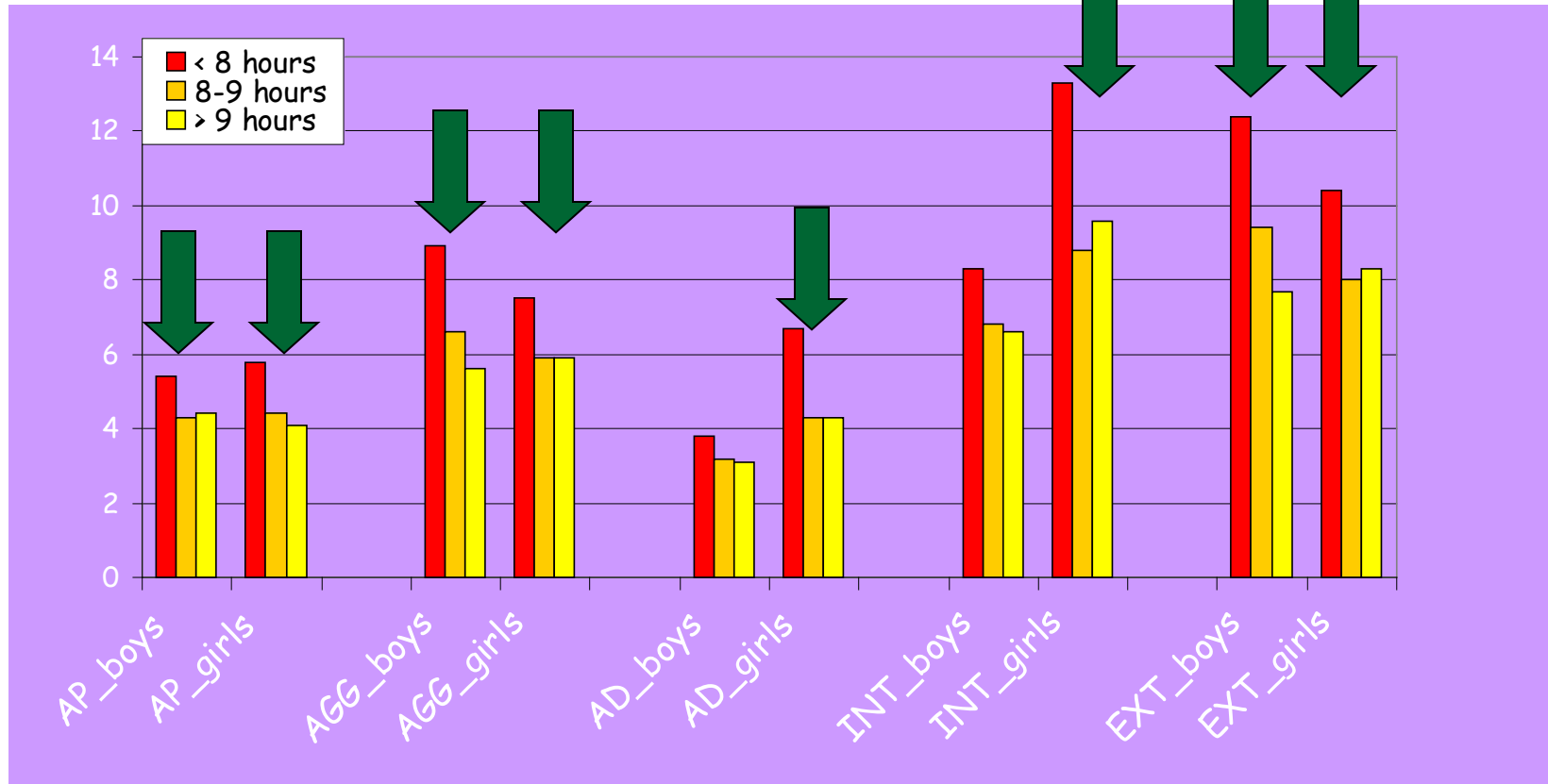
Smoking Behavior and Psychopathology



Preliminary Results of Adolescents Data

(The Dutch Health and Behavior Questionnaire)

Sleep and Psychopathology



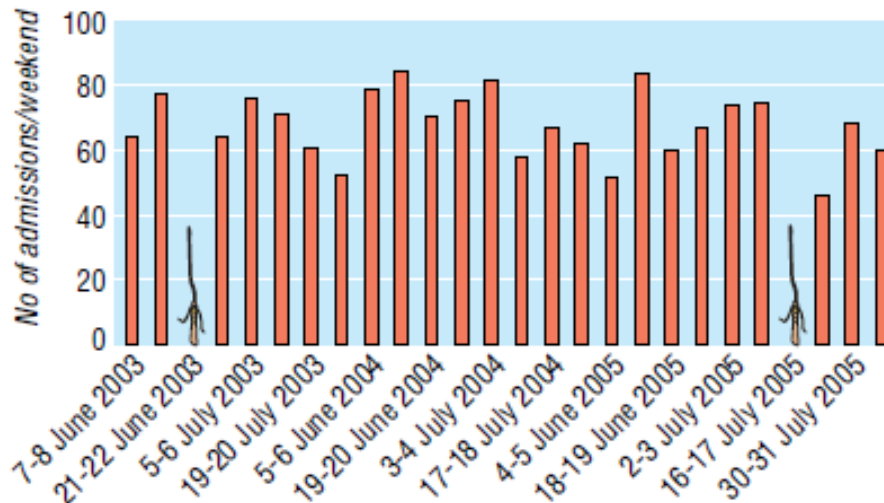
The Harry Potter effect!

BMJ

Harry Potter casts a spell on accident prone children

Stephen Gwilym, Dominic P J Howard, Nev Davies and Keith Willett

BMJ 2005;331;1505-1506
doi:10.1136/bmj.331.7531.1505



What is already known on this topic

Traumatic childhood injuries are a serious source of mortality and morbidity

There is a seasonal variation in the incidence of injuries in muggle children, with the highest numbers occurring during periods of longest daylight, warm weather, and school holidays

What this study adds

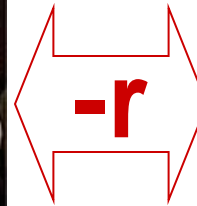
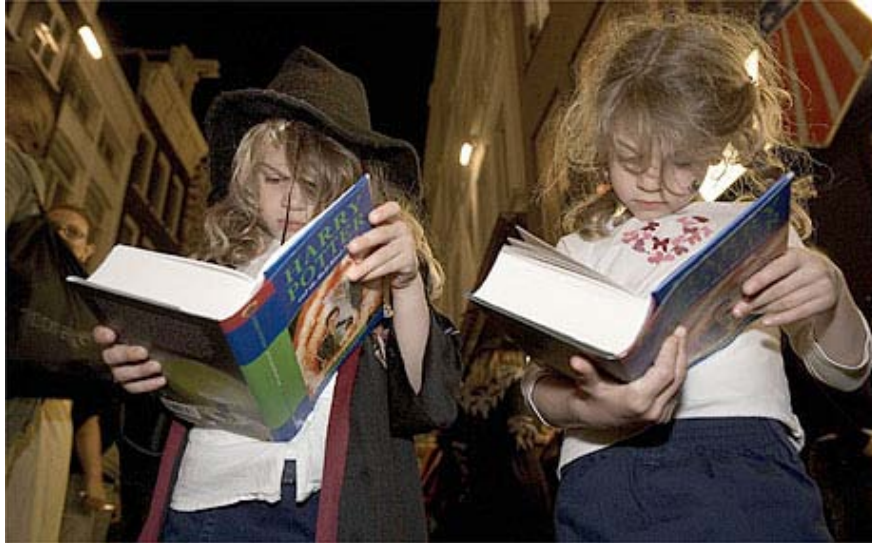
Releasing Harry Potter books seems to reduce the incidence of traumatic injuries in children

Note: Firebolt brooms indicate the two weekends when the latest Harry Potter books were release

Children attending emergency department with musculoskeletal injuries on summer weekends 2003-5



The Harry Potter effect!



Introduction: Leisure Time & Aggression

Journal of Adolescence 27 (2004) 5–22

The effects of violent video game habits on adolescent hostility, aggressive behaviors, and school performance

Douglas A. Gentile^{a,*}, Paul J. Lynch^b, Jennifer Ruh Linder^c, David A. Walsh^a

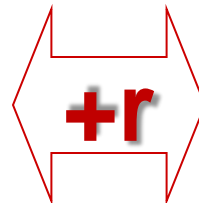
^a*National Institute on Media and the Family, 606 24th Avenue South, Suite 606, Minneapolis, MN 55454, USA*

^b*University of Oklahoma Medical School, USA*

^c*Linfield College, USA*

8th and 9th grade students

**Violent
Videogame
Exposure**



**-Physical fights
-Hostility**



Introduction: Leisure Time & Aggression

Pediatrics 2007;120:993-999

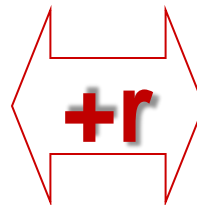
Violent Television Viewing During Preschool Is Associated With Antisocial Behavior During School Age

Dimitri A. Christakis, MD, MPH, Frederick J. Zimmerman, PhD

Department of Pediatrics, Child Health Institute, University of Washington, Seattle, Washington; Department of Health Services, Seattle, Washington; Seattle Children's Research Institute, Children's Hospital and Regional Medical Center, Seattle, Washington

Children 2- 5 yo

**Violent TV
viewing**



Children 7-10 yo

**Antisocial
Behavior (CBCL)**



Introduction: Leisure Time & Aggression

CYBERPSYCHOLOGY & BEHAVIOR

Volume 10, Number 2, 2007

Incidence and Correlates of Internet Usage Among Adolescents in North Cyprus

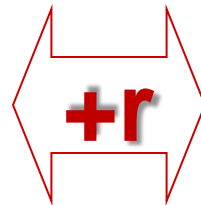
FATIH BAYRAKTAR, M.A.¹ and ZÜBEYIT GÜN, M.A.²

¹Department of Psychology, Ankara University, Sıhhiye, Ankara, Turkey.

²Department of Psychology, Sorbonne University, Paris, France.

Elementary & High school students

**Internet use for murdering,
bombing & fighting games**



**-Antisocial Aggression
-Aggression towards self**



Introduction: Leisure Time & Aggression

Personality and Individual Differences 42 (2007) 1453–1465

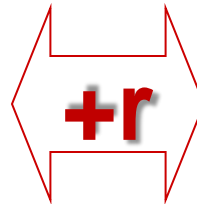
Evaluation of a Spanish version of the Buss and Perry aggression questionnaire: Some personal and situational factors related to the aggression scores of young subjects

Carmen Santisteban *, Jesús M. Alvarado, Patricia Recio

Instituto de Estudios Biofuncionales, Universidad Complutense de Madrid, Paseo Juan XXIII 1, 28040 Madrid, Spain

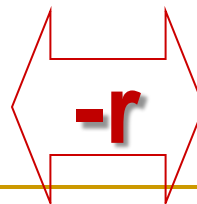
Adolescents 9-17yo

-Video Games
-Television



-Aggression
-Anger

-Reading



-Hostility

-Homework

Method: Sample & Measures

Measures: Longitudinal Survey Study

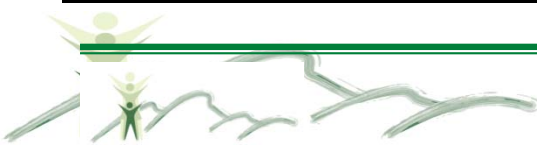
➤ How much time does the child spend in the following activities?

- Watching Television/Video/DVD
- Computergames/Gameboy
- Computer/Internet
- Listening Music
- Music instrument/Choir
- Reading books
- Drawing/Sculpting
- Handwork

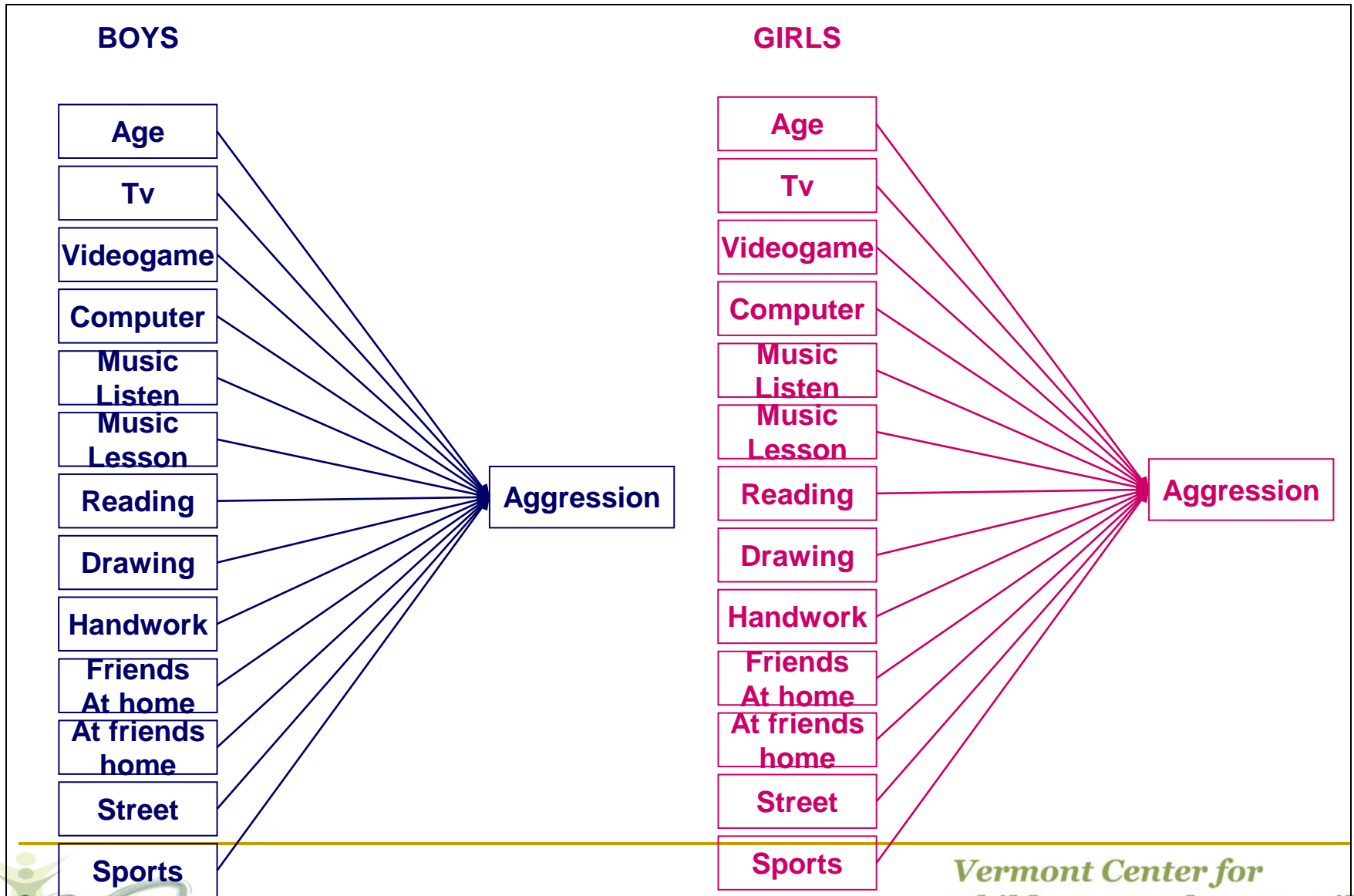
- At home with friends
- At friends home
- On the street with friends
- In the sportsclub or with scouts

Answer Categories (1-7):

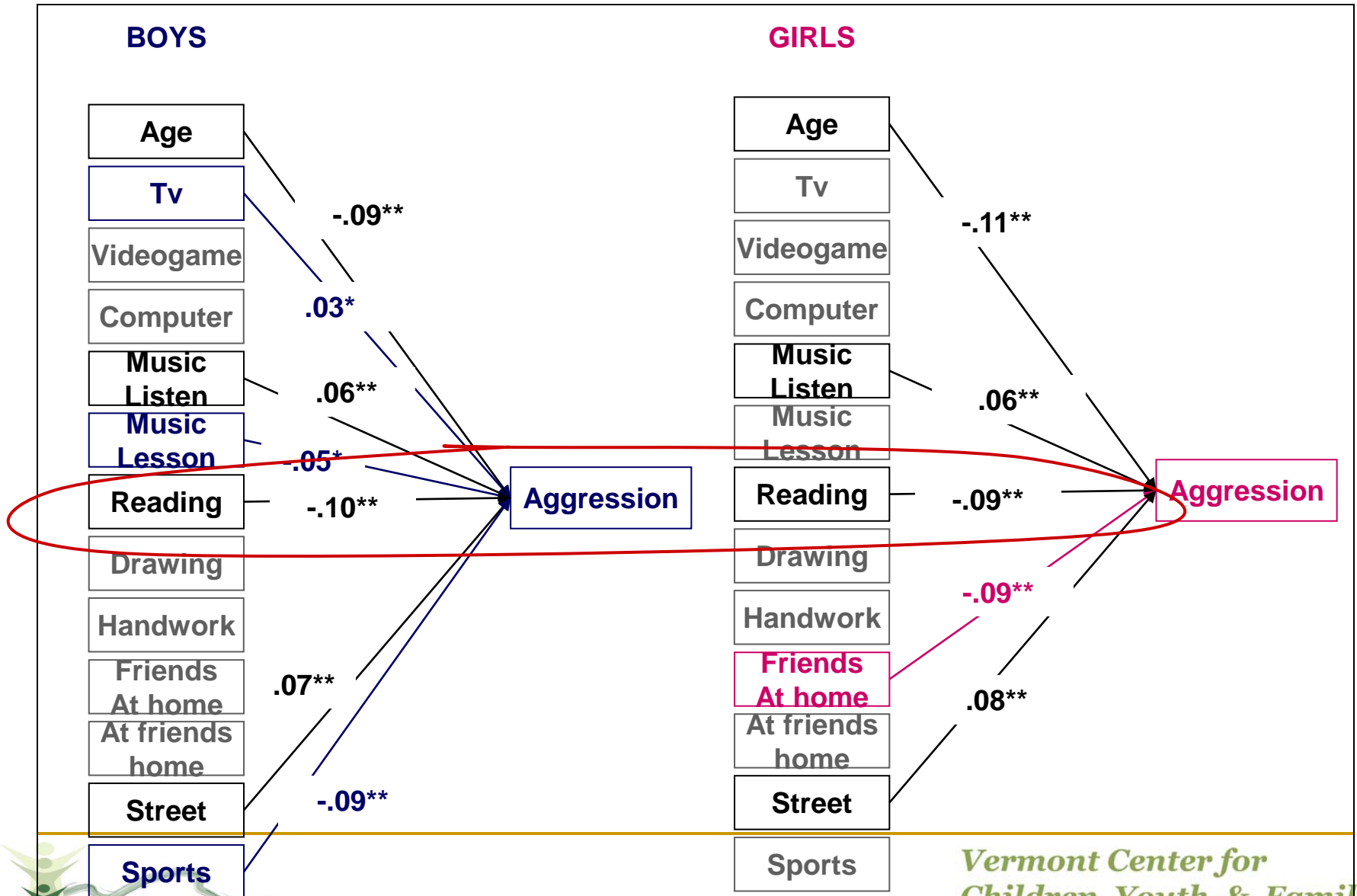
every day, almost every day,
a couple of times a week,
once a week, less than once
a week, once so far, never.



Results: Regression Analyses



Results: Regression Analyses



Conclusions

- 1) **Reading** is significantly and **negatively related** to **aggression**
- 2) **Reading** is partially **heritable** $h^2=.24$
 - ✓ **Mostly** explained by **environmental** factors **shared** by family members
- 3) **Aggression** is mostly **heritable** $h^2=.64-.74$
- 4) **Relationship** between Reading and Aggression is **40-45%** due to common **genetics**, and **60-55%** due to **shared environment**



Conclusions

5) The relation between reading and aggression is causal at a genetic level:

- ✓ **Reading moderates** genetic and environmental effects unique to aggression + r_g correlation is low and constant → The results are likely to reflect a process of **Social Causation** instead of a Selection Process.

6) For boys, reading

- ✓ **protects from the deleterious genetic influence on aggression**
- ✓ **enhances positive shared environmental variation for aggression**



ESCAP 2009

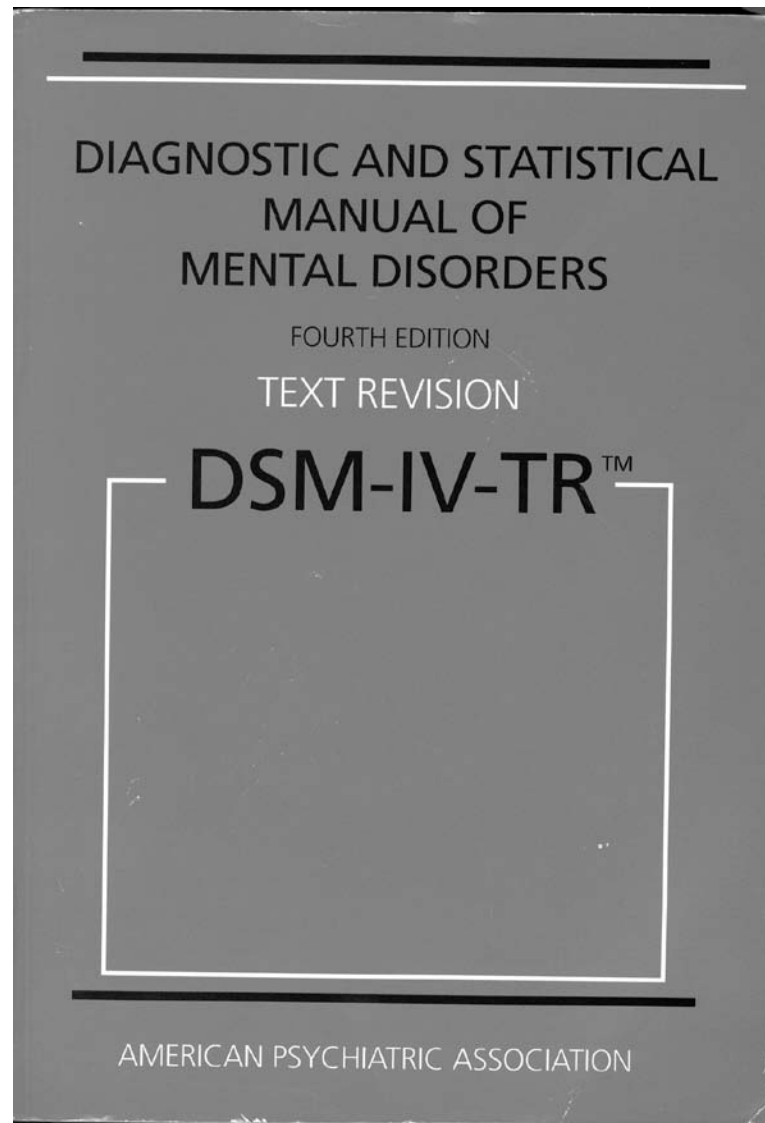
“It is time for us to admit that, although we do not know exactly how, we do have evidence that genes and environment do work together.”

Sir Professor Michael Rutter
ESCAP 2009 Opening Lecture



**Variance NOT
Considered in
The DSM-IV**

Quantitative
Development
Gender
Informant
Ethnicity



International Journal of Methods in Psychiatric Research
Int. J. Methods Psychiatr. Res. 16(S1): 000–000 (2007)
Published online in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/mpr.217



A dimensional approach to developmental psychopathology

JAMES J. HUDZIAK,^{1,2} THOMAS M. ACHENBACH,¹ ROBERT R. ALTHOFF,¹ DANIEL S. PINE³

1 University of Vermont, Burlington, VT, USA

2 Vrije University, Amsterdam, The Netherlands

3 National Institute of Mental Health, Bethesda, MD, USA



**Vermont Center for
Children Youth & Families**
Vermont Family Based Approach

Please print. Be sure to answer all items.

Below is a list of items that describe children and youths. For each item that describes your child **now or within the past 6 months**, please circle the **2** if the item is **very true or often true** of your child. Circle the **1** if the item is **somewhat or sometimes true** of your child. If the item is **not true** of your child, circle the **0**. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know)

1 = Somewhat or Sometimes True

2 = Very True or Often True

- | | | | | | | | |
|------------------------------------|------------------------------------|------------------------------------|--|------------------------------------|------------------------------------|------------------------------------|--|
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 1. Acts too young for his/her age | <input type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 32. Feels he/she has to be perfect |
| <input type="radio"/> 0 | <input checked="" type="radio"/> 1 | <input type="radio"/> 2 | a2. Drinks alcohol without parents' approval
(describe): <u>3x</u> | <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 33. Feels or complains that no one loves him/her |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 3. Argues a lot | <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 34. Feels others are out to get him/her |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | a4. Fails to finish things he/she starts | <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 35. Feels worthless or inferior |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | a5. There is very little he/she enjoys | <input type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 36. Gets hurt a lot, accident-prone |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 6. Bowel movements outside toilet | <input type="radio"/> 0 | <input checked="" type="radio"/> 1 | <input type="radio"/> 2 | 37. Gets in many fights |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 7. Bragging, boasting | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 38. Gets teased a lot |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 8. Can't concentrate, can't pay attention for long | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 39. Hangs around with others who get in trouble |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 9. Can't get his/her mind off certain thoughts;
obsessions (describe): <u>computers;
people who cross him</u> | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 40. Hears sound or voices that aren't there
(describe): _____ |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 10. Can't sit still, restless, or hyperactive | <input type="radio"/> 0 | <input checked="" type="radio"/> 1 | <input type="radio"/> 2 | 41. Impulsive or acts without thinking |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 11. Clings to adults or too dependent | <input type="radio"/> 0 | <input checked="" type="radio"/> 1 | <input type="radio"/> 2 | 42. Would rather be alone than with others |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 12. Complains of loneliness | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 43. Lying or cheating |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 13. Confused or seems to be in a fog | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 44. Bites fingernails |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 14. Cries a lot | <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 45. Nervous, highstrung, or tense |
| <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 15. Cruel to animals | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 46. Nervous movements or twitching (describe):

_____ |
| <input type="radio"/> 0 | <input type="radio"/> 1 | <input checked="" type="radio"/> 2 | 16. Cruelty, bullying, or meanness to others | <input checked="" type="radio"/> 0 | <input type="radio"/> 1 | <input type="radio"/> 2 | 47. Nightmares |



CBCL/6-18 - Syndrome Scale Scores for Boys 12-18

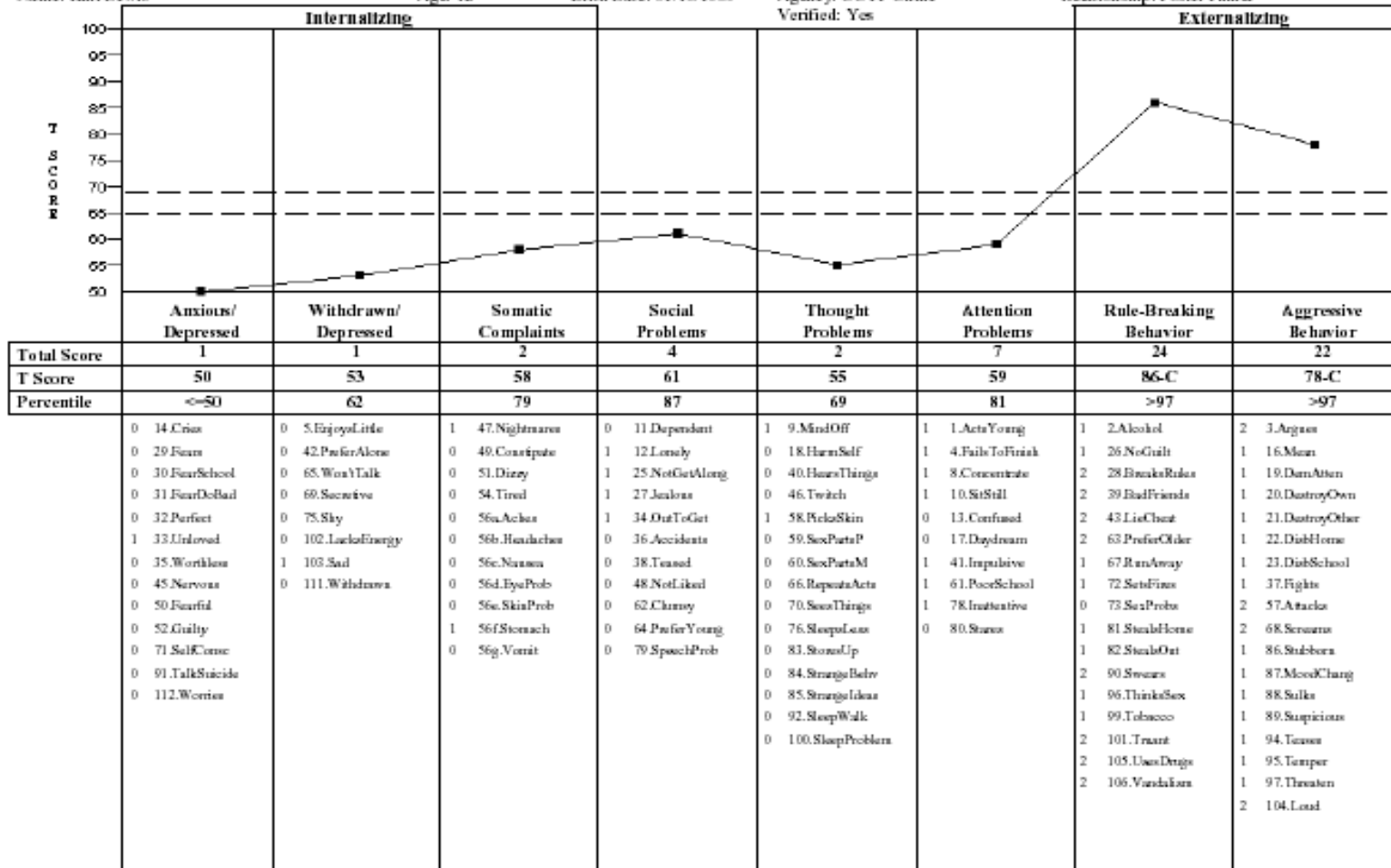
ID: 4001
Name: Karl Lewis

Gender: Male
Age: 12

Date Filled: 02/20/2001
Birth Date: 01/10/1989

Clinician: M. Ivanova
Agency: CCYF Clinic
Verified: Yes

Informant:
Relationship: Foster Father



CLINICAL
NORMAL

Copyright 2001 T.M. Achenbach

B = Borderline clinical range; C = Clinical range

Broken lines = Borderline clinical range



Syndromes

Anxious/Depressed ~ DSM Anxiety Disorders

Withdrawn/Depressed

Somatic Complaints

Social Problems

Thought Problems

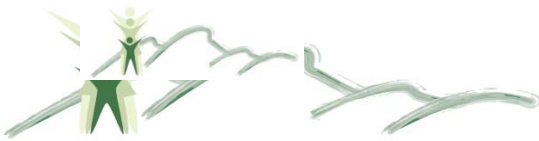
Attention Problems~DSM ADHD

Rule-Breaking Behavior

Aggressive Behavior~DSM ODD, CD, and SUD

Obsessive Compulsive Syndrome

Juvenile Bipolar Disorder



Forms Translated Into Over 90 Languages

For office use only
ID#

兒童行為調查問卷 (一歲半至五歲)
(Child Behavior Checklist for Ages 1½-5)

子女姓名:	籍貫: 出生地點:	父母通常的職業, (即使現時沒有工作), 業類別。 例如: 司機、教師、家庭主婦、工人、職員、皮鞋售貨員、警察。 父親職業: _____ 母親職業: _____
性別: <input type="checkbox"/> 男 <input type="checkbox"/> 女	年齡:	
填寫日期: 年 月 日	出生日期: 年 月 日	

請根據你對貴子女行為的看法填寫此問卷 (即使你的觀點與其他不同), 請隨意填在每項目旁

此問卷之填報人 (請填上你的姓名): _____

Slegs vir kantoorgebruik
ID#

GEBRUIK ASB. DRUKSKRIF **KINDERGEDRAG VRAELYS VIR OUDERDOM 1½-5 JAAR**

KIND SE VOLLE NAME:

Eerste	Middel	Van
--------	--------	-----

KIND SE GESLAG: Seun: <input type="checkbox"/> Meisie: <input type="checkbox"/>	KIND SE OUDERDOM	KIND SE ETNIESE GROEP OF RAS
---	------------------	------------------------------

VANDAG SE DATUM: Mnd _____ Dag _____

GEBORTE DATUM: Mnd _____ Dag _____

BEROEP VAN OEUERS, al werk die ouer nie op die oomblik nie (wees asb. spesifiek in u benaming, bv. siviele ingenieur, hoërskool onderwyseres, huisvrou, arbeider, verkoopsman, weermagsersant ens.)

BEROEP VAN VADER: _____

BEROEP VAN MOEDER: _____

HIEDIE VORM IS INGEVUL DEUR: (Skryf u volle naam in drukskrif)

Пожалуйста, впишите ответы печатными буквами

Анкета для Родителей Детей 6 – 18 лет
(Russian translation of the Child Behavior Checklist for Ages 6-18)

Только для служебного использования
ID №

CHILD BEHAVIOR CHECKLIST FOR AGES 1½ - 5

ФАМИЛИЯ	ИМЯ РЕБЕНКА	
ПОЛ РЕБЕНКА	ВОЗРАСТ РЕБЕНКА	НАЦИОНАЛЬНОСТЬ
<input type="checkbox"/> муж. <input type="checkbox"/> жен.		
СЕГОДНЯШНЯЯ ДАТА	ДАТА РОЖДЕНИЯ РЕБЕНКА	
Число _____ Месяц _____ Год _____	Число _____ Месяц _____ Год _____	

ШКОЛЬНЫЙ Ответы на вопросы, продолжайте, пока вы не увидите следующее поле

TARRESA-ILALCHAA AMALA MUCAA
WAGGAA 1 ½ -5FI

For office use only
ID #

<i>Maaloo Addan-baasi katabii.</i>	Maqaa Jalqabaa Gidduu Boodaa	AKAKUU DALAGA WARRAA YEROO BAA'E, yoolle amma hin dalagne. <i>Maaloo addan-baasi-fakkeenyaaf, Makaanikii Makinaa, Barsiisaa Mana-barumsaa Oll-aanaa, Hojjeetaa-humnaa Hojjeetaa Maashinaa rooga baasuu irra Gurgurtuu Kephaa Ajjajaa 10 Lalluu.</i>
Saalaa Mucaa Umurii Mucaa Oomoo ykn Saanyii Mucaa	<input type="checkbox"/> Dhira <input type="checkbox"/> Durba	AKAAKUU DALAGA ABBAA
Guyyaa Harqaa Guyyaa Dhalootaa Mucaa	J'a _____ Guyyaa _____ Bara _____	AKAAKUU DALAGA HAADHAA
J'a _____ Guyyaa _____ Bara _____	J'a _____ Guyyaa _____ Bara _____	FOORMII KANA KAN GUUTEE: (Maqaa kee guutummati addan-baasi katabi)
Maaloo foormii kana guutti ilalcha amala mucaa keef qabdu calaqaesuf; yoolle namooni bira itti waliif galu hin malle. Bilisummaan sitti hadhaga'amu qeqqanna bira tokko tokkoo waan sanaa birati ykn iddo fuula 2 irratti dhiyaate gubbaati. Waan hundaaf deebii laachu kee hubadhu.	Firooma ati mucaa irraa qabdu: <input type="checkbox"/> Haadha <input type="checkbox"/> Abba <input type="checkbox"/> Kan-bira (Addan baasi):	

استبيان سلوك الأطفال للأعمار من 1.5 إلى

أولاً: بيانات عامة عن الطفل:

اسم الطفل: _____ اسم الأب: _____ اسم الجد أو العائلة: _____

الجنس: ذكر أنثى

العمر: يوم: _____ شهر: _____ سنة: _____

تاريخ الميلاد: _____ / _____ / _____

الجنسية: _____

تاريخ اليوم: 200 / /

ثانياً: بيانات عن الوالدين:

عمل الوالدين المعتاد (حتى ولو كان متعتلاً عن العمل حالياً).
المرجو أن تكون المهنة المذكورة محددة: كأن نقول مثلاً "مدرس ثانوي" وليس "يعمل أول بالشرطة" وليس "ضابط شرطة"، وهكذا.

1½-5 वर्ष की उम्र के बच्चों के व्यवहार का जाच-सूचा

वर्ष का पूरा नाम	पहला	द्वितीय	ओपियो	माता-पिता के सामान्य कार्य का पता, जैसे ही वे अब काम नहीं कर रहे हैं। कृपया लिए, जैसे मैकेनिक, हाइस्कूल टीचर, होमकेकर, कन्सु, तीव्र औपचारिक वॉन वाहन नहीं को-जे वाहन।
वर्ष का तिथि	वर्ष की उम्र	वर्ष का नली सफू या उपरोक्त नला		पिता के काम का पता

工作人员使用

兒童行為調查問卷 (一歲半至五歲)
(Child Behavior Checklist for Age 1½-5)

编号

Scala Achenbach - Forma pentru părinți pentru categoria de vârstă 6-18 ani

Numele și prenumele copilului			Profesia părinților (menționați chiar dacă părinții nu lucrează în prezent; exemple: profesor, vânzător, ofițer, laborant etc.)
Sexul copilului <input type="checkbox"/> B <input type="checkbox"/> F	Vârsta:	Etnia:	Profesia tatălui: Profesia mamei: _____
Data completării chestionarului Luna _____ Ziaua _____ An _____			Acest chestionar este completat de (vă rugăm să vă notați numele complet): _____
Data nașterii copilului (dacă știți): Luna _____ Ziaua _____ An _____			Sexul dvs: <input type="checkbox"/> B <input type="checkbox"/> F
Clasa _____ <input type="checkbox"/> Nu merge la școală	Vă rugăm să completați acest chestionar conform aprecierii dvs. despre comportamentul copilului, chiar dacă alte persoane nu sunt de acord. Puteți să oferiți informații suplimentare sau comentarii lângă fiecare item sau în spațiul de la pagina 2. Vă rugăm să răspundeți la toate întrebările		
	Poziția dvs. în școală: Profesor/învățător Profesor de sprijin (specificați) Psihopedagog Administrator Consilier Alta		

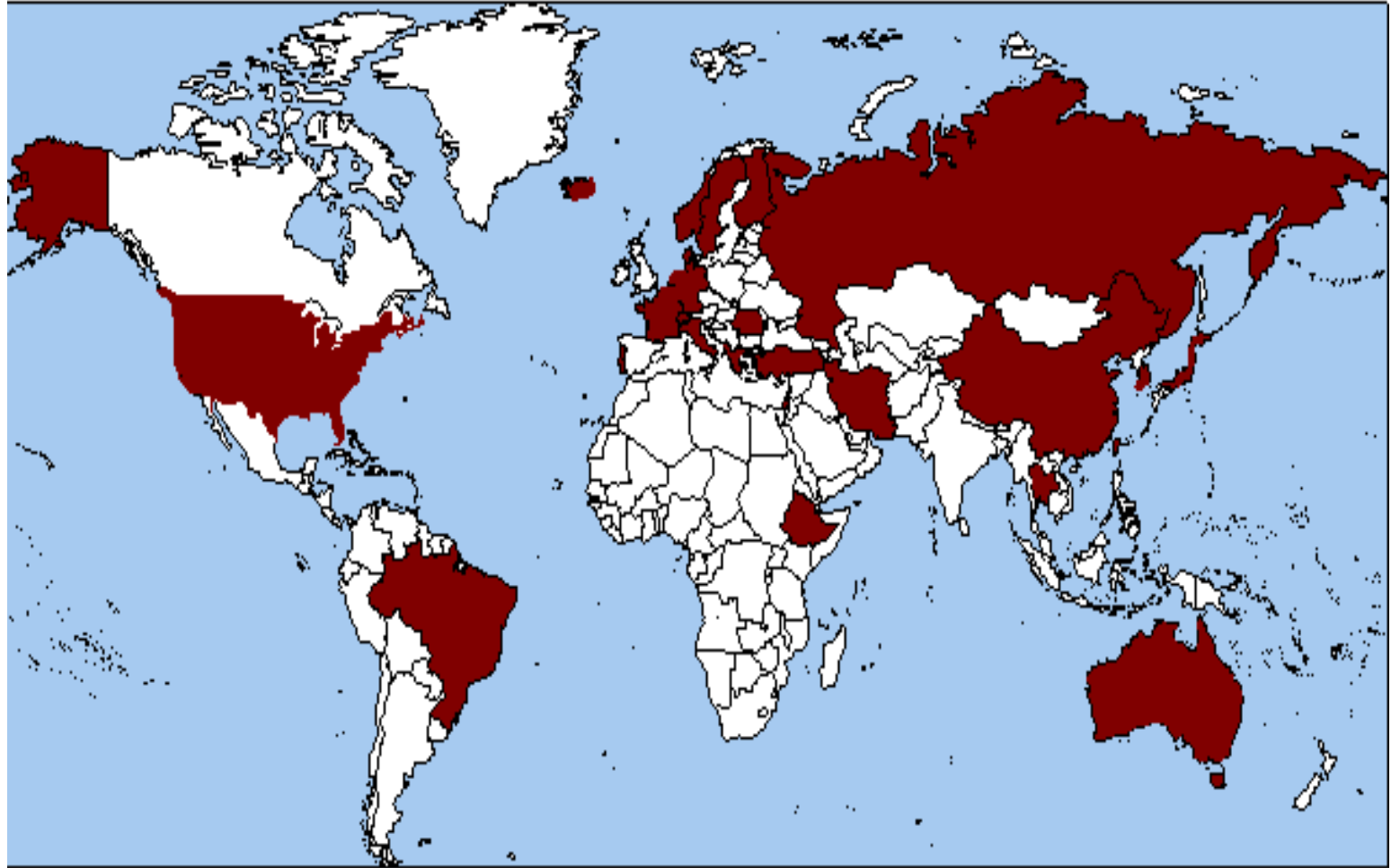
子女姓名:	籍貫: 出生地點:	父母通常的職業 (即使現在沒有工作), 請說明職業類別。 例如: 司機、教師、家庭主婦、工人、機械操作員、皮鞋售貨員、警察。 父親職業: _____ 母親職業: _____ 此問卷的填報人 (請填上你的姓名): _____
性別: <input type="checkbox"/> 男 <input type="checkbox"/> 女	年齡:	
填寫日期: 年 月 日	出生日期: 年 月 日	

請根據你對貴子女行為的看法填寫此問卷 (即使你的觀點與其他不同), 請隨意填在每項目旁及第三頁中寫你的評語。請回答每一條問題。

你與該兒童/青少年的關係:
 父親 母親
 其他 (請列明關係)

以下是一系列有關兒童的描述, 請根據貴子女現在或過往兩個月內的情況, 評定下列每一項描述之準確程度。非常準確或經常準確, 請圈 2; 接近或中等準確, 請圈 1; 不準確, 請圈 0。請盡量回答所有問題, 即使有些題目似乎不適用於貴子女。

Societies Participating in ASEBA Multicultural Studies



Goals of Presentation:

- I. Discuss why we are here – bridge the gap between neuroscience and genetics research in developmental psychopathology and **CLINICAL PRACTICE.**
- II. Discuss principles of genetics and developmental neurobiology and psychopathology.
- III. **Describe our Genetically Informed Family Based WELLNESS Approach inspired by current (and past) research.**



The Vermont Family Based Approach (VFBA)

Definition: a paradigm for promoting mental health and wellness, preventing and treating psychopathology that applies evidence-based strategies from the family perspective.

Goal: using evidence based prevention and intervention strategies, to keep the well well, protect those at risk from developing psychopathology, and effectively treat those who are suffering from it.



VFBA Foundations

- All families deserve to have the knowledge and skills to promote health in their children's lives.
- Lack of knowledge and resources can get in the way of health promotion.
- Emotional behavioral problems can get in the way of health promotion.
- New medical evidence provides us with the motivation to use promotion and prevention aimed at emotional behavioral health to support all health.



Key Definitions in the VFBA

- Health – all health emerges from emotional behavioral health.
- Promotion – is more powerful than prevention.
- Prevention – is more powerful than intervention.
- Intervention – should be family based.



Taking the FBA to the REAL World:

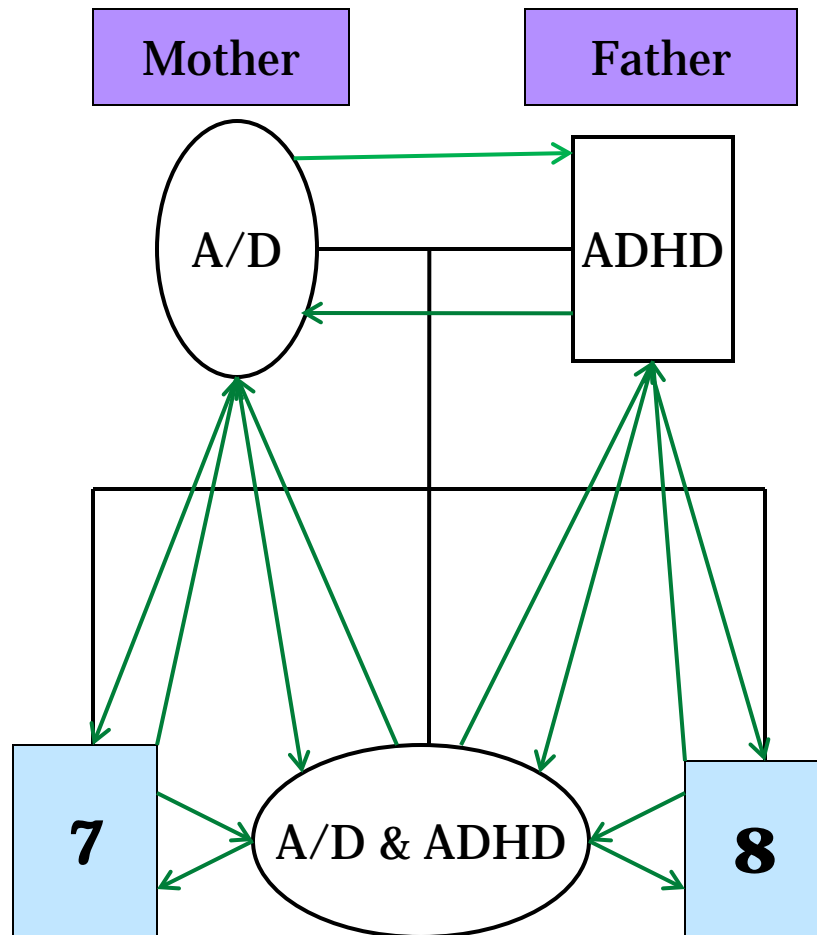
Garfield School, Sioux Falls South Dakota

- Careful (Family Based Screening).
- Tailored Health Promotion
- Tailored Prevention
- Tailored Intervention (that has benefitted from Promotion and Prevention).

This work is done with the Avera Institute for Human Behavioral Genetics,
In collaboration with Tim Soundy, M.D. and his team at South Dakota School
Of Medicine.



Family-Based Approach: The Argument



If Mother suffers from
Anxious Depression
(50/50),

If Father suffers from
ADHD (70/30),

Then the child is at
increased risk for both.
Should he/she have either:

Does it make sense to treat
only the child when it is
clear that environment
contributes as much to risk
as genes?





Vermont Family Based Approach

Well Group

At-Risk Group

Ill Group

Family Wellness Coach

Focused Family Coach

Family-based Psychiatrist





Hudziak & Ivanova

Vermont Center for Children, Youth, and Families Family Wellness Coaching Training Outline

Course date: //2010 - //2010

Course location and time:

Contact Information:

Session # (Date)	Topic
Session 1 (//2010)	(1) Introduction to the <i>Family Based Approach</i> (2) Defining <i>Family Wellness Coaching</i>
Session 2 (//2010)	Elements of <i>Family Wellness Coaching</i> : I. Family-based assessment (the <i>Achenbach System of Empirically Based Assessment</i> and the <i>Vermont Health Behavior Questionnaire</i>).
Session 3 (//2010)	Elements of <i>Family Wellness Coaching</i> : II. Motivational aspects of behavior change (<i>Motivational Interviewing</i> and the <i>Health Coaching Movement</i>).
Session 4 (//2010)	Elements of <i>Family Wellness Coaching</i> : III. Family nutrition and exercise (the <i>WE CAN!</i> National Institutes of Health Program). IV. Healthy activities and community involvement
Session 5 (//2010)	Elements of <i>Family Wellness Coaching</i> : V. Child Development: A primer. VI. What is good parenting?
Session 6 (//2010)	Elements of <i>Family Wellness Coaching</i> : VII. Supporting good parenting: the prenatal, neonatal and childhood periods.
Session 7 (//2010)	Elements of <i>Family Wellness Coaching</i> : VIII. Supporting good parenting: the adolescent and young adulthood periods.
Session 8 (//2010)	Case illustrations and practicing





Vermont Center for Children, Youth, and Families

Focused Family Coaching Training Outline

Course date: //2010 - //2010

Course location and time:

Contact Information:

Session # (Date)	Topic
Session 1 (//2010)	(1) Introduction to the <i>Family Based Approach</i> (2) Defining <i>Focused Family Coaching</i>
Session 2 (//2010)	Elements of the Family Based Approach: <i>Family-Based Assessment</i> (the Achenbach System of Empirically Based Assessment and the Vermont Health Behavior Questionnaire)
Session 3 (//2010)	Elements of the Family Based Approach: <i>Family Wellness Coaching</i>
Session 4 (//2010)	<i>Focused Family Coaching Part I: Applying evidence-based psychotherapeutic treatments from the family perspective</i>
Session 5 (//2010)	<i>Focused Family Coaching Part II: Cognitive behavioral psychotherapy</i>
Session 6 (//2010)	<i>Focused Family Coaching Part III: Evidence based treatments of child and adolescent psychopathology</i>
Session 7 (//2010)	<i>Focused Family Coaching Part IV: Evidence based treatments of adult psychopathology</i>
Session 8 (//2010)	Case illustrations and practicing

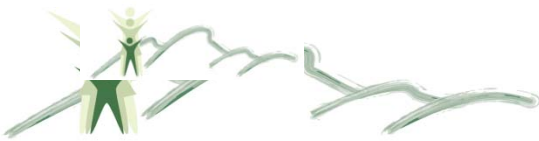


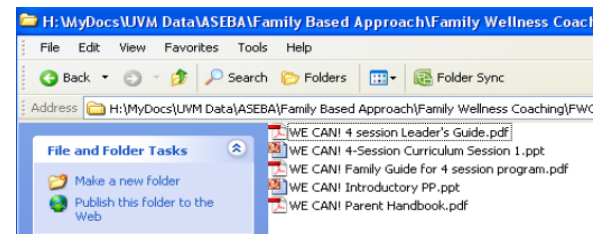


Family Wellness Coaching Toolkit

(Draft date: 03-16-2010)

Domain	Tools
I. Family-based assessment	<p>I. Information about the <i>Achenbach System of Empirically Based Assessment</i> (ASEBA) can be found at: www.aseba.org</p> <p>II. A copy of the <i>Vermont Health Behavior Questionnaire</i> (VHBQ) can be obtained at: http://www.med.uvm.edu/vccyf/</p>
II. Motivational aspects of behavior change	<p>I. Motivational Interviewing (MI)</p> <p>MI - a psychotherapeutic method for enhancing motivation for change by exploring and resolving ambivalence. Based on the Prochaska and DiClemente's <i>Stages of Change</i> theory.</p> <p>The official MI website: http://motivationalinterview.org/index.shtml</p>





Universal Screening





Vermont Family Based Approach

Well Group

At-Risk Group

Ill Group

Family Wellness Coach

Comprehensive Program of Family Health & Wellness:

- A. Nutrition
- B. Exercise and Healthy Activities
 1. Intensive Music Training
 2. Reading Program
 3. Sports Program
 4. Peer Support Program
- C. Physical and Mental Health
- D. Effective Parenting



Musical Wellness Coach



Family Wellness Coach





Vermont Family Based Approach

Well Group

At-Risk Group

Ill Group

Family Wellness Coach

Focused Family Coach

Evidence-based psychotherapeutic interventions delivered from the family perspective.





Vermont Family Based Approach

Well Group

At-Risk Group

Ill Group

Family Wellness Coach

Focused Family Coach

Evidence-based psychotherapeutic & psychopharmacologic interventions delivered from the family perspective



Family-based Psychiatrist



Family Based Child Psychiatrist



Director of School System



Garfield Wellness Program



*Vermont Center for
Children Youth & Families*
Vermont Family Based Approach

Garfield 50 May 2009



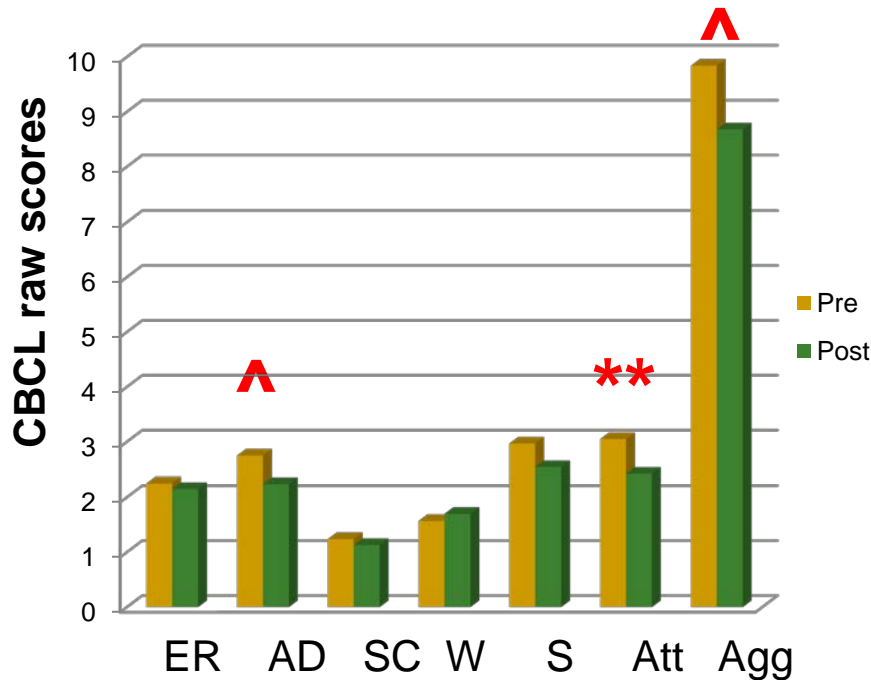
“Soon after my son began the program and started making progress, the family coach thought my other children could benefit as well. We soon had the entire family undergoing treatment and realized what an amazing effect it had on our household dynamic and their futures. Thank you so much for helping our family become whole”.

Mother of one of the Garfield 50, May 2009

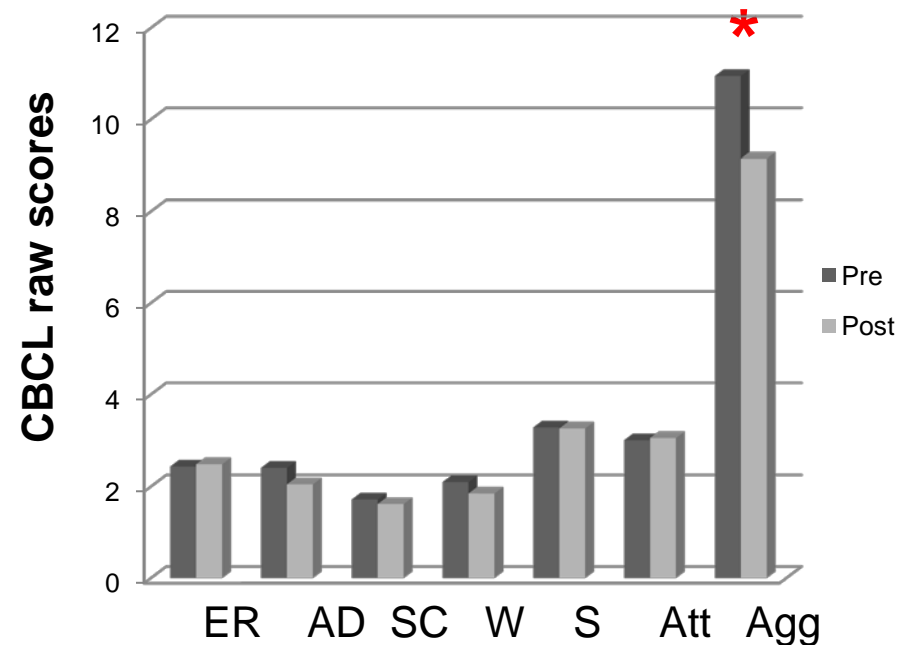


South Dakota Project: CBCL Data

FBA Schools



Control School



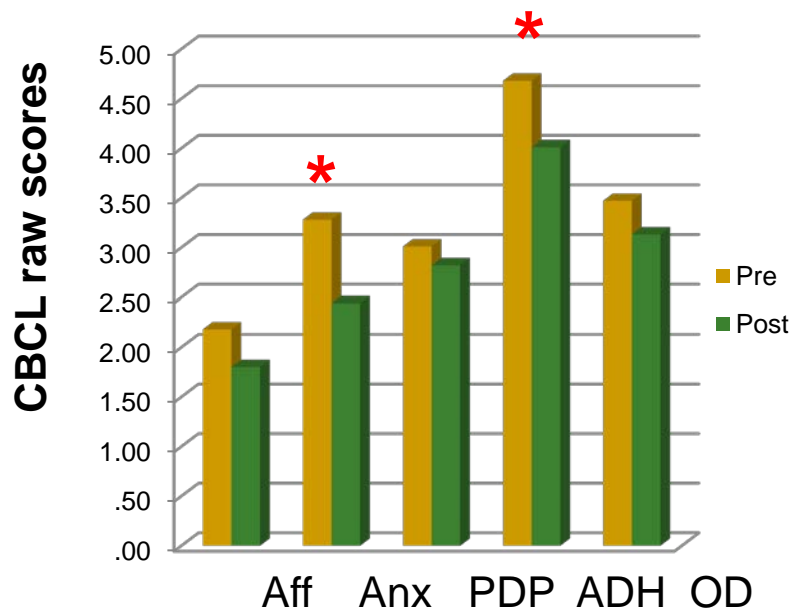
Notes. ER = Emotionally Reactive, AD = Anxious/Depressed, SC = Somatic Complaints, W = Withdrawn, S = Sleep Problems, Att = Attention Problems, Agg = Aggressive Behavior.

Npairwise comparisons = 79 Treatment, 39 Controls; ^ - $p < .10$, * - $p < .05$, ** - $p < .01$.

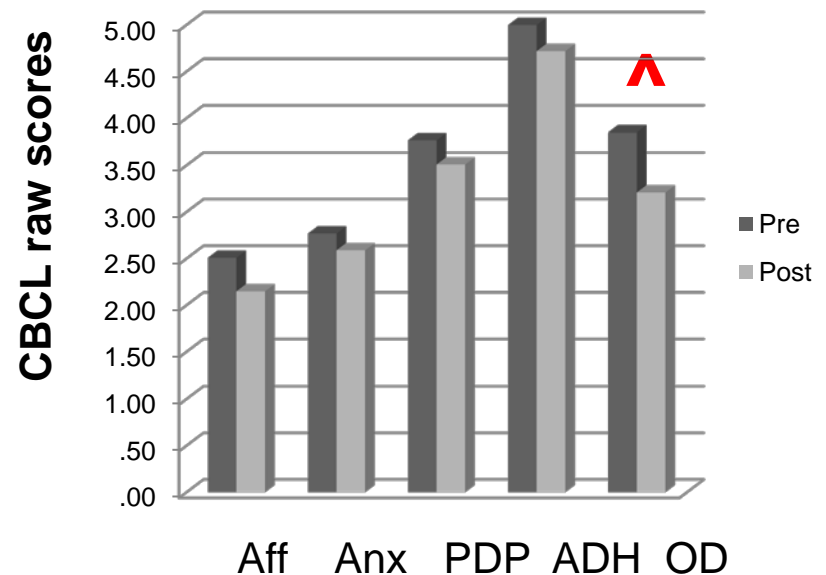


South Dakota Project: CBCL Data

FBA Schools



Control School



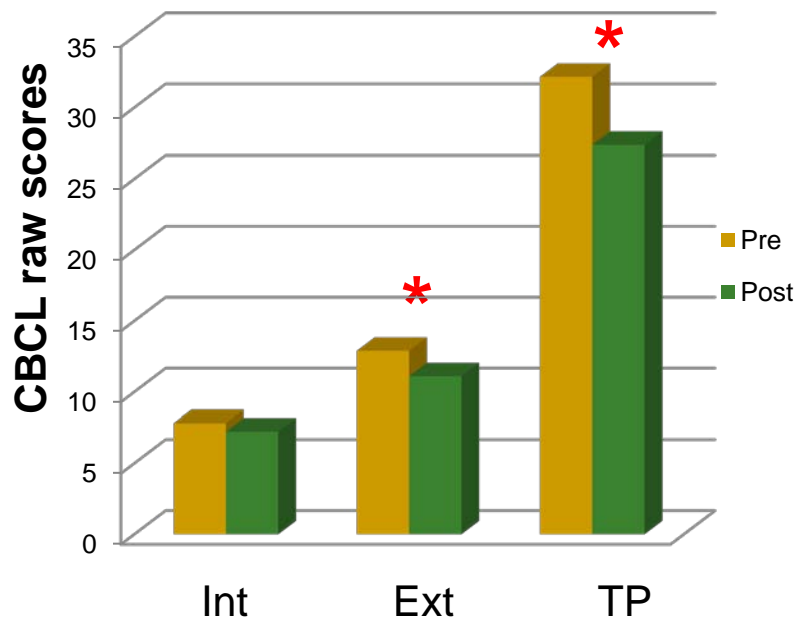
Notes. Aff = Affective Problems, Anx = Anxiety Problems, PDP = Pervasive Developmental Problems, ADH = Attention Deficit/Hyperactivity Problems, OD = Oppositional Defiant Problems.

Npairwise comparisons = 79 Treatment, 39 Controls; ^ - $p < .10$, * - $p < .05$.

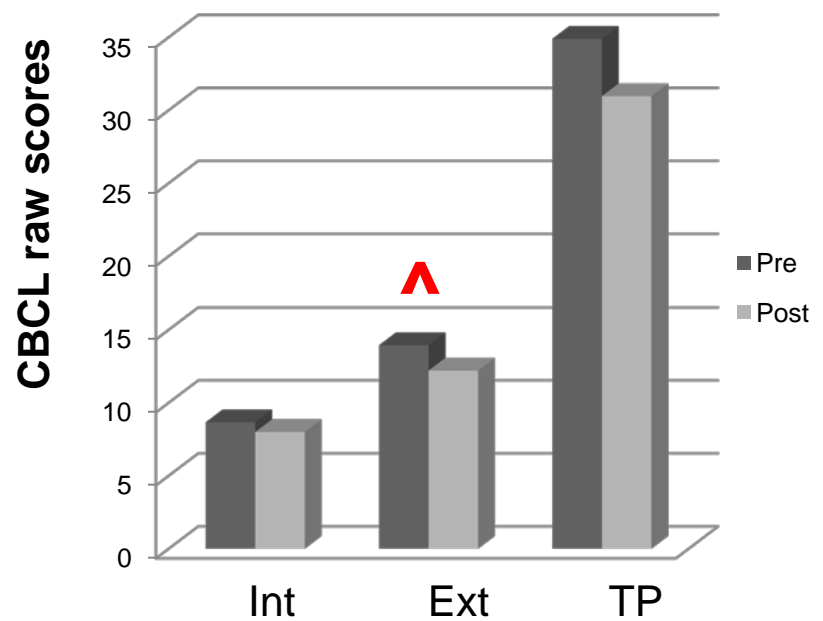


South Dakota Project: CBCL Data

FBA Schools



Control School



Notes. Int = Internalizing, Ext = Externalizing, TP = Total Problems.
Npairwise comparisons = 79 Treatment, 39 Controls; ^ - $p < .10$, * - $p < .05$.



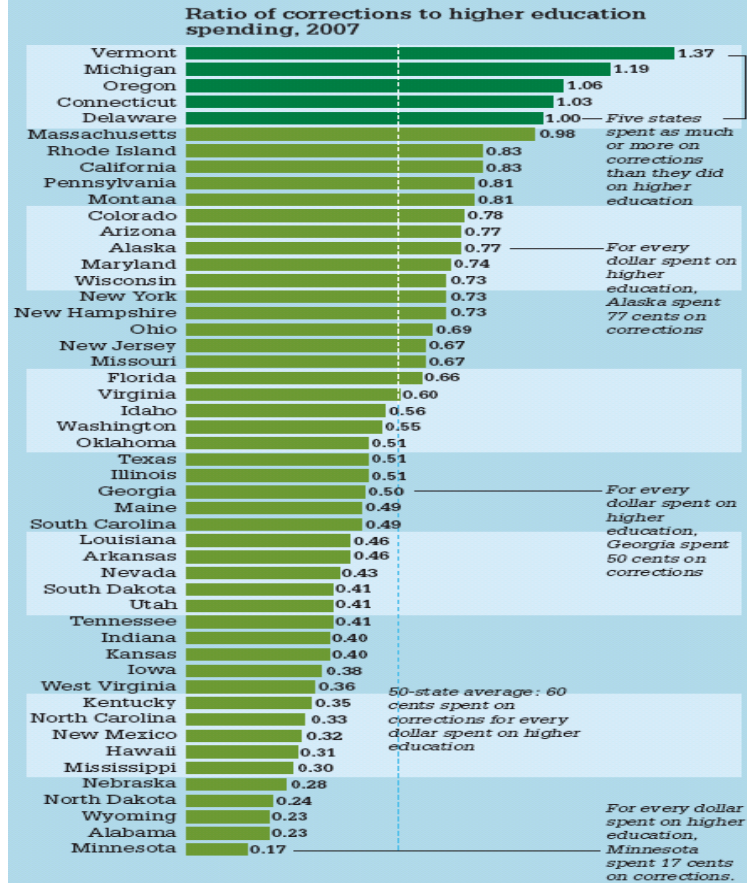
In Summary:

- The Goal of Child Psychiatry should be one that embraces health promotion, illness prevention, and intelligent intervention.
- We (Child Psychiatrists) are responsible to see that this goal is achieved.
- Our Mission should be to keep the well-well, protect the at risk, and intervene for those who are ill. This approach has something for everyone.



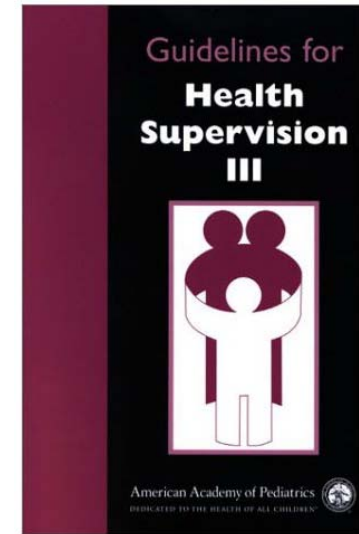
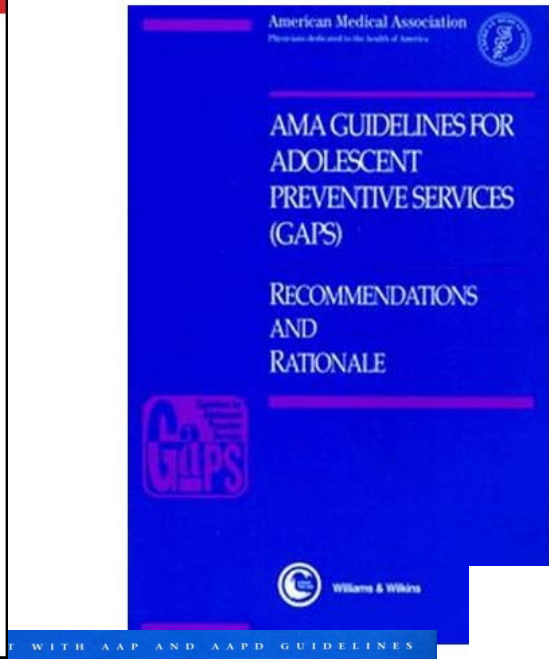
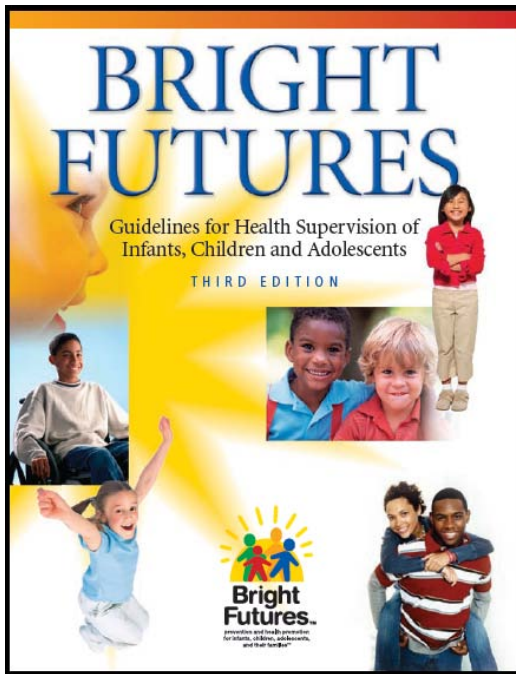
MAKING DECISIONS WHERE TO SPEND

While states don't necessarily choose between higher education and corrections, a dollar spent in one area is unavailable for another.



SOURCE: Reanalysis of data presented in the National Association of State Budget Officers, "State Expenditure Report" series





...is a set of principles, strategies and tools that are theory - based, evidence - driven, and systems - oriented, that can be used to improve the health and well-being of all children through culturally appropriate interventions that address the current and emerging health promotion needs at the family, clinical practice, community, health system and policy levels.



MOST OF US HAVE GENES that make us as hardy as dandelions: able to take root and survive almost anywhere. A few of us, however, are more like the orchid: fragile and fickle, but capable of blooming spectacularly if given greenhouse care. So holds a provocative new theory of genetics, which asserts that the very genes that give us the most trouble as a species, causing behaviors that are self-destructive and antisocial, also underlie humankind's phenomenal adaptability and evolutionary success. With a bad environment and poor parenting, orchid children can end up depressed, drug-addicted, or in jail—but with the right environment and good parenting, they can grow up to be society's most creative, successful, and happy people.

Orchid

