The UNIVERSITY of VERMONT
COLLEGE of MEDICINE

Vermont Center for Children Youth & Families
Vermont Family Based Approach

vrije Universiteit amsterdam

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

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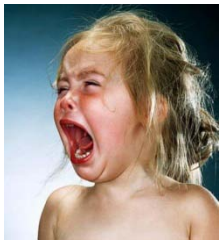
Vrije, University, Amsterdam, The Netherlands
Visiting Professor Erasmus University, The Netherlands

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.



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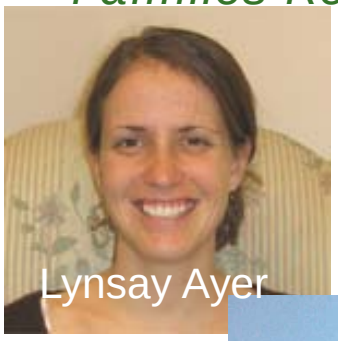

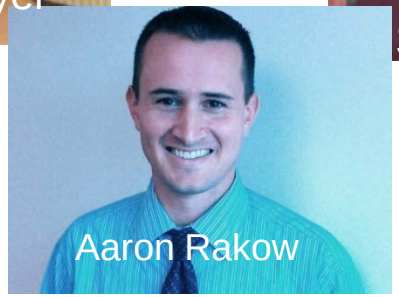

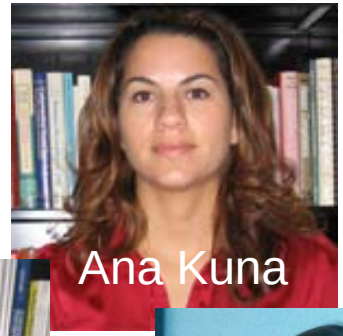

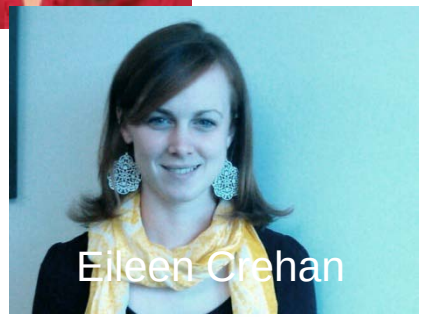

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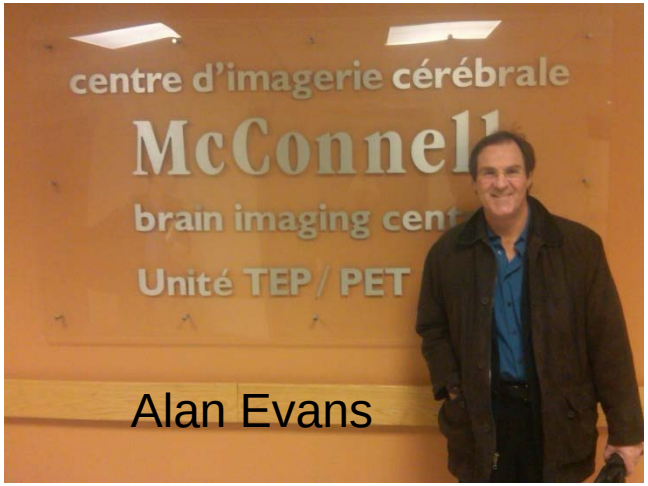

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Vermont Center for Children Youth & Families

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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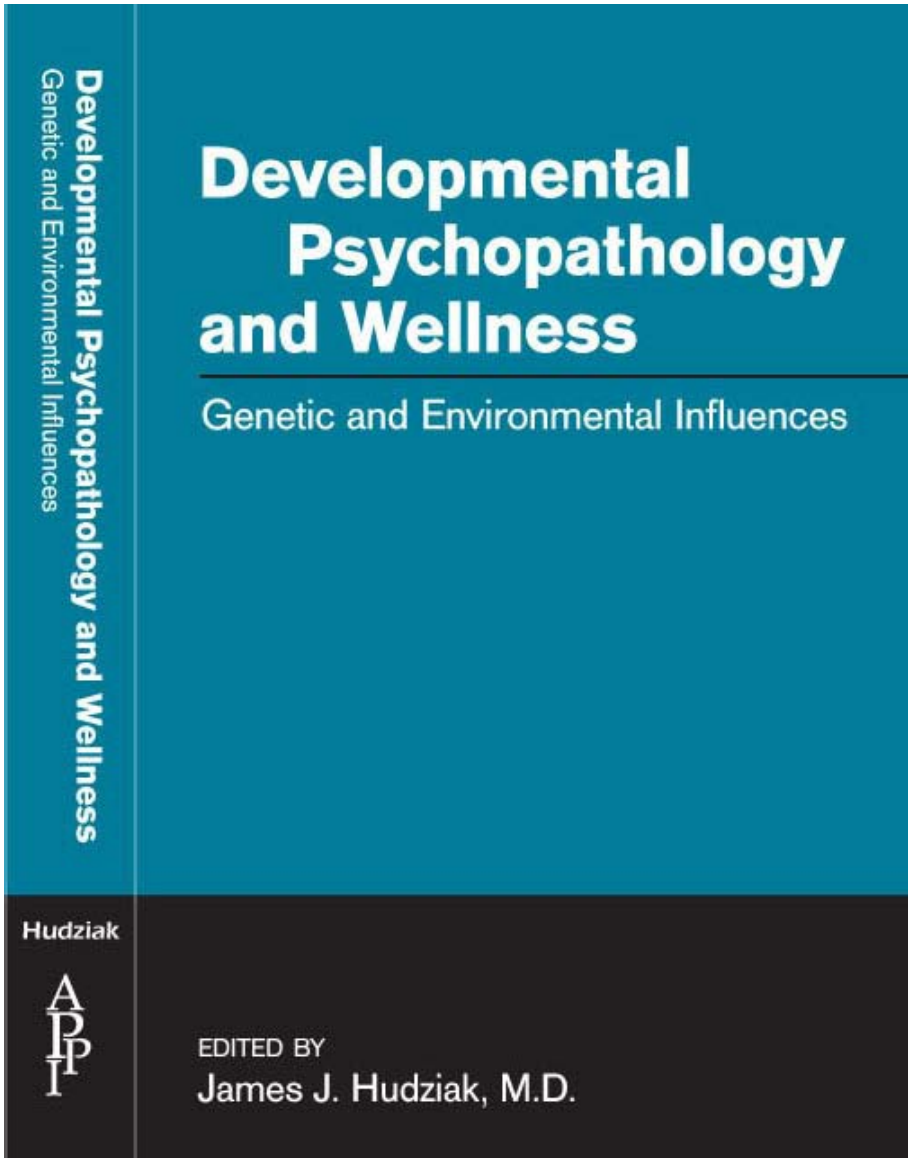
Developmental Psychopathology and Wellness
Genetic and Environmental Influences
Hudziak
APP
Developmental Psychopathology and Wellness
Genetic and Environmental Influences
EDITED BY
James J. Hudziak, M.D.

ELSEVIER
SAUNDERS

Child Adolesc Psychiatric Clin N Am
16 (2007) 323–339

CHILD AND
ADOLESCENT
PSYCHIATRIC CLINICS
OF NORTH AMERICA

Genetically Informative Designs in the Study of Resilience in Developmental Psychopathology

Meike Bartels, PhD[a,*], James J. Hudziak, MD[a,b,c,d]

[a]*Department of Biological Psychology, Vrije Universiteit, van der Boechorststraat 1, 1081 BT, Amsterdam, The Netherlands*
[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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E-mail address: m.bartels@psy.vu.nl (M. Bartels).

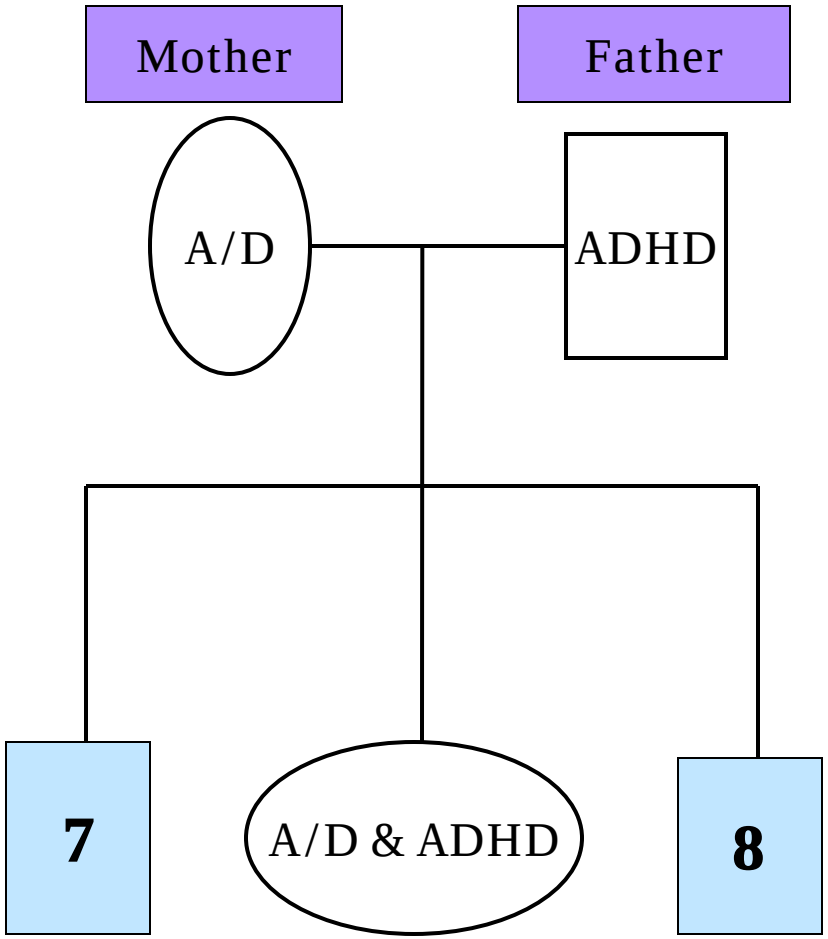
doi:10.1016/j.chc.2006.12.008

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



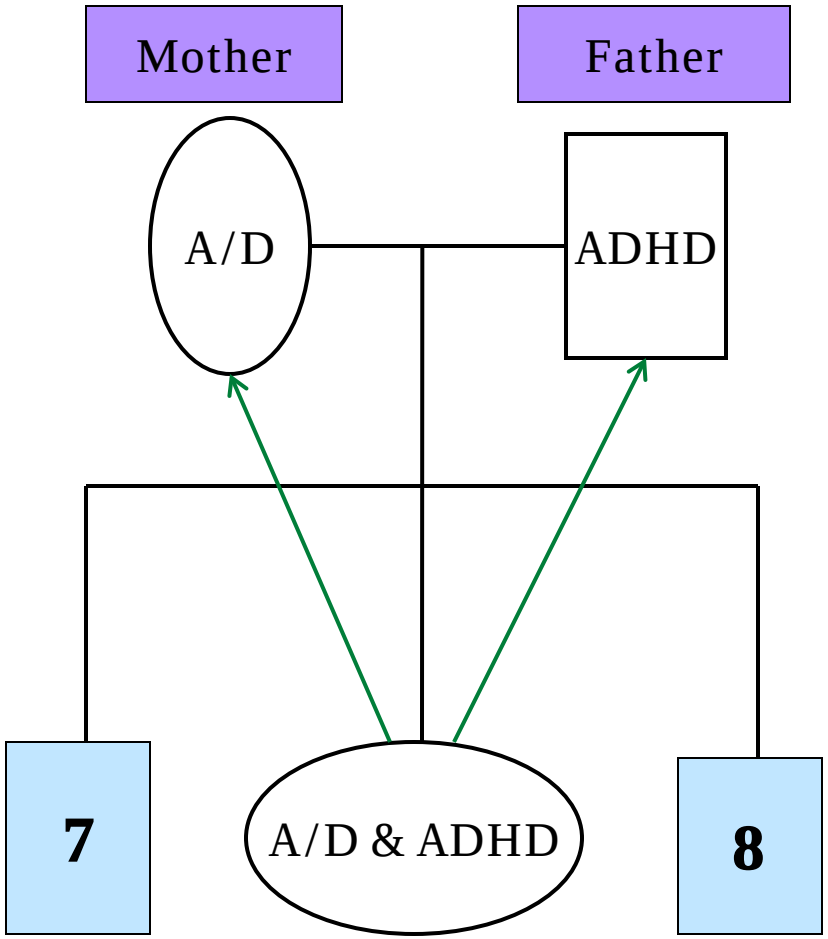
If Mother suffers from Anxious Depression (50/50),

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



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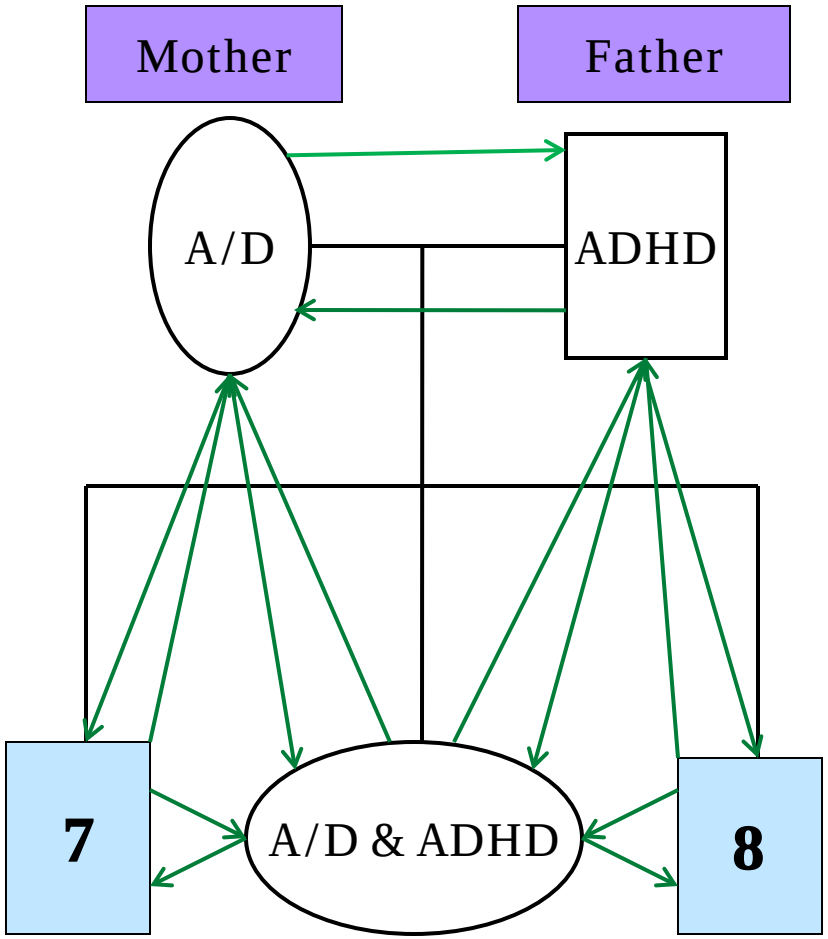

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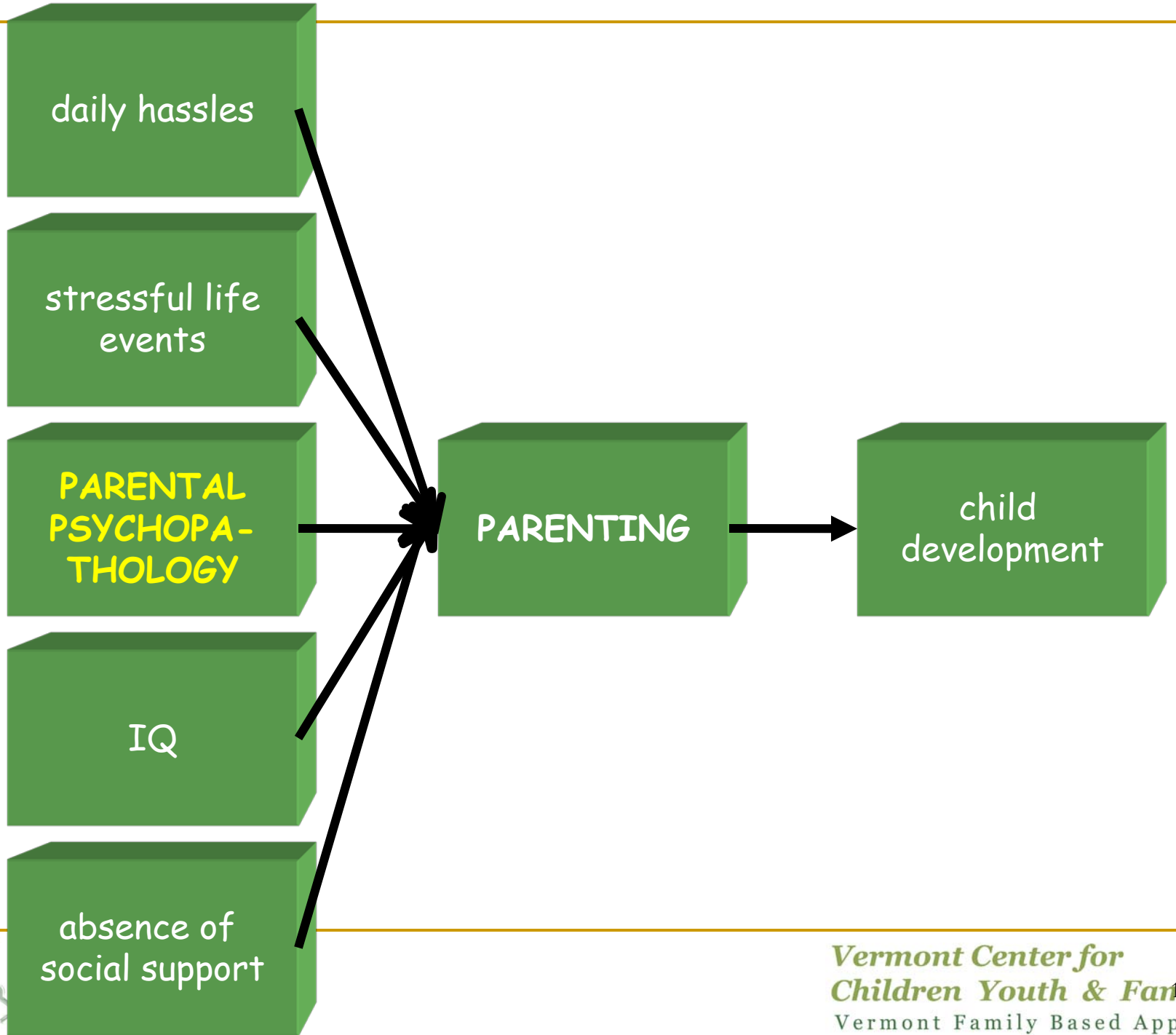
daily hassles
stressful life events
PARENTAL PSYCHOPA-THOLOGY
IQ
absence of social support
PARENTING
child development

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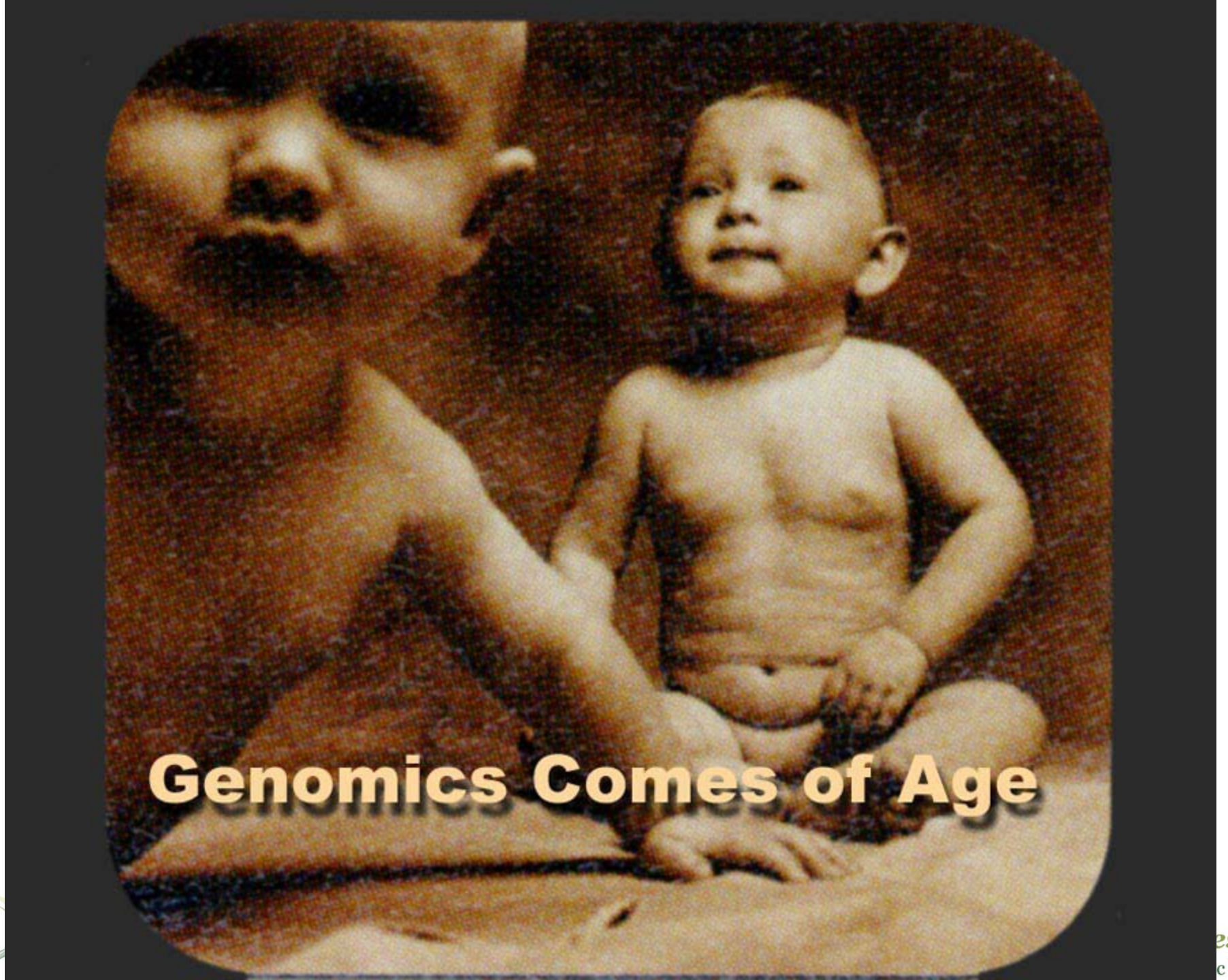

Genomics Comes of Age

The White House - June 26, 2000

The News……..

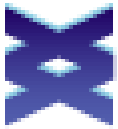
- The Genome is sequenced
- Genetic iteration in diagnoses
- Genomics and Society

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

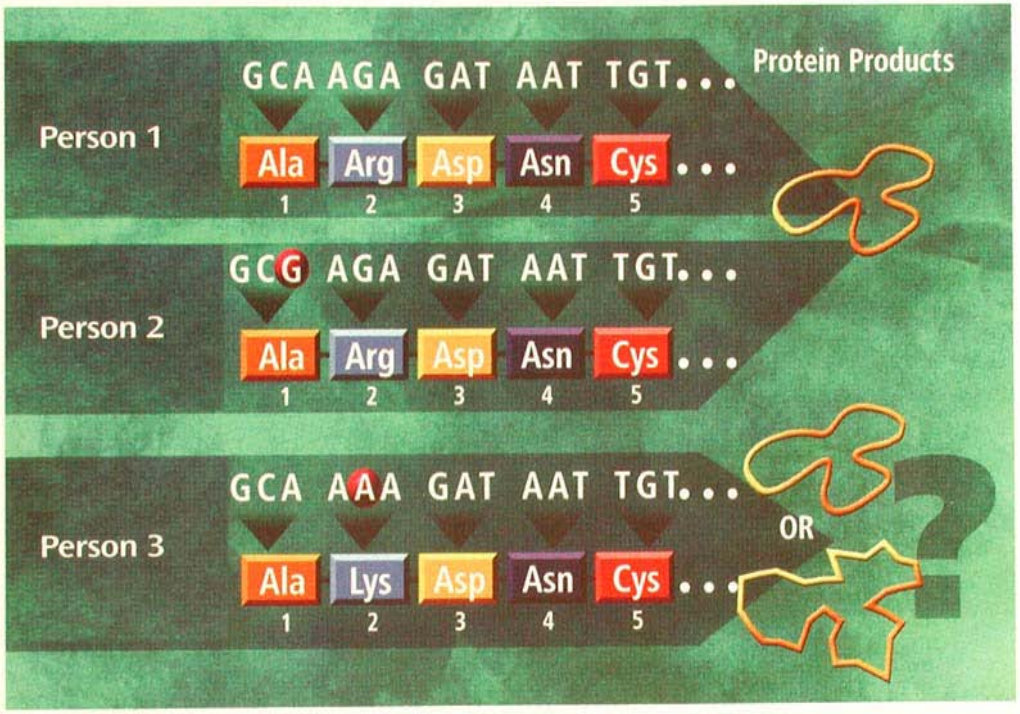
- The human genome consists of about 3.15 billion chemical bases
- It would fill 150,000 telephone book pages with A's, C's, G's and T's
- Disease is often caused by a single variation in the three billion bases - one letter in the 150,000 pages
- Our challenge is partly one of scale



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

nature neuroscience

Andreas Meyer-Lindenberg[1,2], Philip D Kohn[1,2], Bhaskar Kolachana[2], Shane Kippenhan[1,2], Aideen McInerney-Leo[3], Robert Nussbaum[3], Daniel R Weinberger[2] & 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.

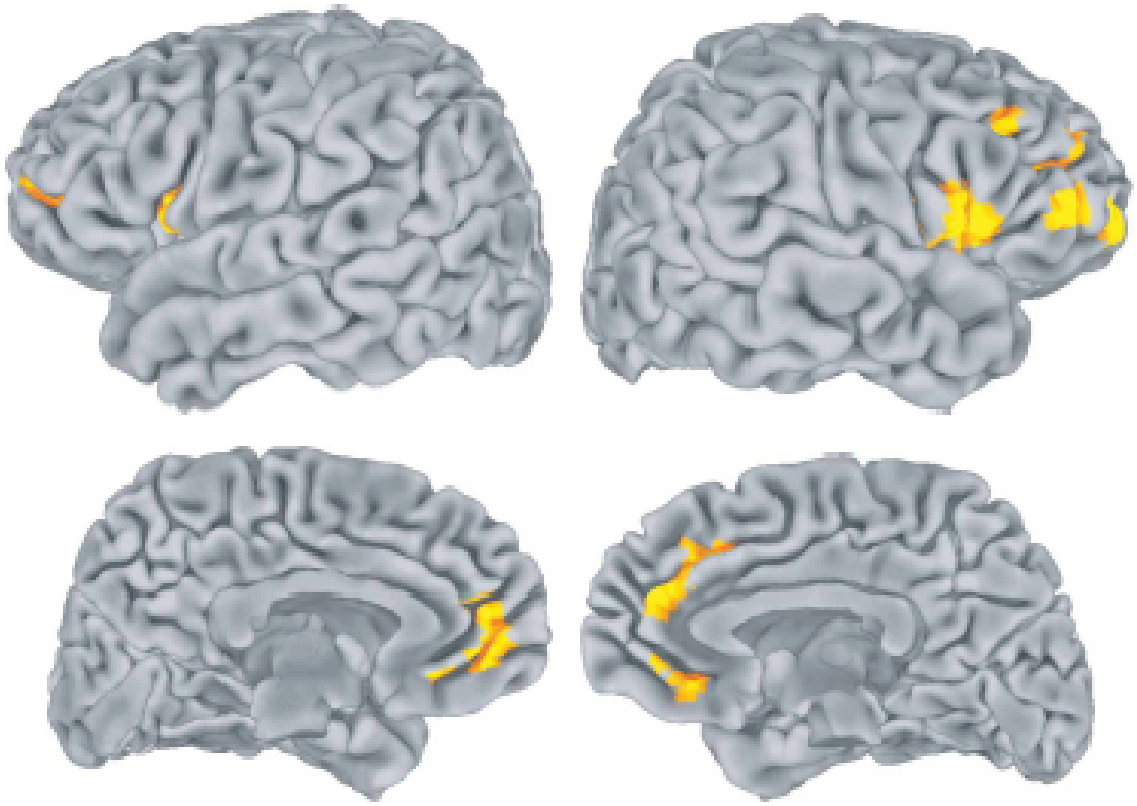


Figure 2 Interactions of cortical rCBF with midbrain dopamine. Significant ($P < 0.001$, uncorrected; $P < 0.05$, corrected, cluster-level) correlations of 0-back blood flow with midbrain F-DOPA uptake K_i, by *COMT* genotype (contrasting valine carriers with methionine homozygotes) were observed. See **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 × 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 diagnostic 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 × environment (*COMT* × 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

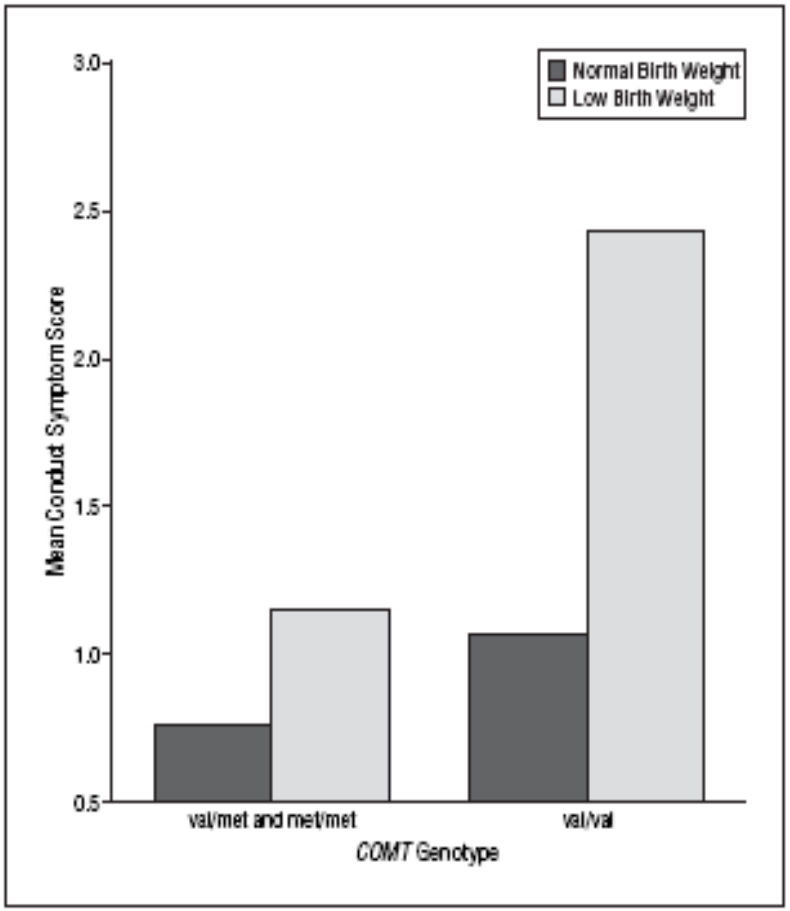


Figure. Mean number of *DSM-IV* conduct symptoms by genotype and birth weight. Association with catechol *O*-methyltransferase (*COMT*) genotype using categorically defined low birth weight (birth weight <2500 g): normal birth weight, valine (val)/methionine (met) and met/met, n=161; val/val, n=44; β=0.099;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

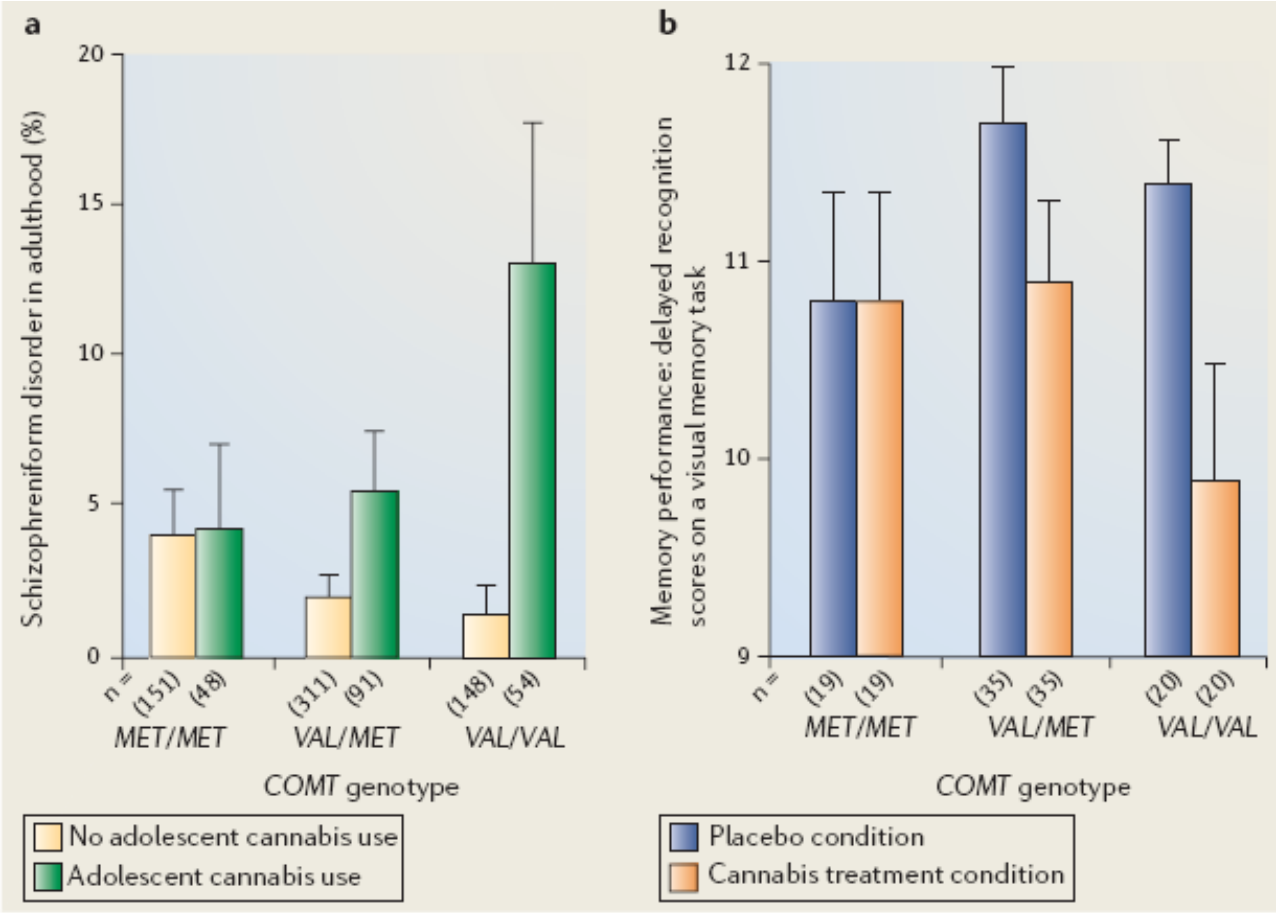
Methods: *In a longitudinal study of a representative birth cohort followed to adulthood, we tested why cannabis use is associated with the emergence of psychosis in a minority of users, but not in others.*

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 valine^{158} 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 × 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



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

nature REVIEWS NEUROSCIENCE

Principles of Developmental Neurobiology and Psychopathology.

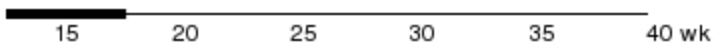
The brain is changing…..

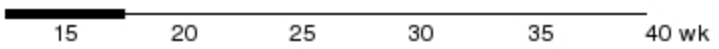
…..and so is behavior.

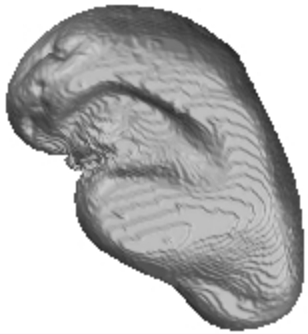
In Utero Maps of Development

WM

GM







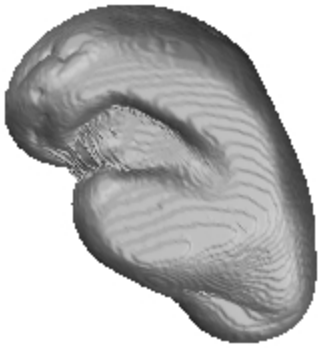
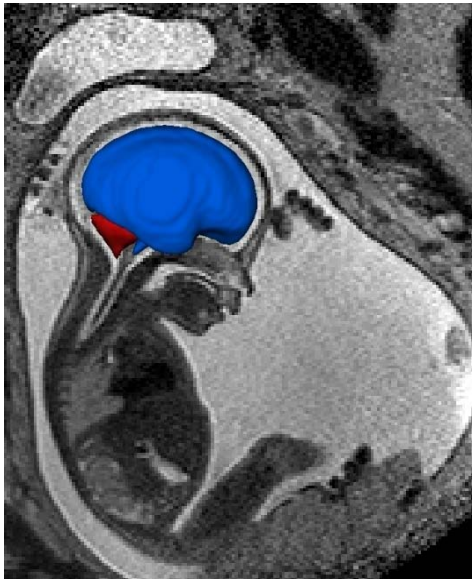


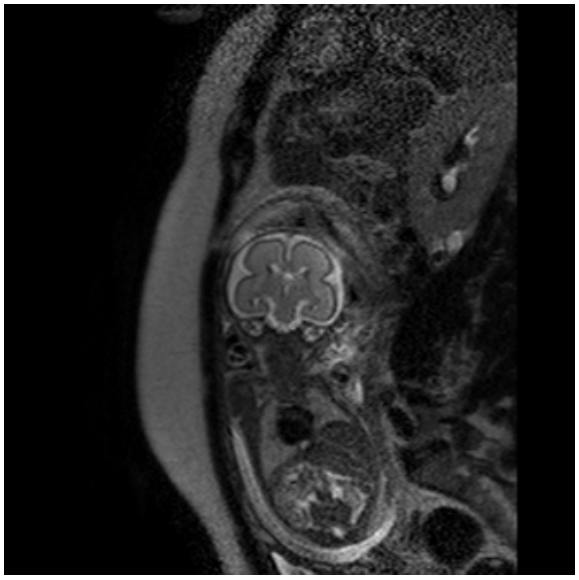
Image Courtesy of Alan Evans at McGill University

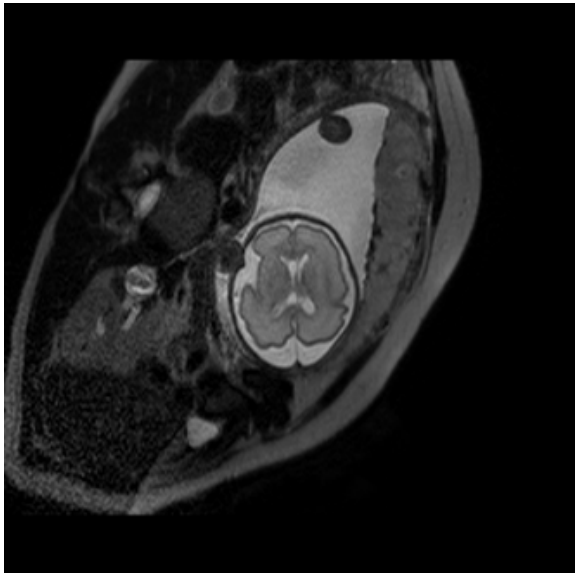
II - In vivo fetal MRI

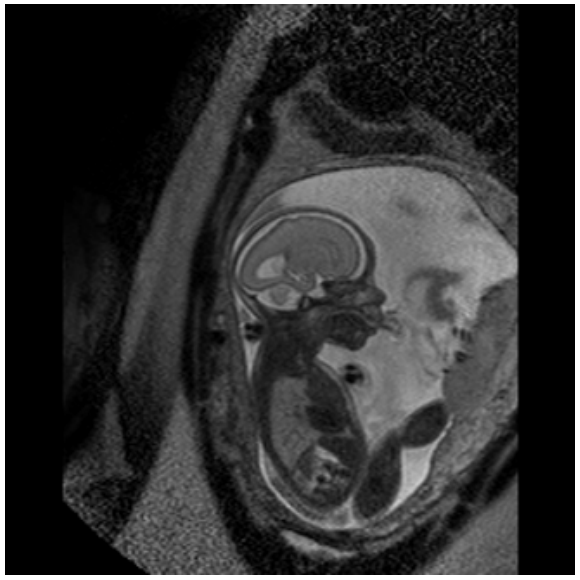
Robust automatic method to measure fetal brain growth
Measure fetal brain development in 2nd/3rd trimester



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

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

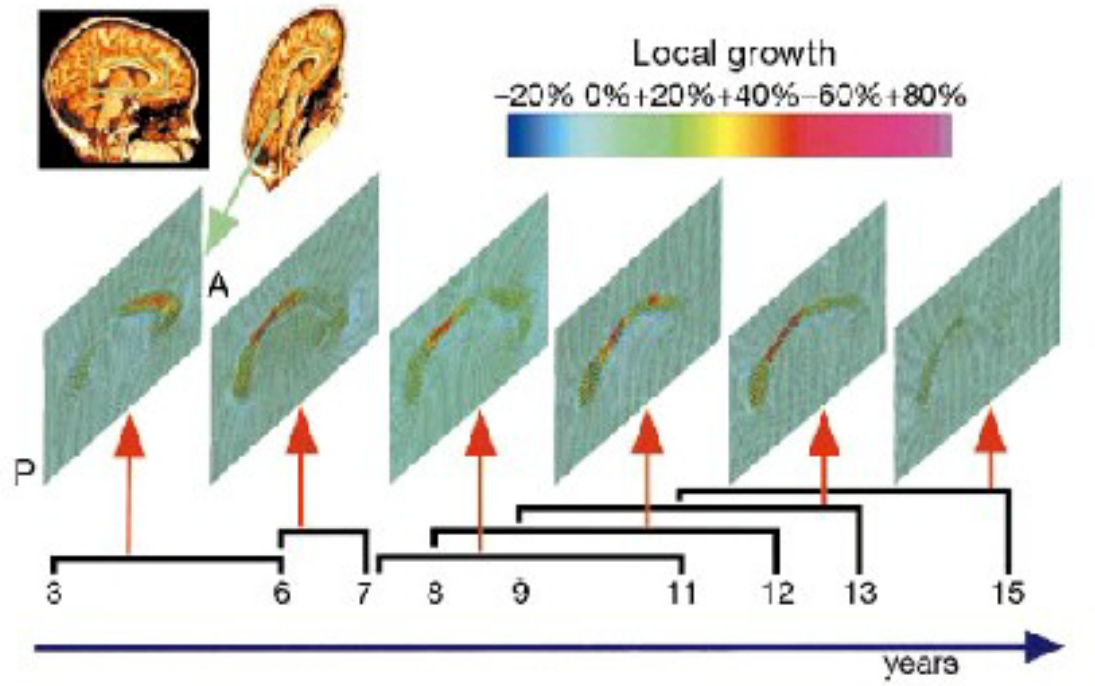
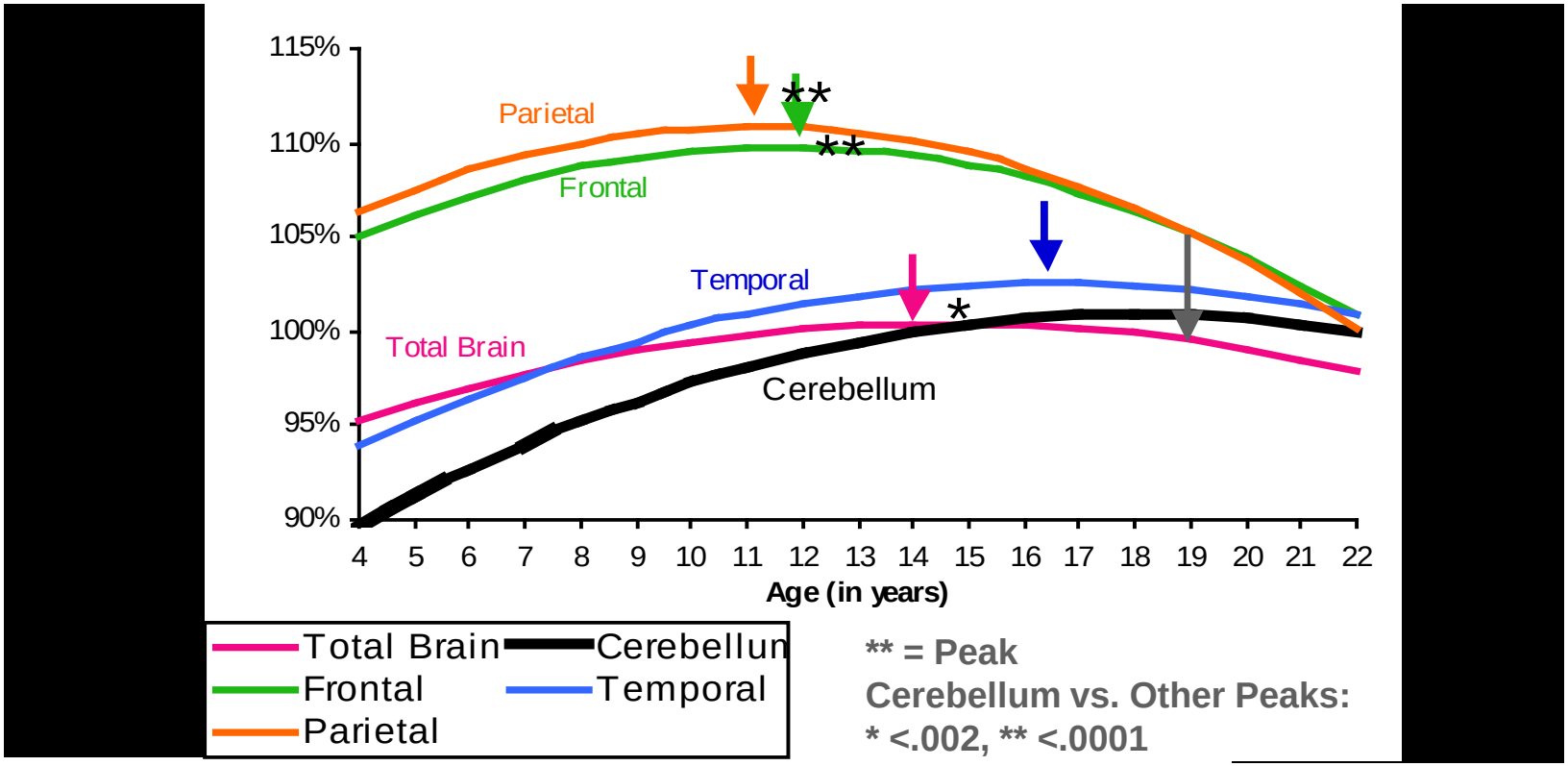


Figure 1 Growth patterns in the developing human brain detected at ages 3–15 years. A rostro-caudal wave of peak growth rates is detected in young normal subjects scanned repeatedly across time spans of up to four years. Between ages 3 and 6 years, peak growth rates (red colours; 60–80% locally) were 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

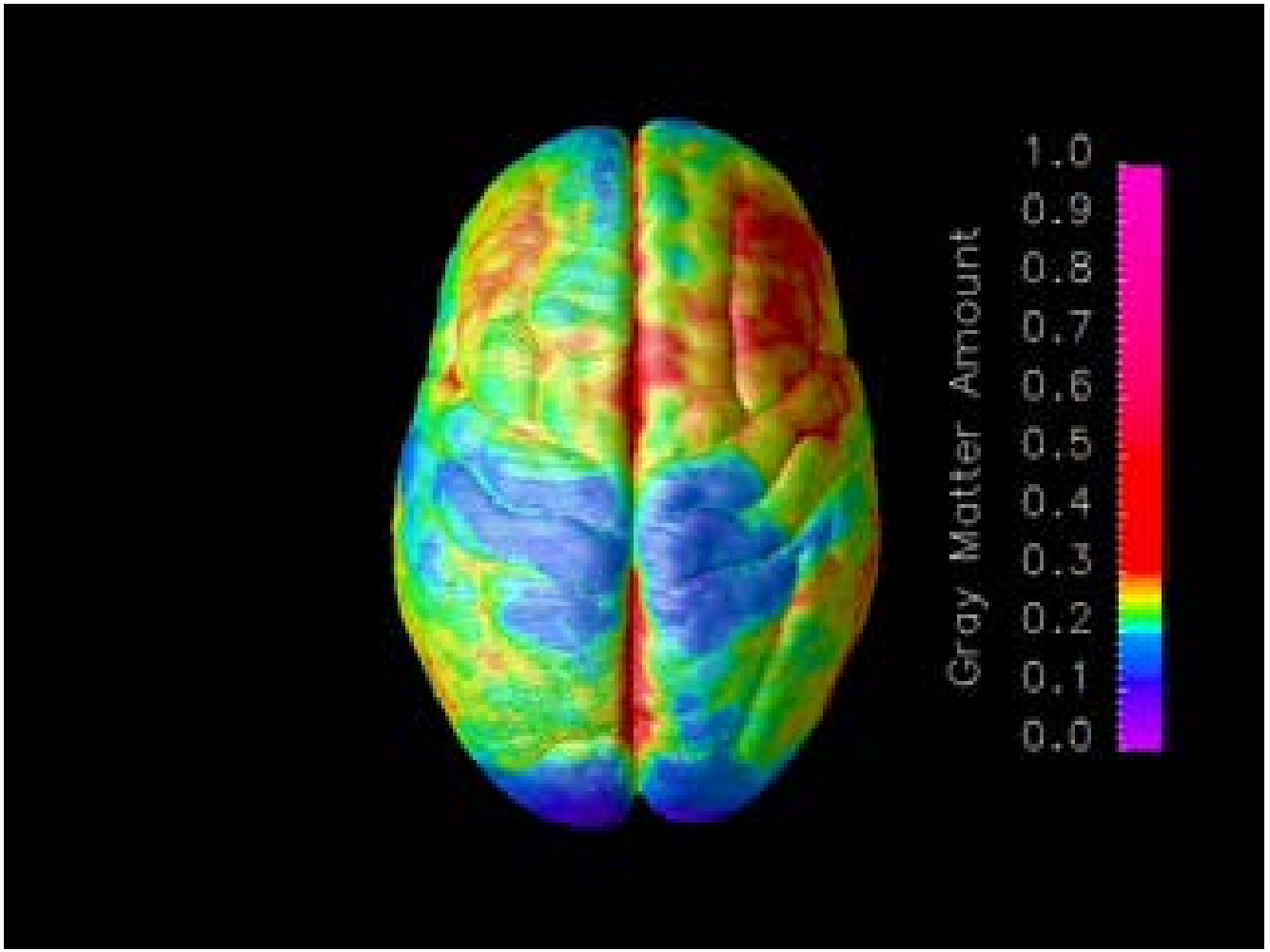
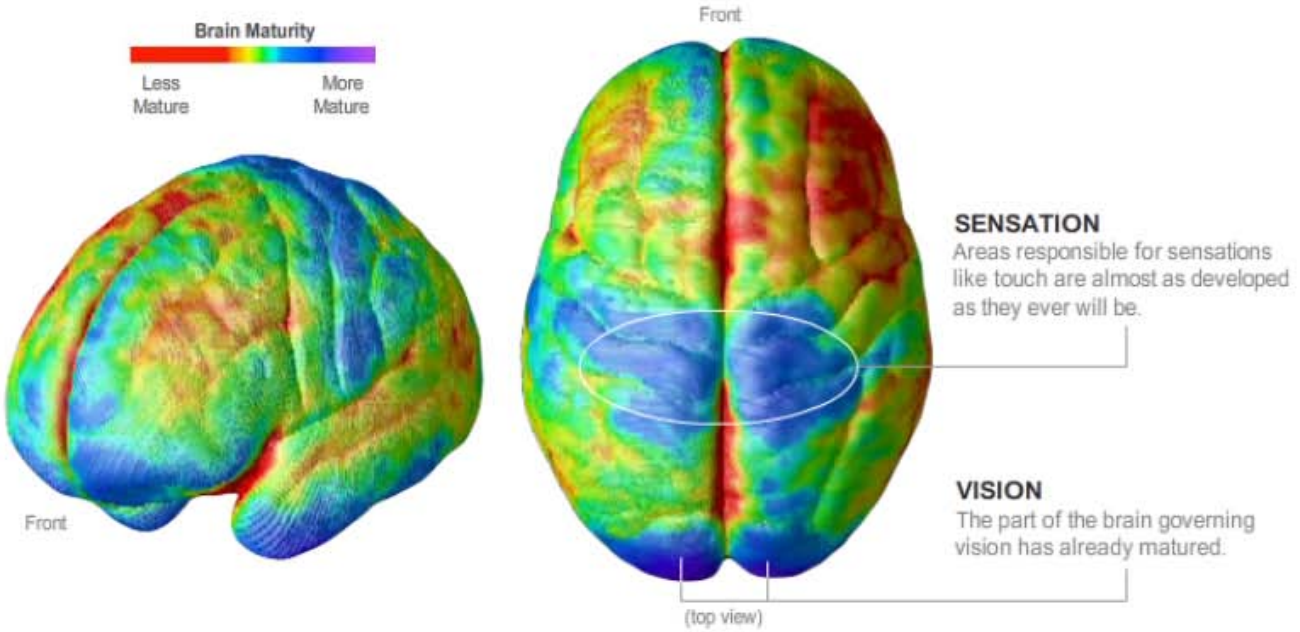


Image courtesy of Paul Thompson, 2007

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

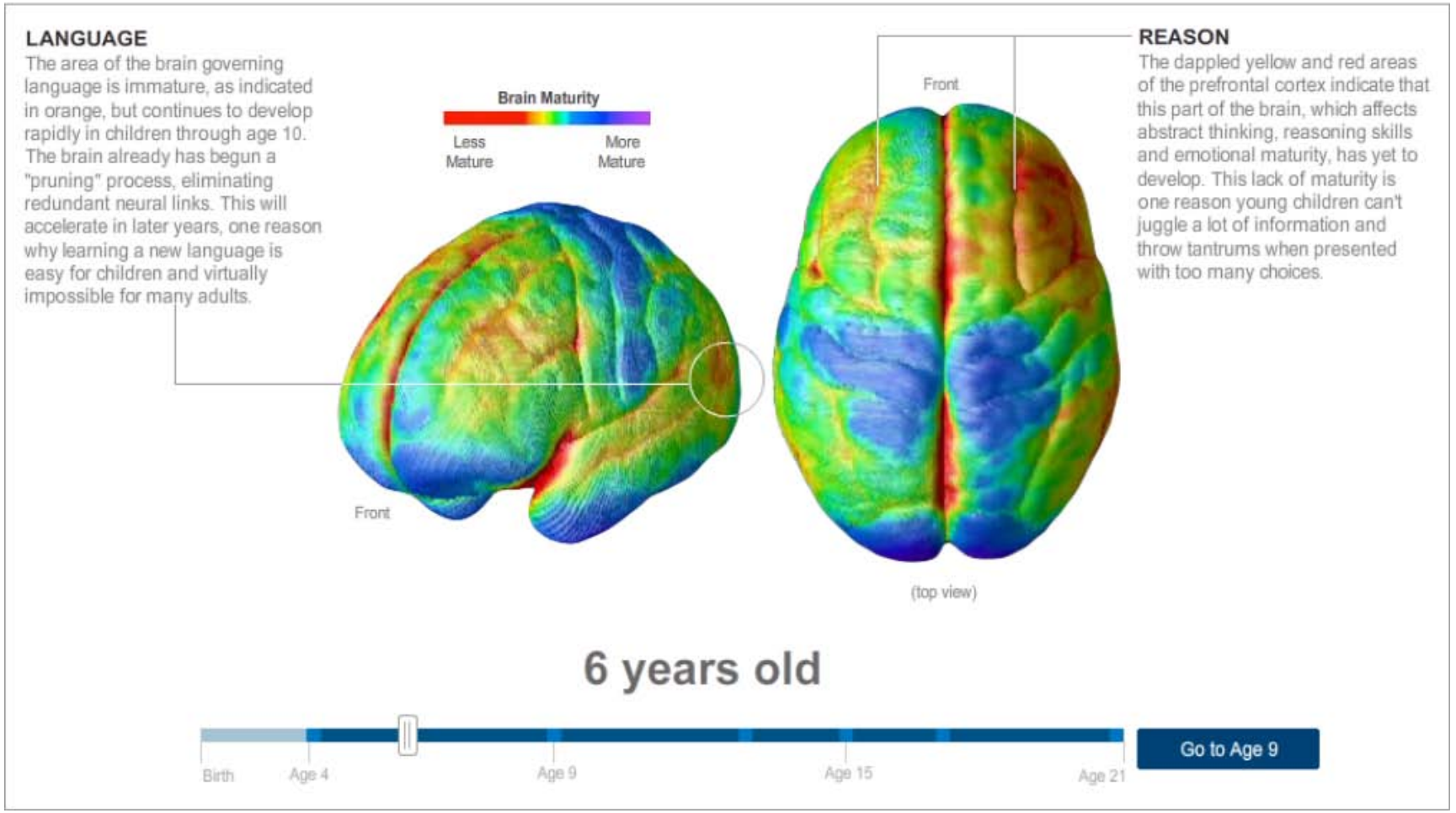
EARLY DEVELOPMENT

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.



4 years old

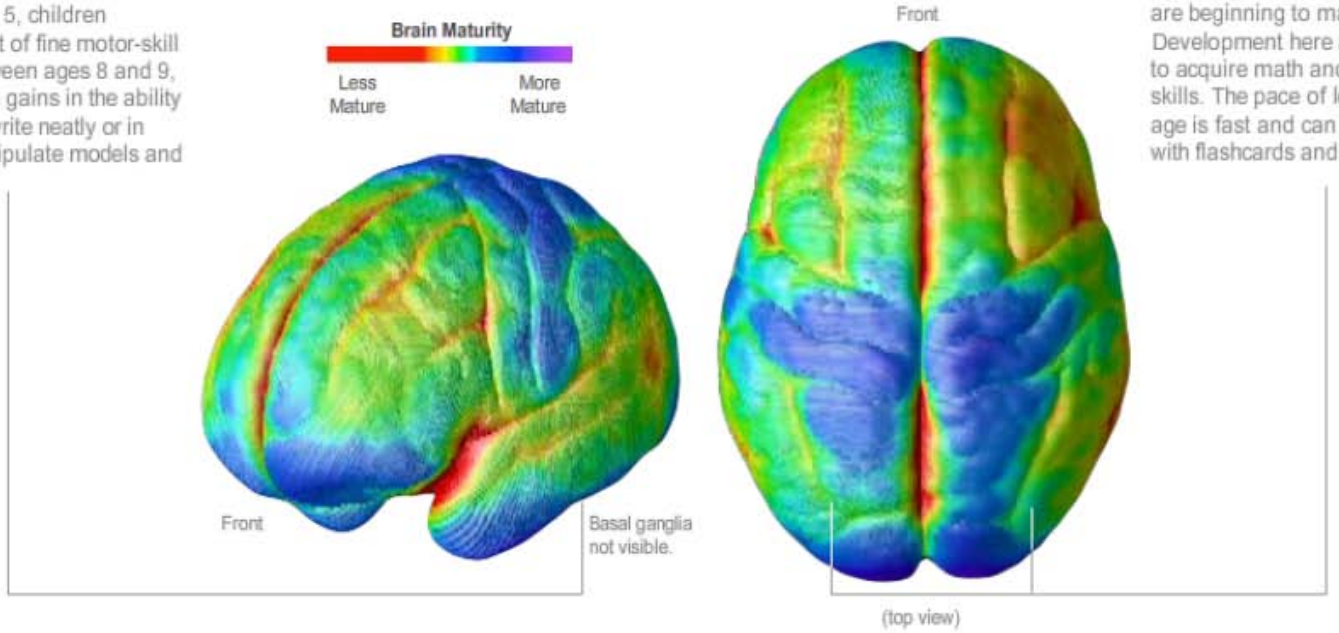
Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times



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.

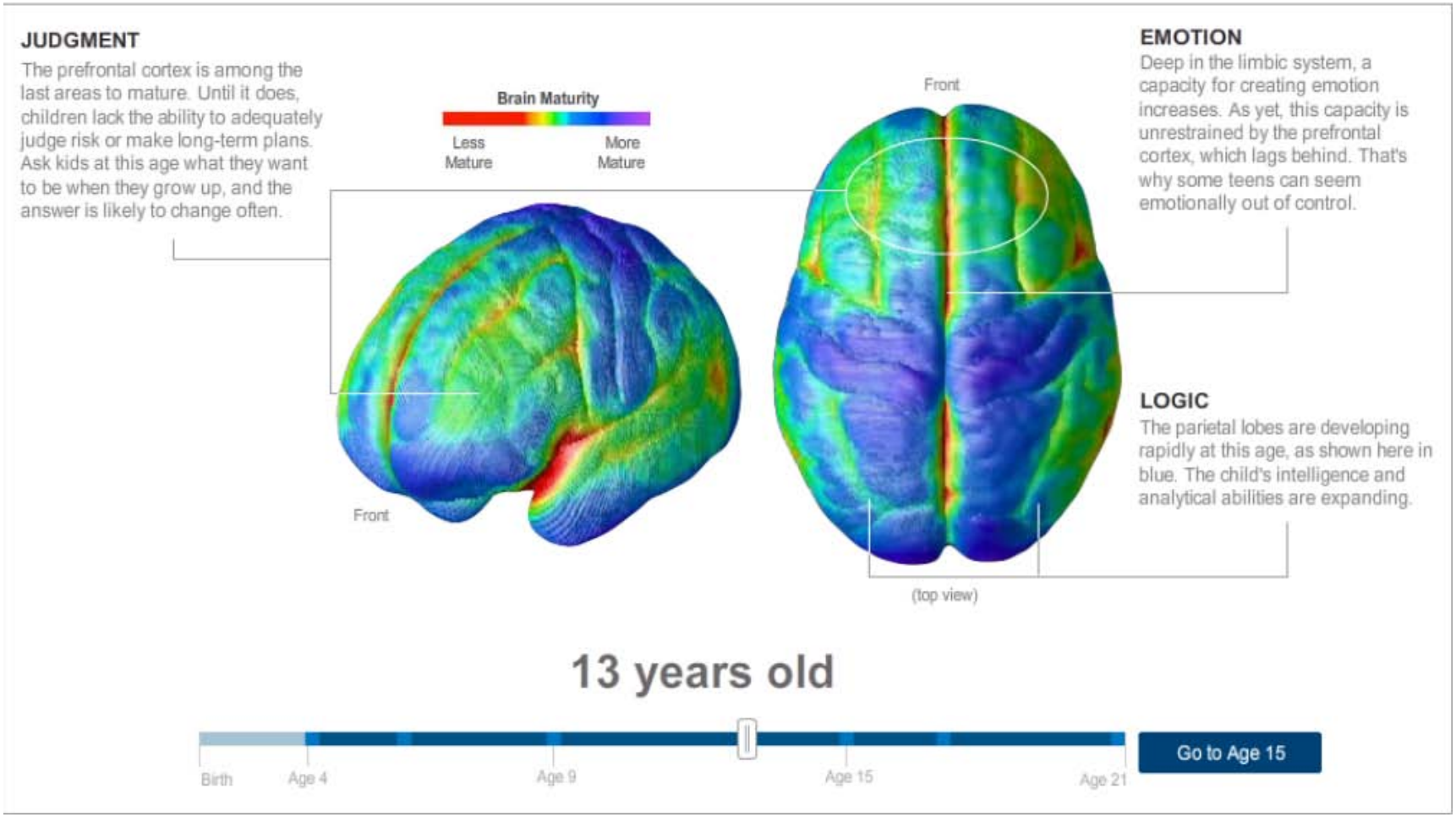


MATHEMATICS

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.

9 years old

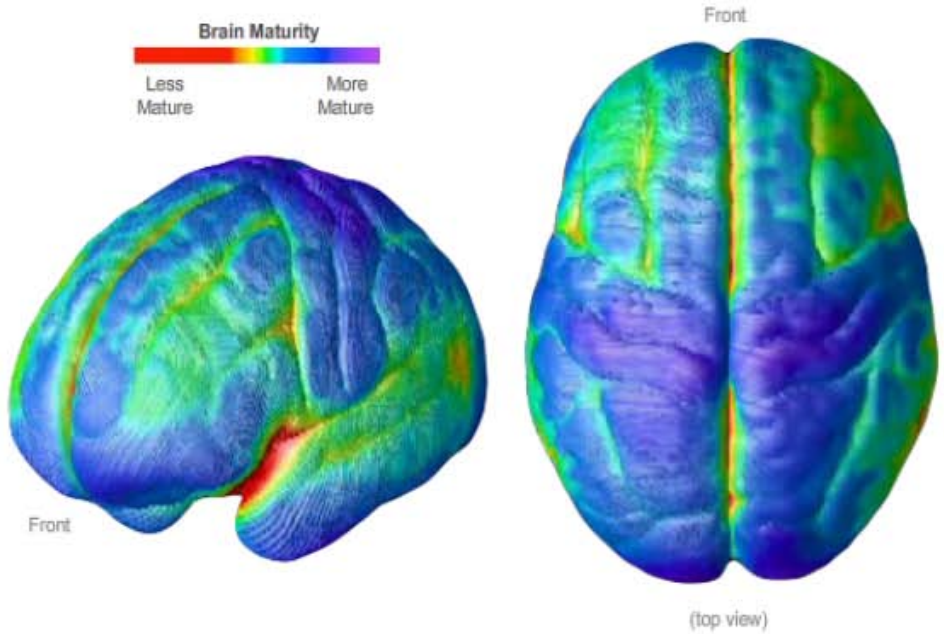
Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times



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.

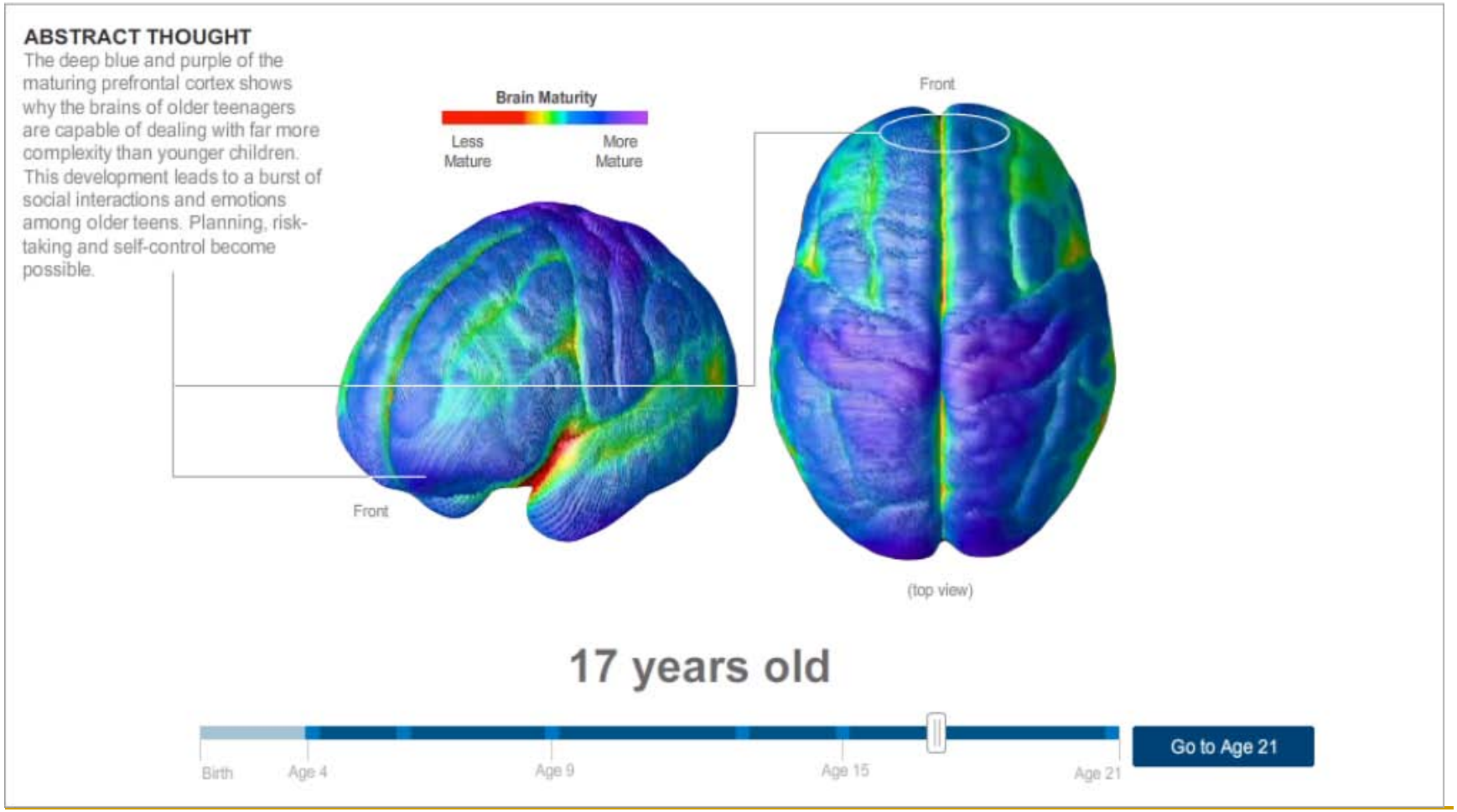


15 years old

Birth | Age 4 | Age 9 | Age 15 | Age 21

Go to Age 17

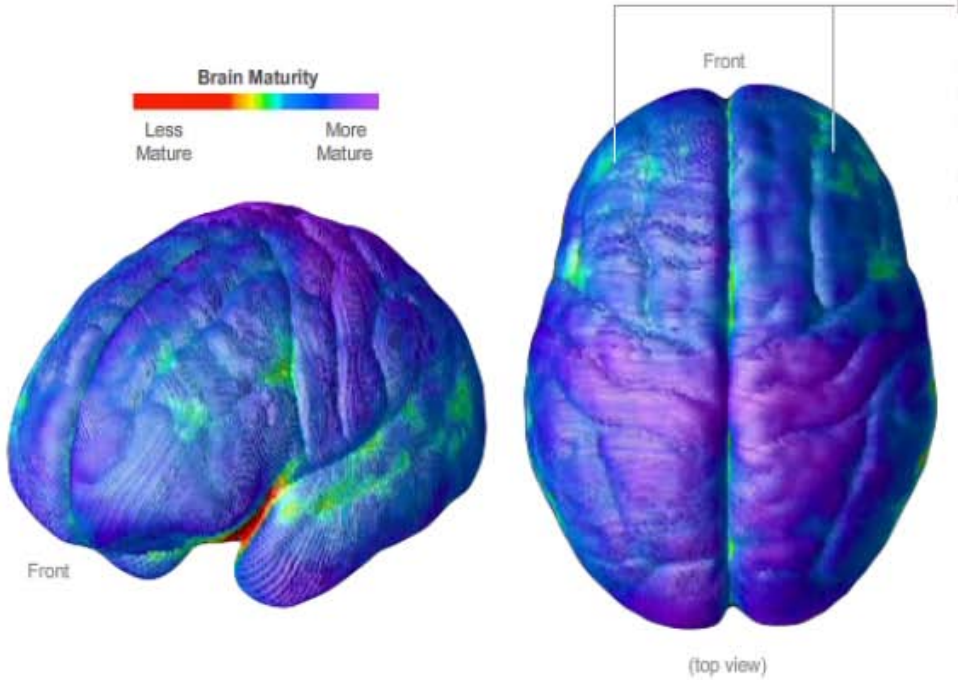
Brain images courtesy of Dr. Paul Thompson, University of California, Los Angeles. Source information provided by Dr. Jay Giedd, National Institutes of Mental Health. Produced by Tara Parker-Pope, Jon Huang, and Mike Mason/The New York Times



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.

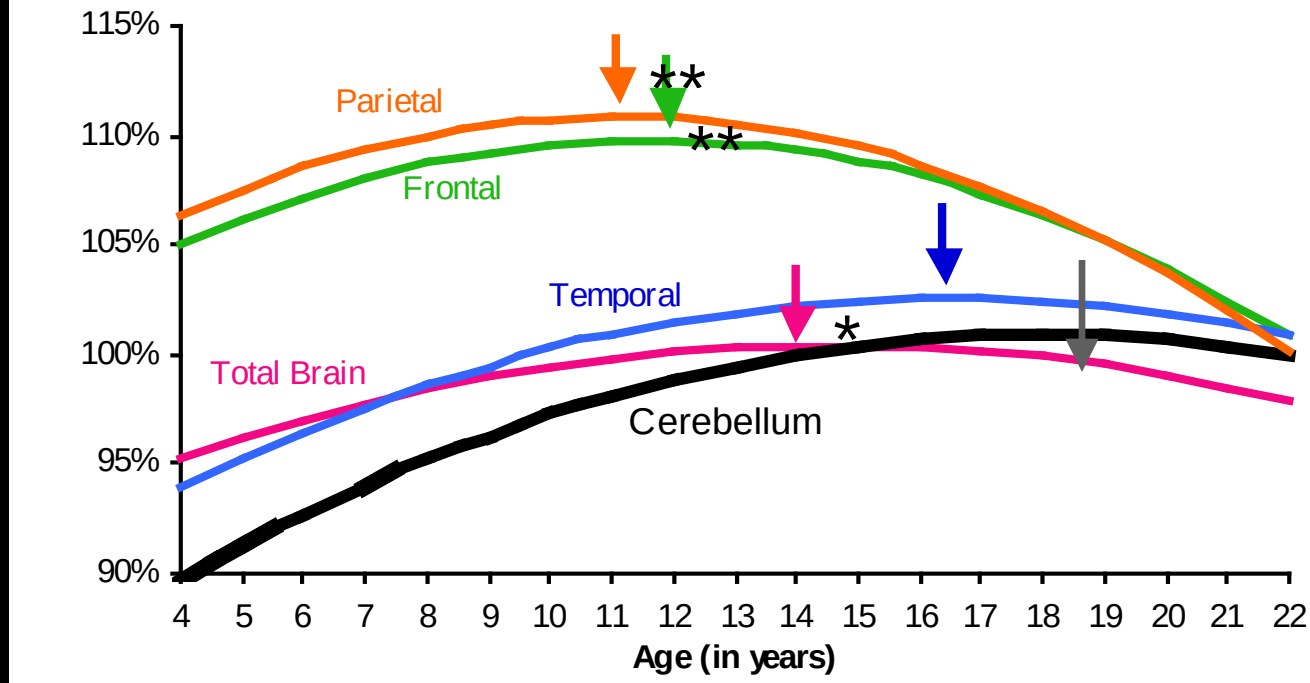


MATURATION

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



** = 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…..

Molecular Psychiatry (2007) 12, 1089–1102

www.nature.com/mp

ORIGINAL ARTICLE

Stress-induced changes in primate prefrontal profiles of gene expression

AM Karssen[1,6], S Her[1,6,7], JZ Li[2], PD Patel[3], F Meng[3], WE Bunney Jr[4], EG Jones[5], SJ Watson[3], H Akil[3], RM Myers[2], AF Schatzberg[1] and DM Lyons[1]

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

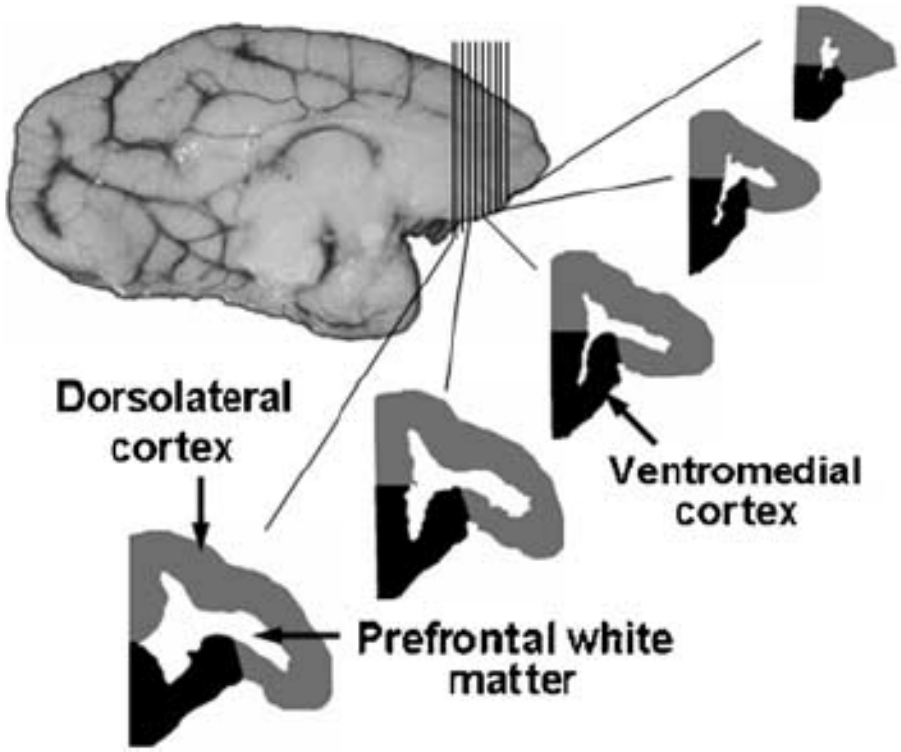


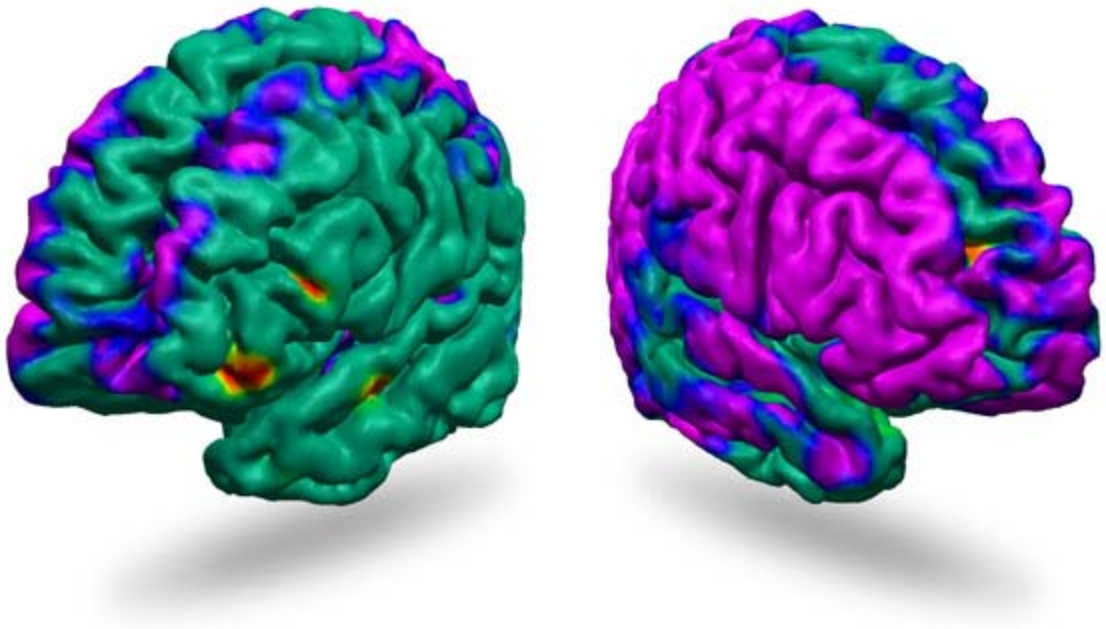
Figure 2 Prefrontal regions on serial sections from the left cerebral hemisphere of a hemisected squirrel monkey brain.

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
		GO:0007416	Synaptogenesis	14	0.046	0.018
		GO:0048489	Synaptic vesicle transport	27	0.037	0.018
	Axonogenesis	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
		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
	Cell growth	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
	Other	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
		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
Cellular component	Membrane	GO:0019898	Extrinsic to membrane	31	0.025	0.008
		GO:0019897	Extrinsic to plasma membrane	27	0.029	0.022
	Other	GO:0005834	Heterotrimeric G-protein complex	18	0.020	0.018
Molecular function	Binding	GO:0008092	Cytoskeletal protein binding	188	0.000	0.014
		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.

nature neuroscience

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'Alessio[3], Sergiy Dymov[3], 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.

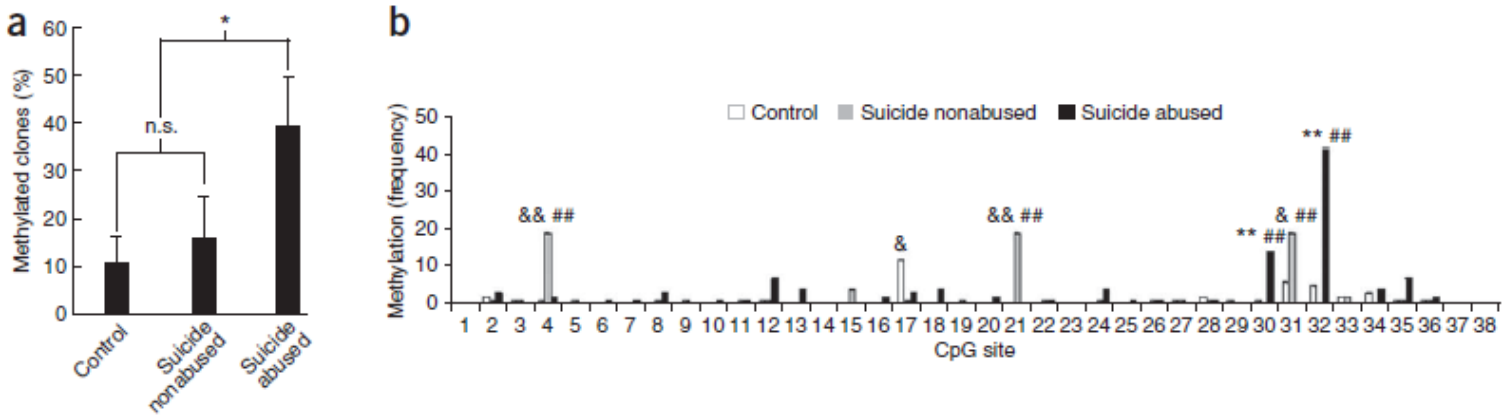


Figure 2 Methylation of the *NR3C1* promoter in the hippocampus. Twenty clones were sequenced for each subject for methylation mapping. (**a**) Mean ± s.e.m. percentage of methylated clones for suicide victims with a history of childhood abuse ($n = 12$), suicide victims without a history of childhood 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…..

The Journal of Neuroscience, March 11, 2009 • 29(10):3019–3025 • 3019

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 Schlaug[4]

[1]McConnell Brain Imaging Center, Montreal Neurological Institute, McGill University, Montreal, Quebec, Canada H3A 2B4, [2]Mouse Imaging Centre, Hospital for Sick Children, Toronto, Ontario, Canada M5T 3H7, [3]Department of Psychology, Boston College, Chestnut Hill, Massachusetts 02467, and [4]Music and Neuroimaging Laboratory, Department of Neurology, Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, Massachusetts 02215

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.

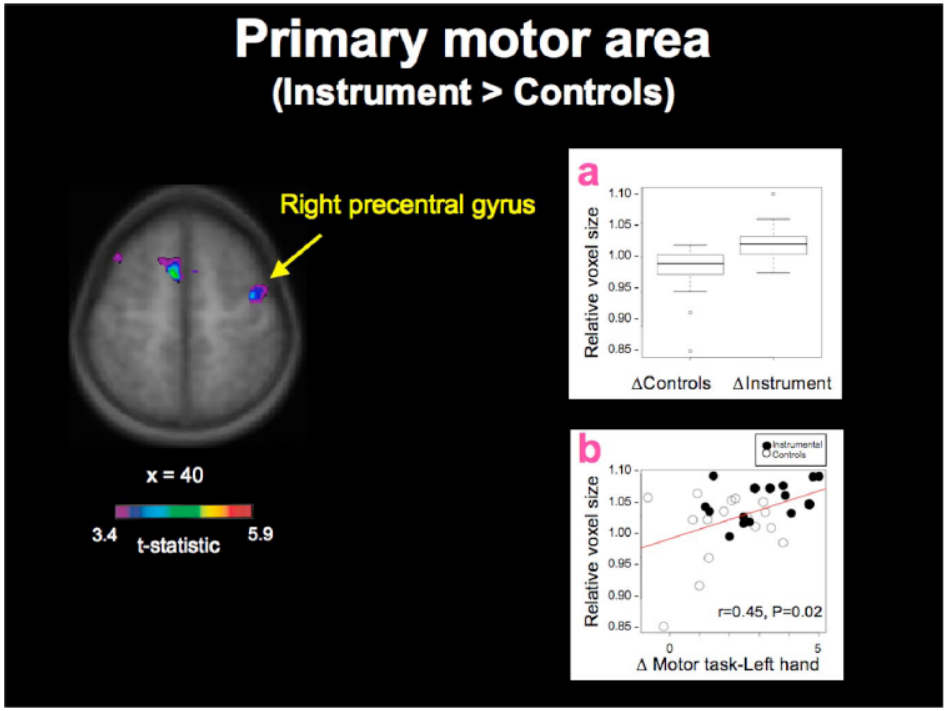


Figure 1. Longitudinal group brain deformation differences and brain–behavioral correlations in primary motor area. The brain image (a horizontal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in terms of 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***.

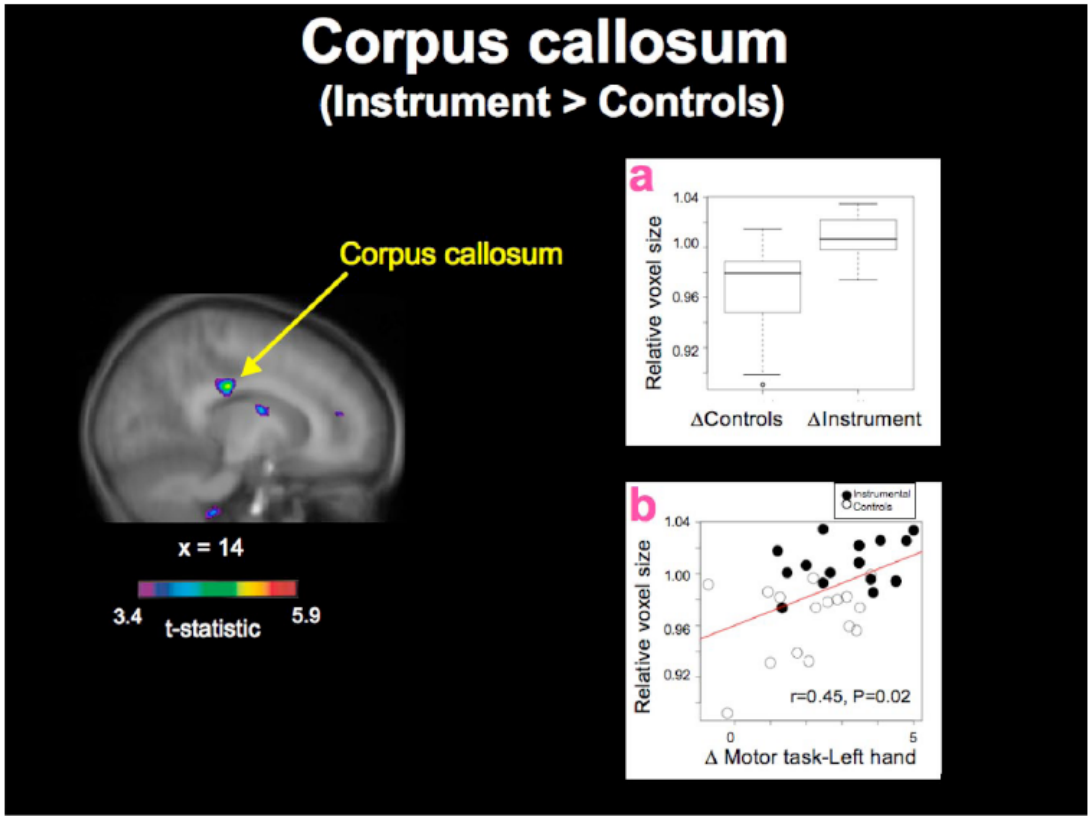


Figure 2. Longitudinal group brain deformation differences and brain–behavioral correlations in the corpus callosum. The brain image (a sagittal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in terms of 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***).

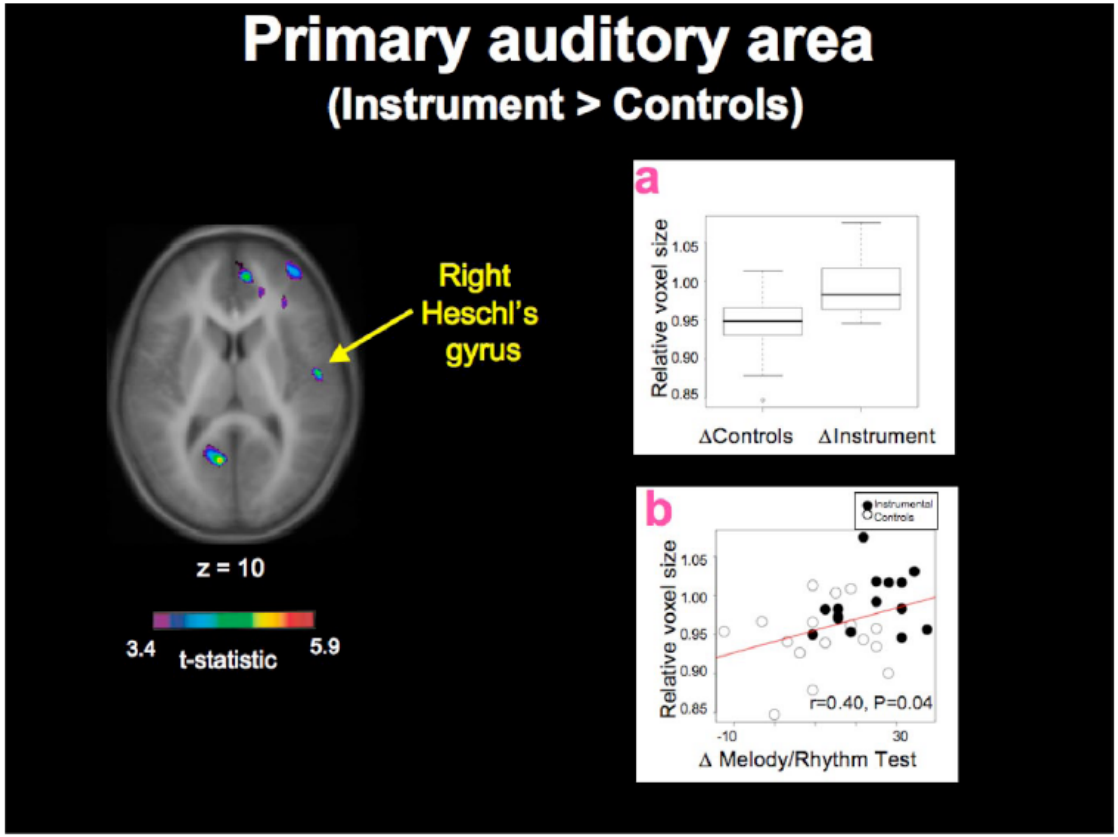


Figure 3. Longitudinal group brain deformation differences and brain–behavioral correlations in right primary auditory area. The brain image (a horizontal slice) shows areas of significant difference in relative voxel size over 15 months in instrumental ($n = 15$) versus control ($n = 16$) children in 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

CHRISTINA GRAPE,[1,2] MARIA SANDGREN,[3] LARS-OLOF HANSSON,[4] MATS ERICSON,[5] AND TÖRES THEORELL[1,2]

[1]*National Institute for Psychosocial Factors and Health*
[2]*Division for Psychosocial Factors and Health, Department of Public Health Sciences, Karolinska Institutet*
[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.

17 JULY 2009 VOL 325 **SCIENCE** www.sciencemag.org

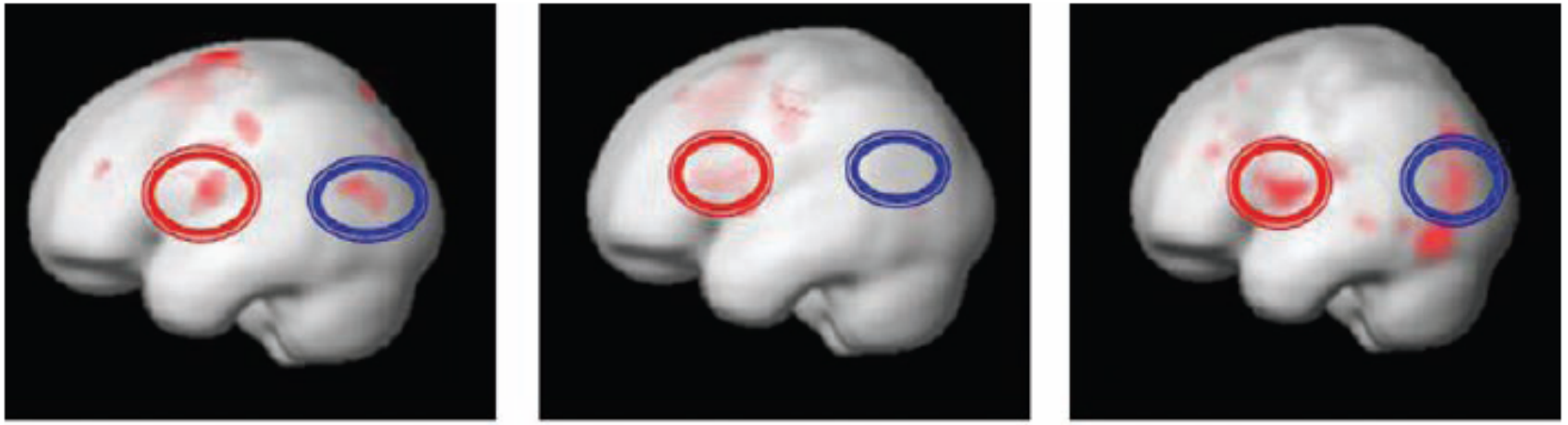
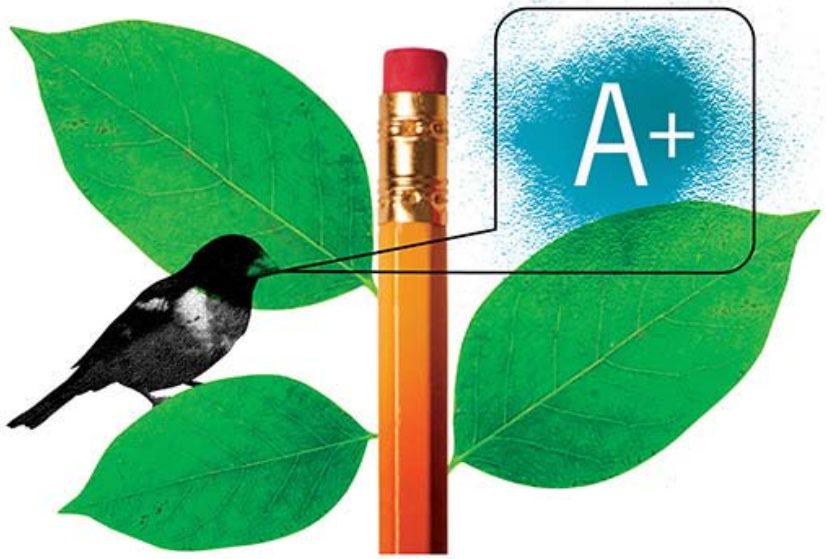


Fig. 1. Brain activation differences in dyslexia and its treatment [from (*36*)]. Functional magnetic resonance imaging activations shown on the left hemisphere for phonological processing in typically developing readers (**left**), age-matched dyslexic readers (**middle**), and the difference before 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 New York Times

Tuesday, February 24, 2009

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".

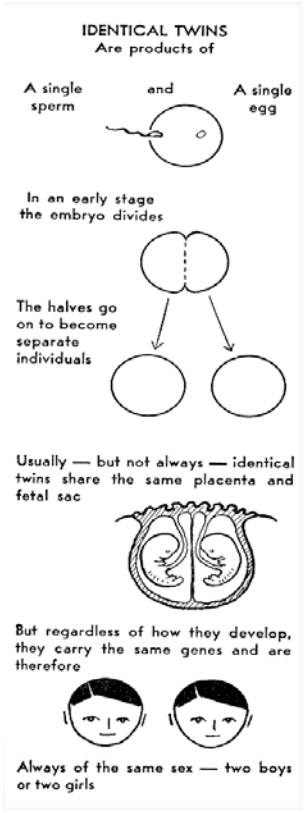
Sir Professor Michael Rutter

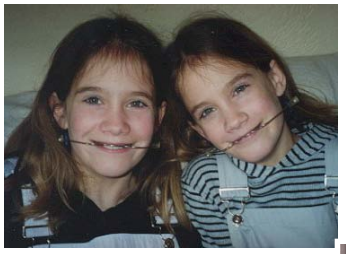
ESCAP Opening Lecture, 2009

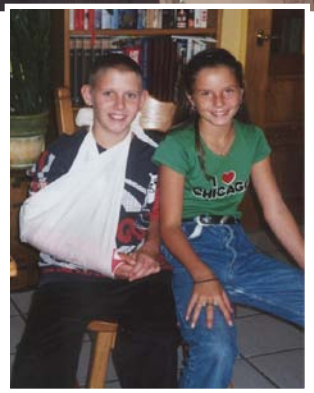
How Have We Contributed to This Knowledge?

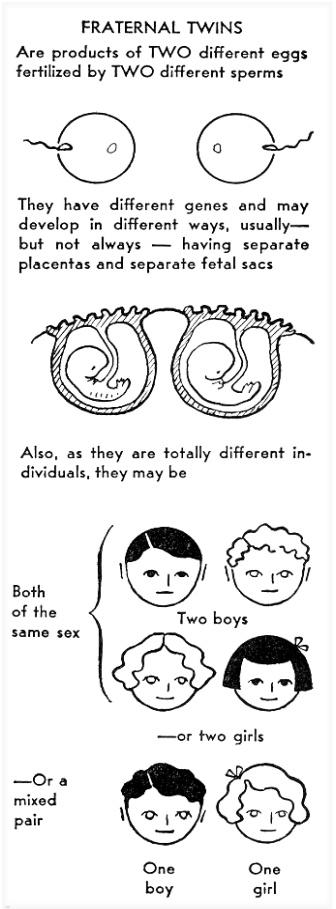
- Twin Studies
- Family Studies
- Molecular Genetic Studies
- Taxonomic Studies

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?

Birth > 30,000 pairs, born after 1986

age 2 Motor development, parental smoking, growth

age 3 CBCL both parents

age 5 DCB both parents

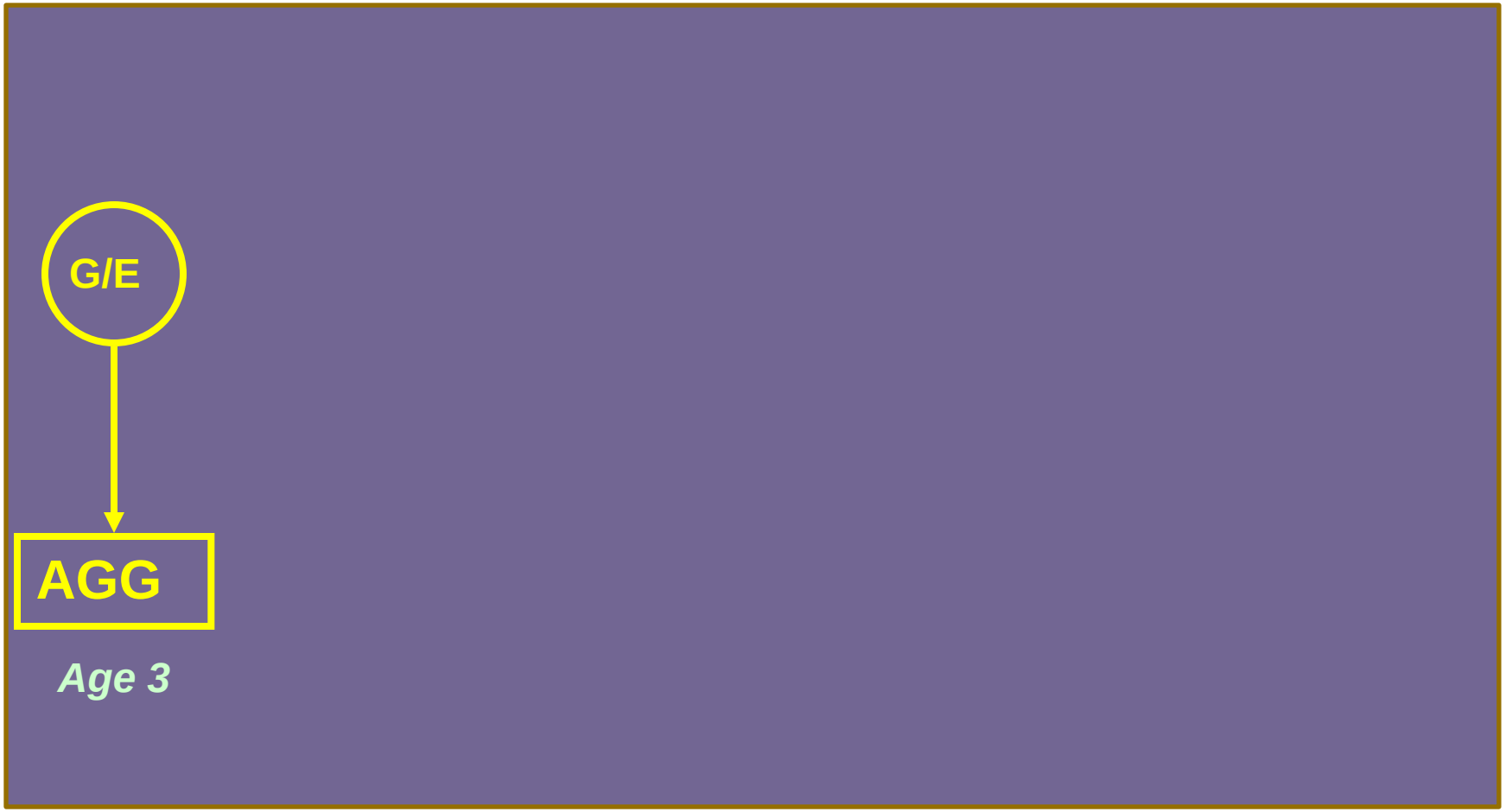
age 7 CBCL/TRF/Connors parents & teachers

age 10 CBCL/TRF/Connors parents & teachers

age 12 CBCL/TRF/Connors parents & teachers

age 14,16,18 YSR & DHBQ

Developmentally Sensitive Analysis



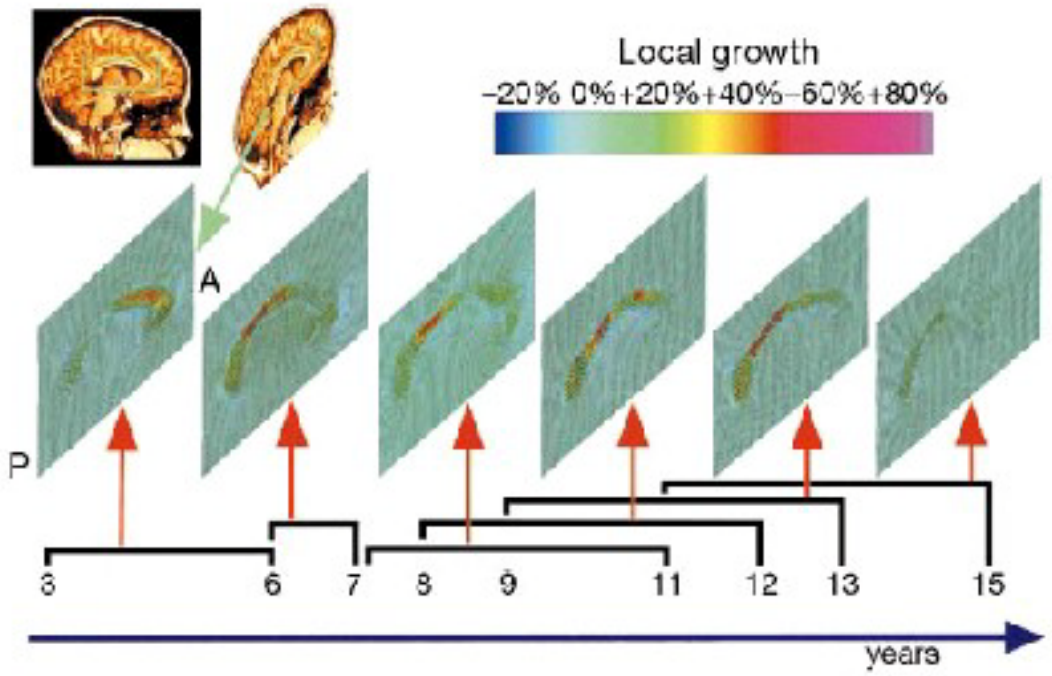
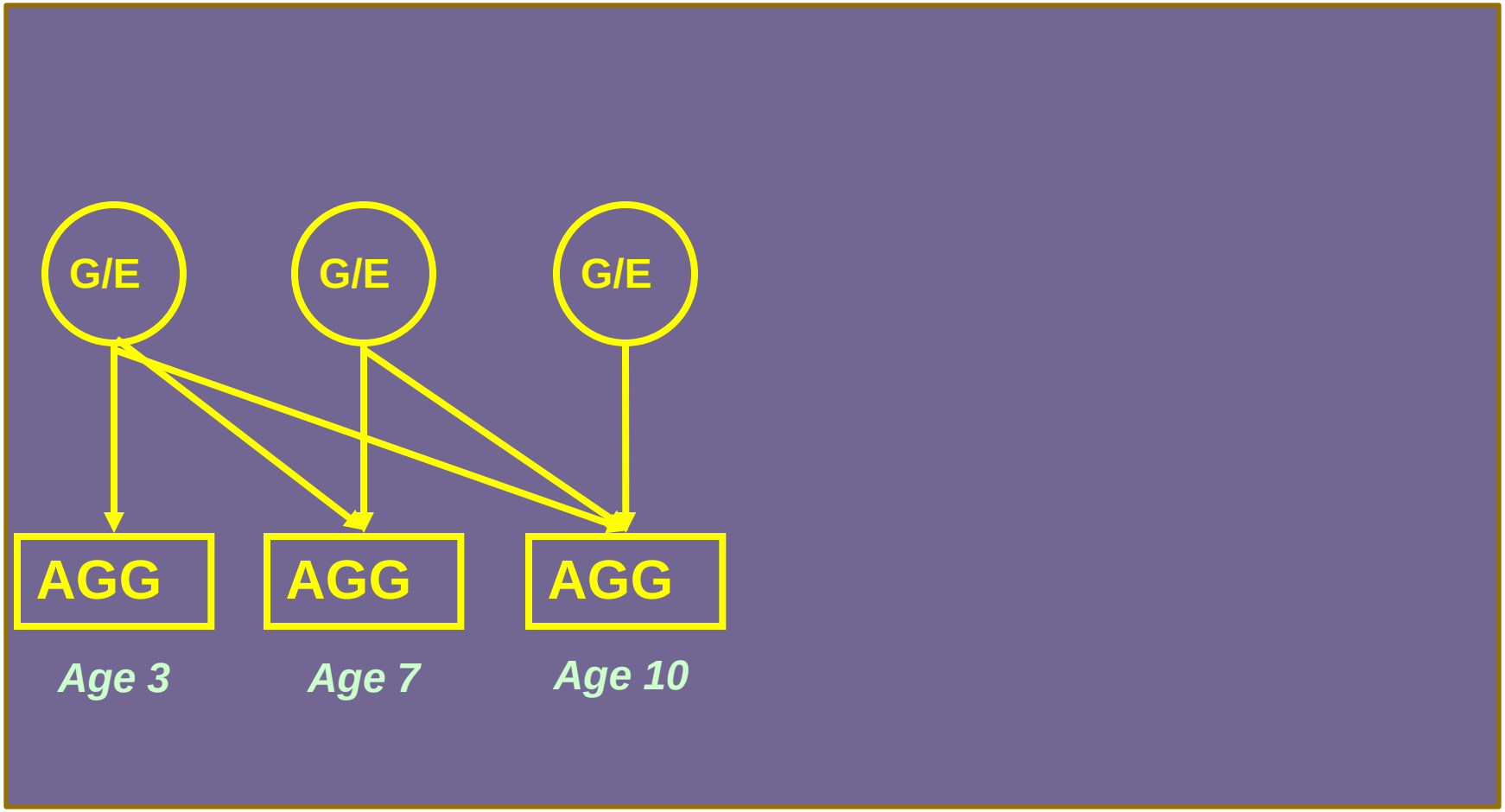


Figure 1 Growth patterns in the developing human brain detected at ages 3–15 years. A rostro-caudal wave of peak growth rates is detected in young normal subjects scanned repeatedly across time spans of up to four years. Between ages 3 and 6 years, peak growth rates (red colours; 60–80% locally) were 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.

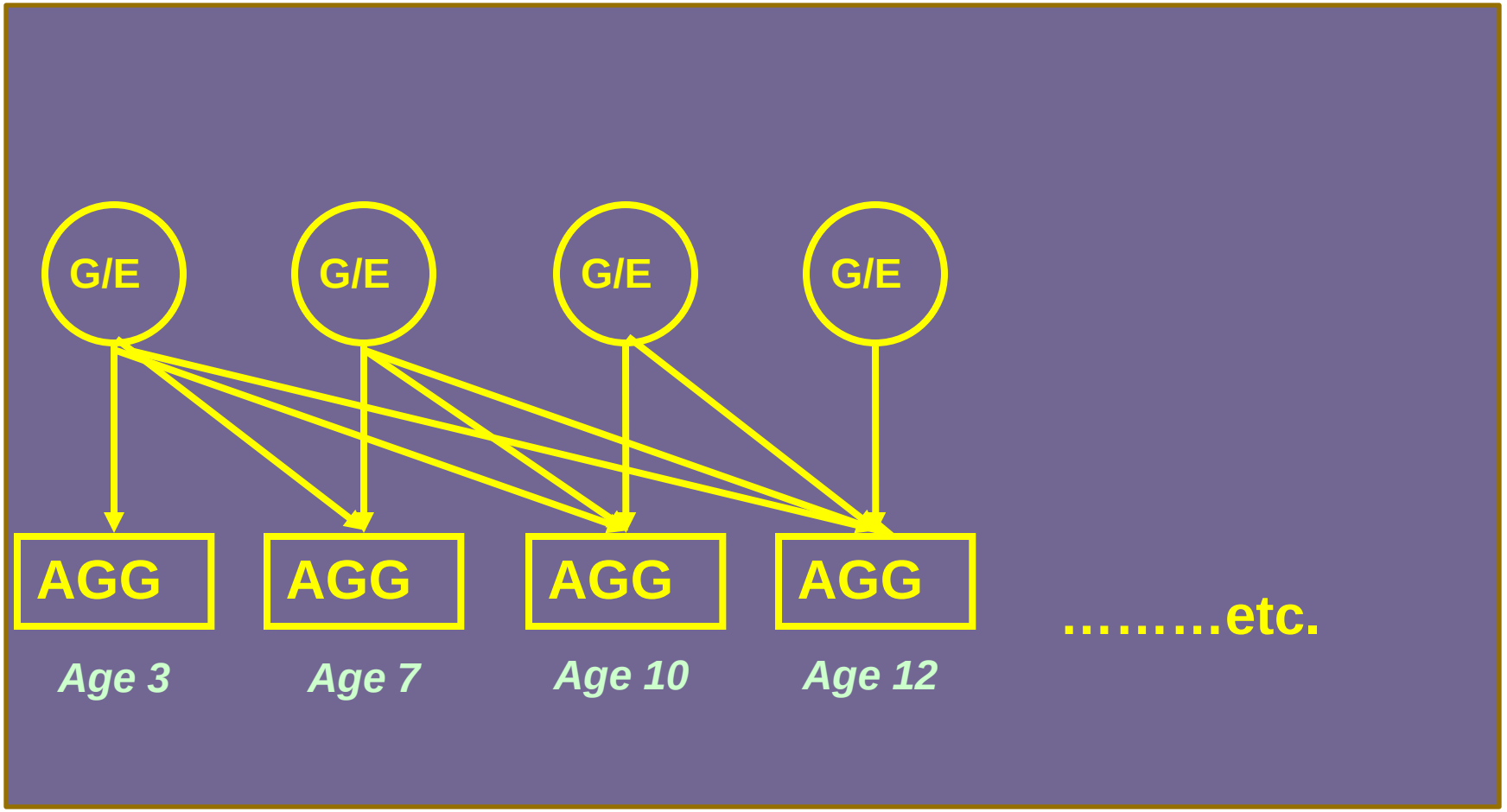
Thompson et al., 2000; *Nature* 484:190-193

Developmentally Sensitive Analysis

Developmentally Sensitive Analysis



Developmentally Sensitive Analysis



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

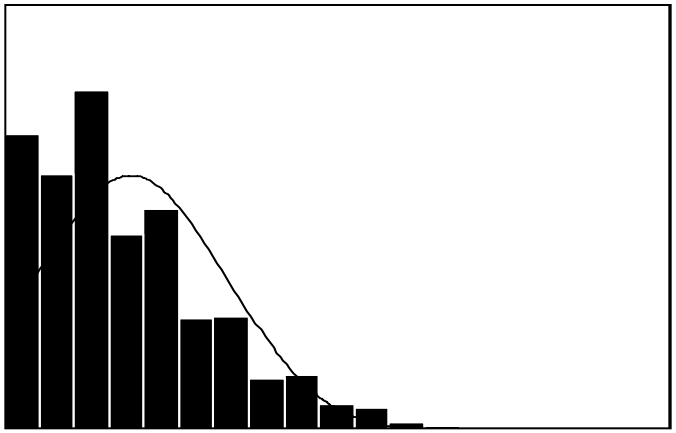
- We have shown that all emotional disorders are influenced by both genetic and environmental influences.
- We should search for genes and risk and protective factors that may put individuals at risk for or protect them from psychiatric disorders.
- We are now doing these studies.

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)

Reliogiosity

“Environmental” Measures
The Dutch Health and Behavior Questionnaire (DHBQ)

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

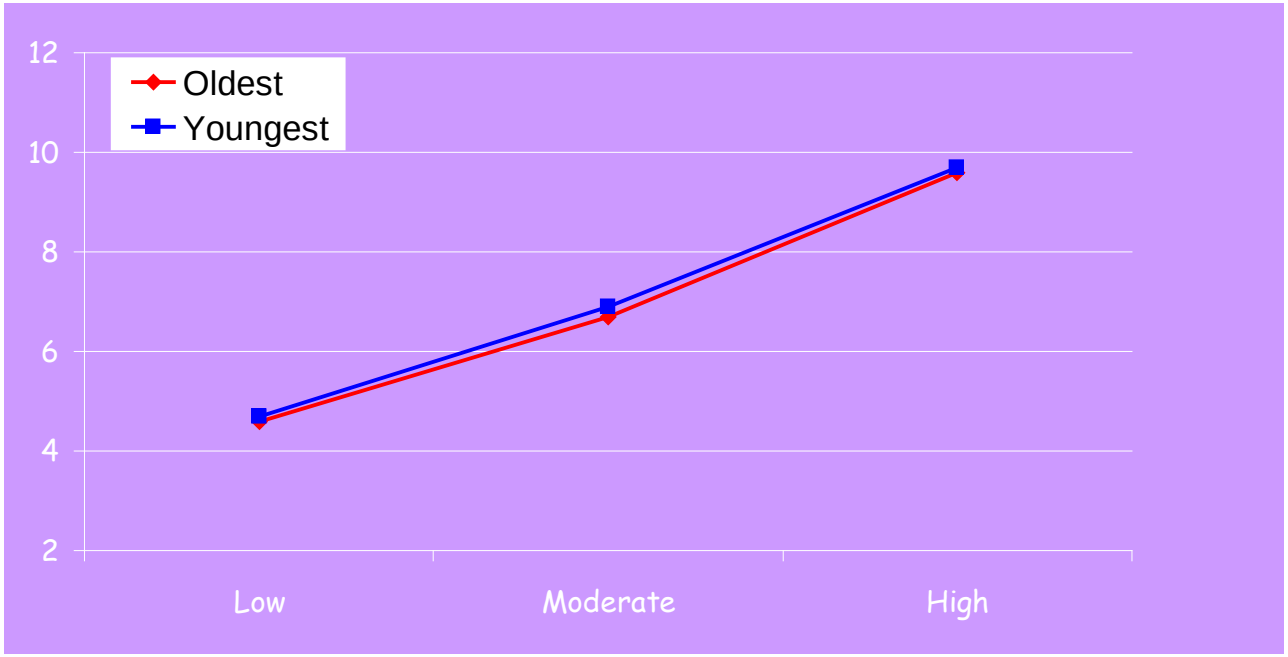
The Role of Familial Conflict in Adolescent AGG: Preliminary Results from the DHBQ

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.

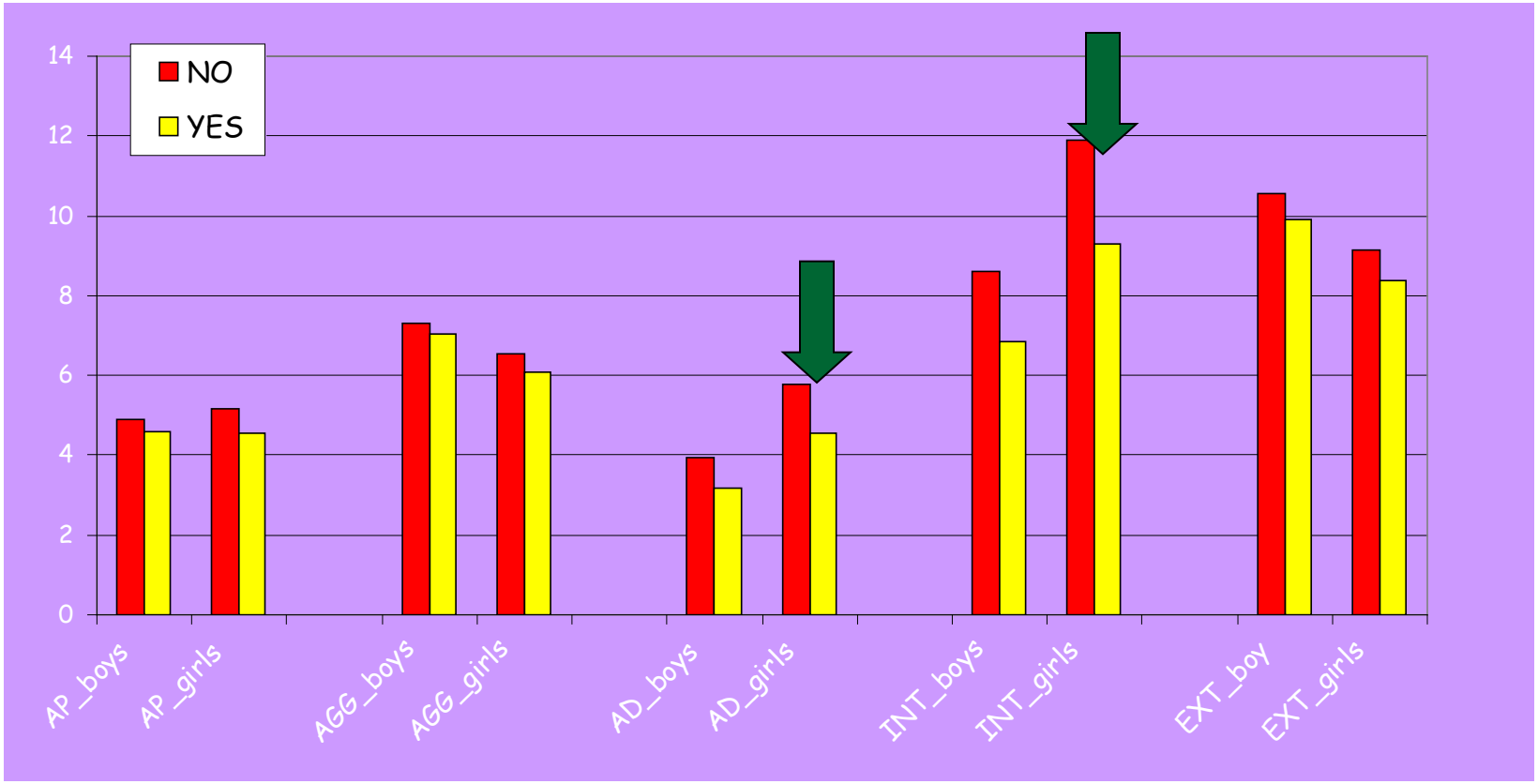
These boys generally:

* 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)

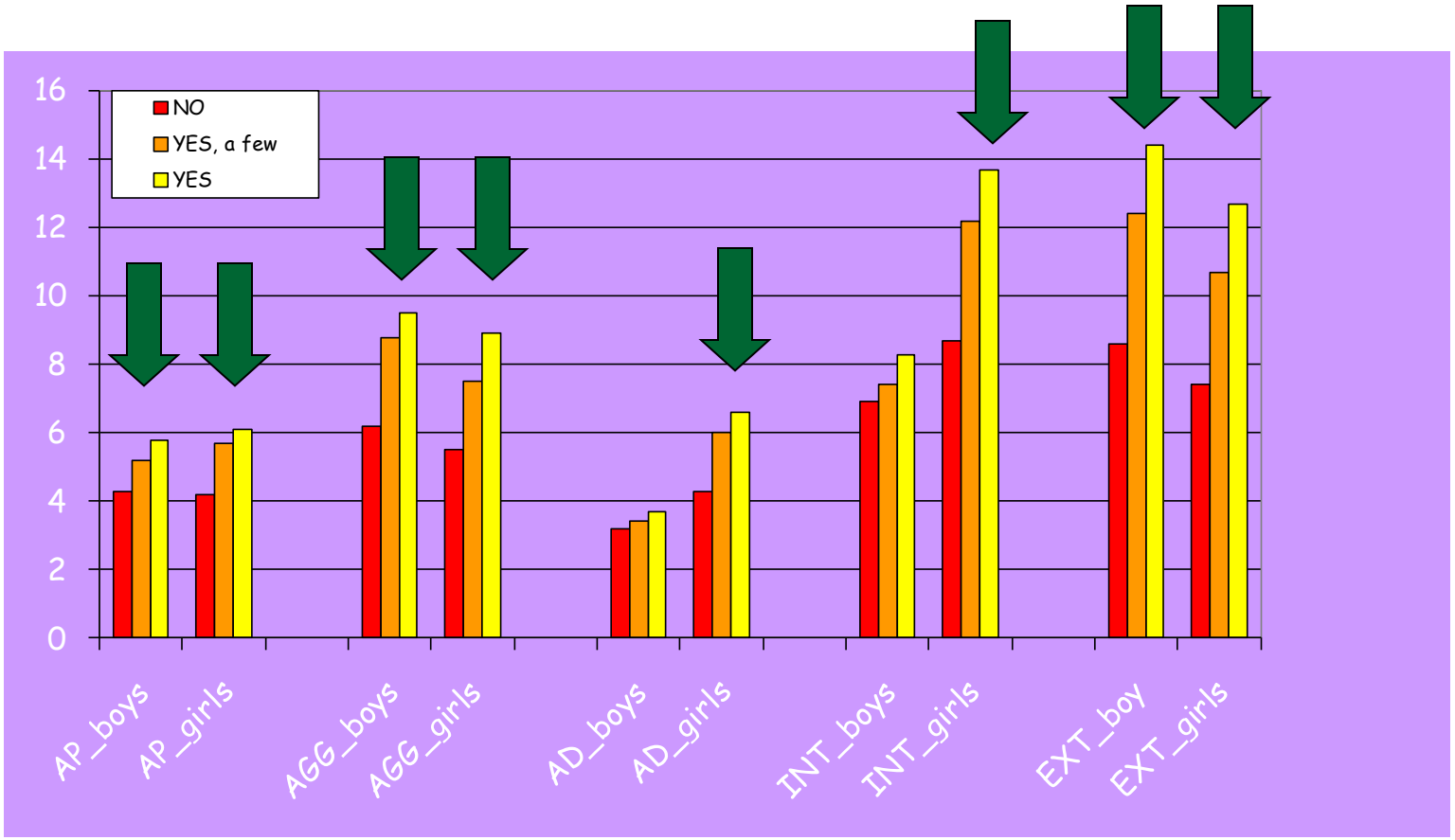
Exercise Behavior and Psychopathology



Preliminary Results of Adolescents Data

(The Dutch Health and Behavior Questionnaire)

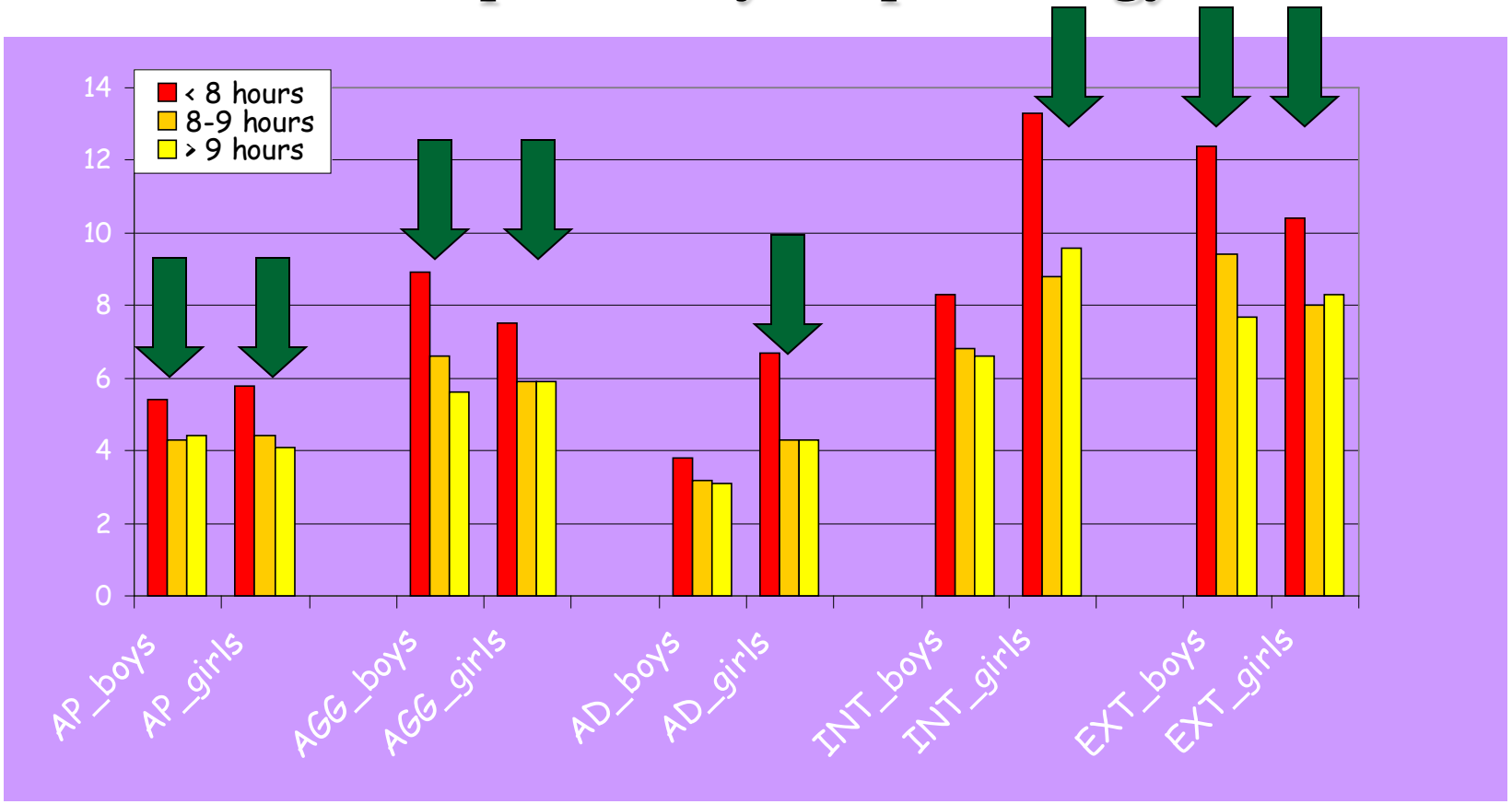
Smoking Behavior and Psychopathology



Preliminary Results of Adolescents Data

(The Dutch Health and Behavior Questionnaire)

Sleep and Psychopathology



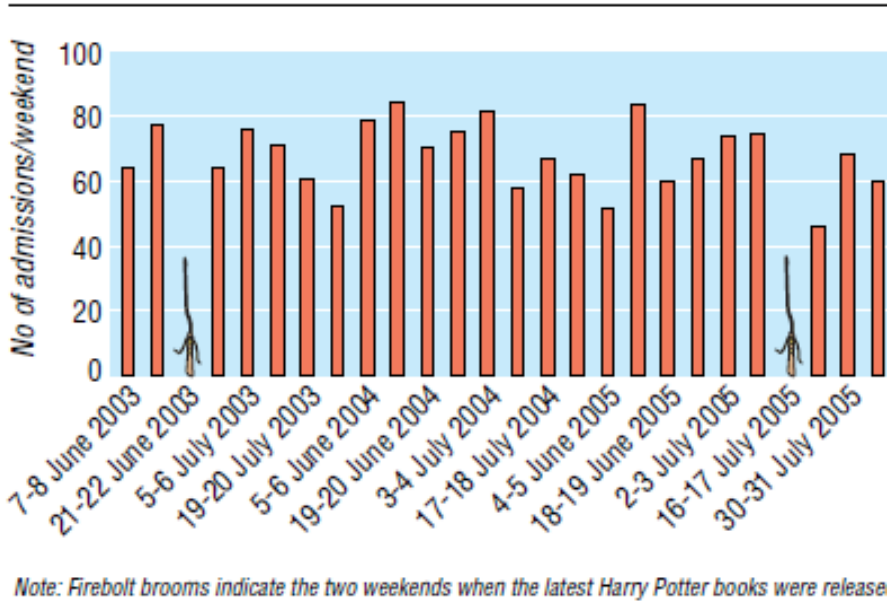
The Harry Potter effect!

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



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

What is already known on this topic

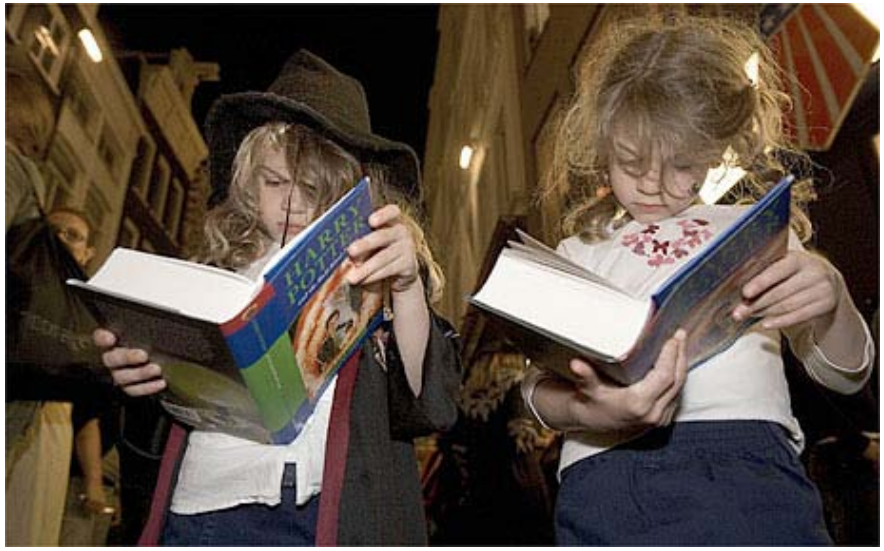
Traumatic childhood injuries are a serious source of mortality and morbidity

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

The Harry Potter effect!



-r

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

+r

-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

+r

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]

[1]Department of Psychology, Ankara University, Sihhiye, Ankara, Turkey.
[2]Department of Psychology, Sorbonne University, Paris, France.

Elementary & High school students

Internet use for murdering, bombing & fighting games

+r

-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

+r

-Aggression

-Anger

-Hostility

-Reading

-Homework

-r

Method: **Sample & Measures**

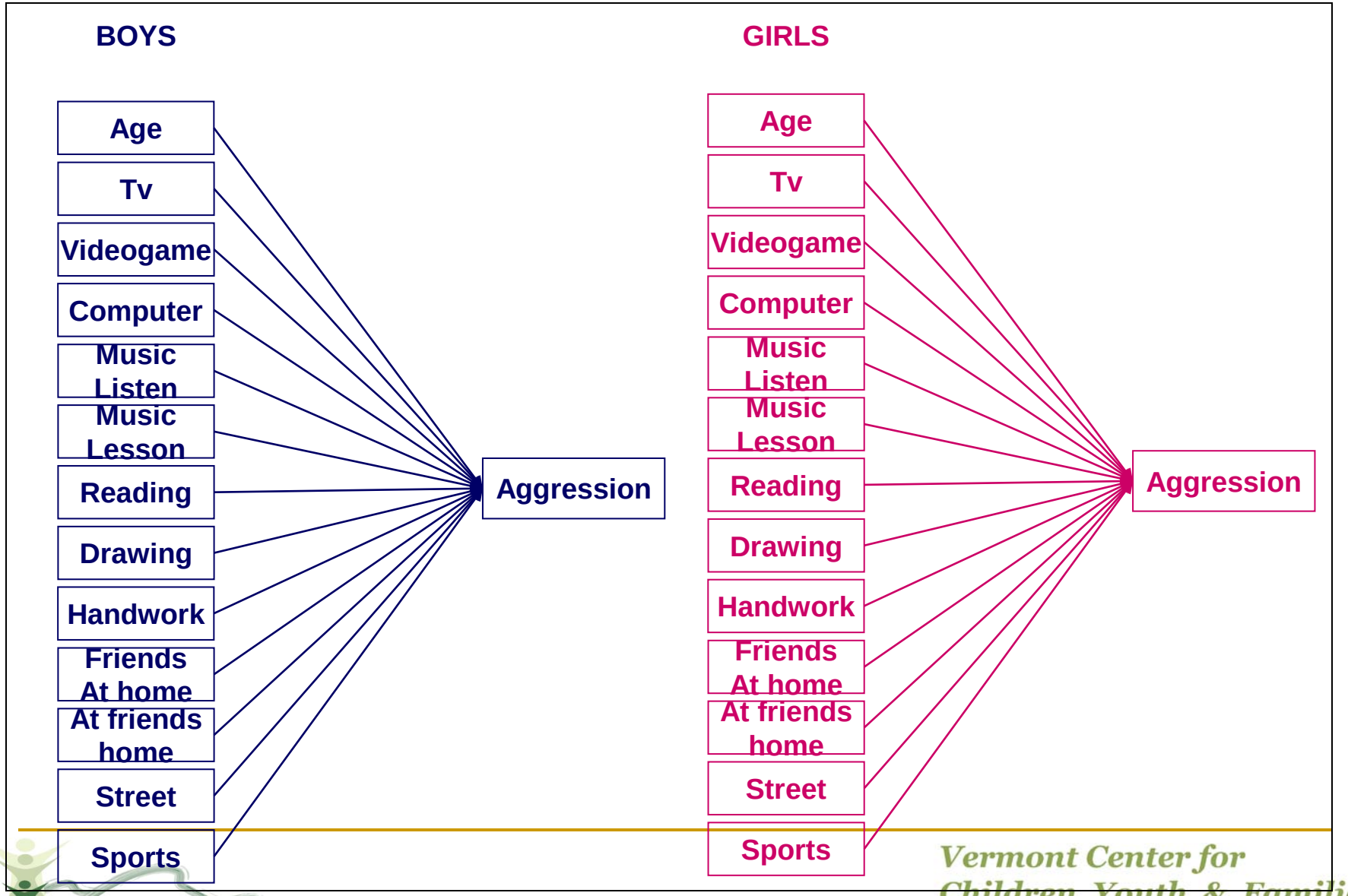
Measures: Longitudinal Survey Study

- 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

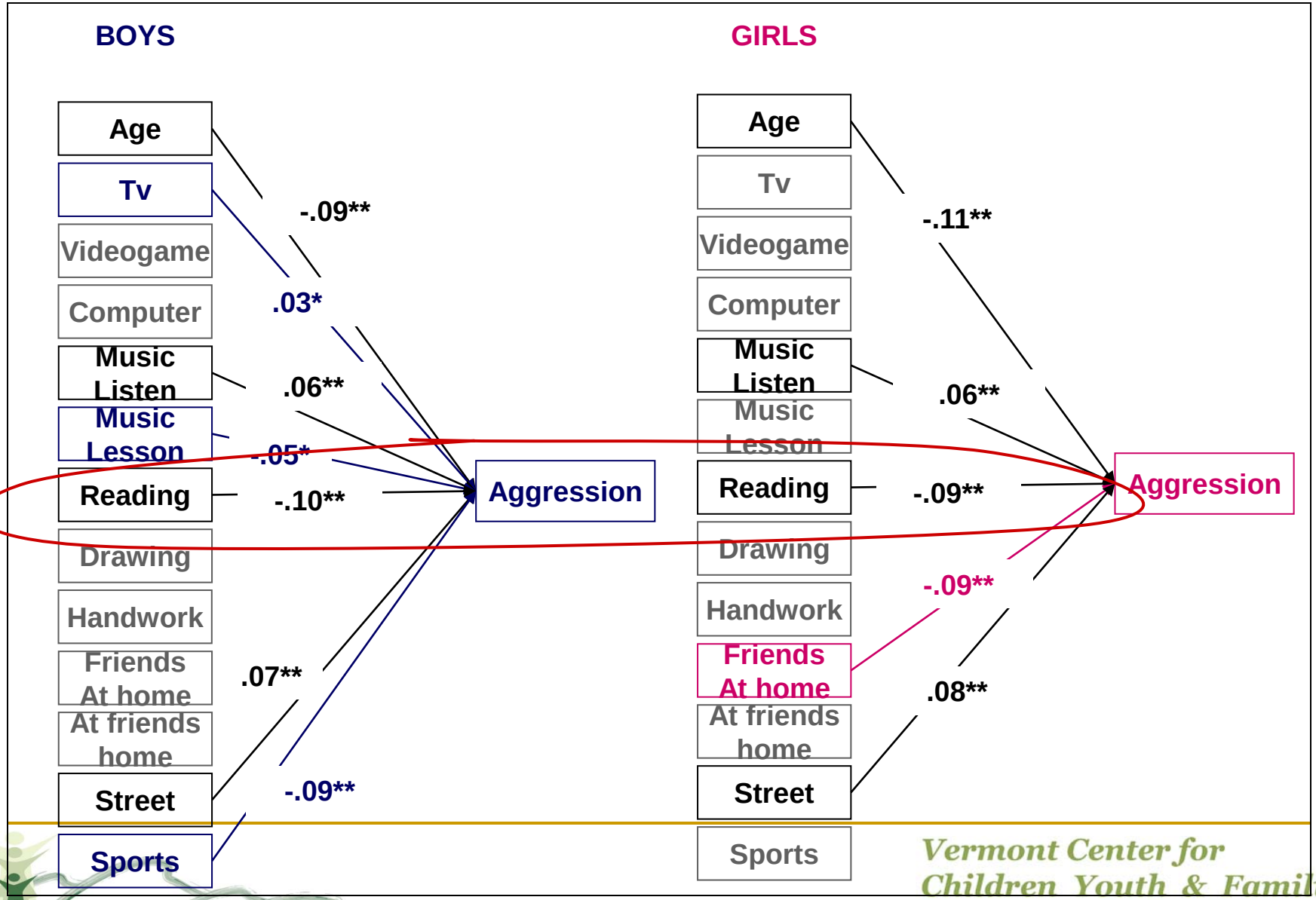
Answer Categories (1-7):

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

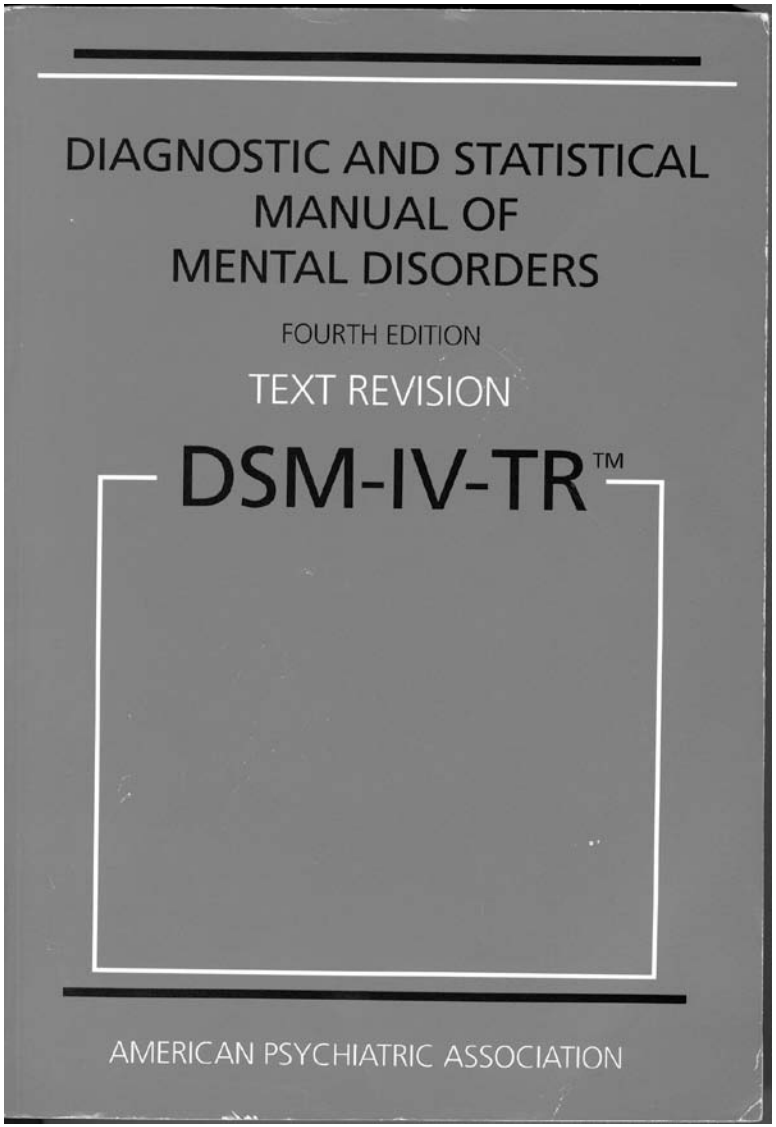
ESCAP 2009

"It is time for us to admit that, although we do not know exactly how, we do have evidence that genes and environment d0 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. PINE[3]

1 University of Vermont, Burlington, VT, USA
2 Vrije University, Amsterdam, The Netherlands
3 National Institute of Mental Health, Bethesda, MD, USA

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**

(0)	1	2	1.	Acts too young for his/her age
0	(1)	2	[a]2.	Drinks alcohol without parents' approval (describe): 3x
0	1	(2)	3.	Argues a lot
0	1	(2)	[a]4.	Fails to finish things he/she starts
0	1	(2)	[a]5.	There is very little he/she enjoys
(0)	1	2	6.	Bowel movements outside toilet
(0)	1	2	7.	Bragging, boasting
0	1	(2)	8.	Can't concentrate, can't pay attention for long
0	1	(2)	9.	Can't get his/her mind off certain thoughts; obsessions (describe): computers; people who cross him
(0)	1	2	10.	Can't sit still, restless, or hyperactive
(0)	1	2	11.	Clings to adults or too dependent
0	1	(2)	12.	Complains of loneliness
0	1	(2)	13.	Confused or seems to be in a fog
(0)	1	2	14.	Cries a lot
(0)	1	2	15.	Cruel to animals
0	1	(2)	16.	Cruelty, bullying, or meanness to others
(0)	1	2	32.	Feels he/she has to be perfect
0	1	(2)	33.	Feels or complains that no one loves him/her
0	1	(2)	34.	Feels others are out to get him/her
0	1	(2)	35.	Feels worthless or inferior
(0)	1	2	36.	Gets hurt a lot, accident-prone
0	(1)	2	37.	Gets in many fights
(0)	1	2	38.	Gets teased a lot
(0)	1	2	39.	Hangs around with others who get in trouble
(0)	1	2	40.	Hears sound or voices that aren't there (describe):
0	(1)	2	41.	Impulsive or acts without thinking
0	(1)	2	42.	Would rather be alone than with others
(0)	1	2	43.	Lying or cheating
(0)	1	2	44.	Bites fingernails
0	1	(2)	45.	Nervous, highstrung, or tense
(0)	1	2	46.	Nervous movements or twitching (describe):
(0)	1	2	47.	Nightmares

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

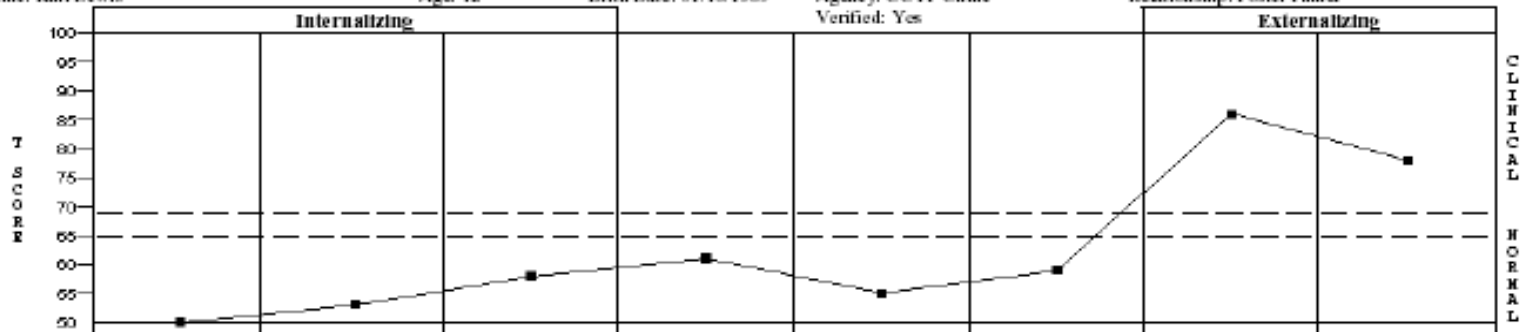
ID: -001
Name: Karl Lewis

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



	Anxious/ Depressed	Withdrawn/ Depressed	Somatic Complaints	Social Problems	Thought Problems	Attention Problems	Rule-Breaking Behavior	Aggressive Behavior
Total Score	1	1	2	4	2	7	24	22
T Score	50	53	58	61	55	59	86-C	78-C
Percentile	<=50	62	79	87	69	81	>97	>97
	0 14.Cries	0 5.EnjoysLittle	1 47.Nightmares	0 11.Dependent	1 9.MindOff	1 1.ActsYoung	1 2.Alcohol	2 3.Argues
	0 29.Fears	0 42.PrefersAlone	0 49.Constipate	1 12.Lonely	0 18.HarmSelf	1 4.FailsToFinish	1 26.NoGuilt	1 16.Mean
	0 30.FearSchool	0 65.WontTalk	0 51.Dizzy	1 25.NotGetAlong	0 40.HearsThings	1 8.Concentrate	2 28.BreaksRules	1 19.DamAtten
	0 31.FearDoBad	0 69.Secretive	0 54.Tired	1 27.Jealous	0 46.Twitch	1 10.SitStill	2 39.BadFriends	1 20.DestroyOwn
	0 32.Perfect	0 75.Shy	0 56a.Aches	1 34.OutToGet	1 58.PicksSkin	0 13.Confused	2 43.LieCheat	1 21.DestroyOther
	1 33.Unloved	0 102.LacksEnergy	0 56b.Headaches	0 36.Accidents	0 59.SexPartsP	0 17.Daydream	2 63.PrefersOlder	1 22.DiebHome
	0 35.Worthless	1 103.Sad	0 56c.Nausea	0 38.Teased	0 60.SexPartsM	1 41.Impulsive	1 67.RunAway	1 23.DiebSchool
	0 45.Nervous	0 111.Withdrawn	0 56d.EyeProb	0 48.NotLiked	0 66.RepeatsActs	1 61.PoorSchool	1 72.SetsFires	1 37.Fights
	0 50.Fearful		0 56e.SkinProb	0 62.Clumsy	0 70.SeesThings	1 78.Inattentive	0 73.SexProbs	2 57.Attacks
	0 52.Guilty		1 56f.Stomach	0 64.PrefersYoung	0 76.SleepsLess	0 80.Stares	1 81.StealsHome	2 68.Screams
	0 71.SelfConsc		0 56g.Vomit	0 79.SpeechProb	0 83.StaysUp		1 82.StealsOut	1 86.Stubborn
	0 91.TalkSuicide				0 84.StrangeBehv		2 90.Swears	1 87.MoodChang
	0 112.Worries				0 85.StrangeIdeas		1 96.ThinksSex	1 88.Sulks
					0 92.SleepWalk		1 99.Tobacco	1 89.Suspicious
					0 100.SleepProblem		2 101.Truant	1 94.Teases
							2 105.UsesDrugs	1 95.Temper
							2 106.Vandalism	1 97.Threaten
								2 104.Loud

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

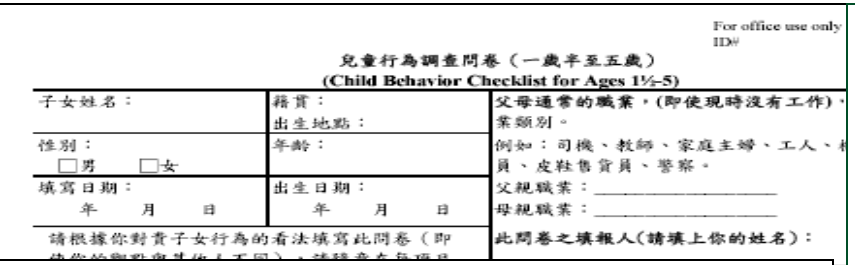
Rule-Breaking Behavior

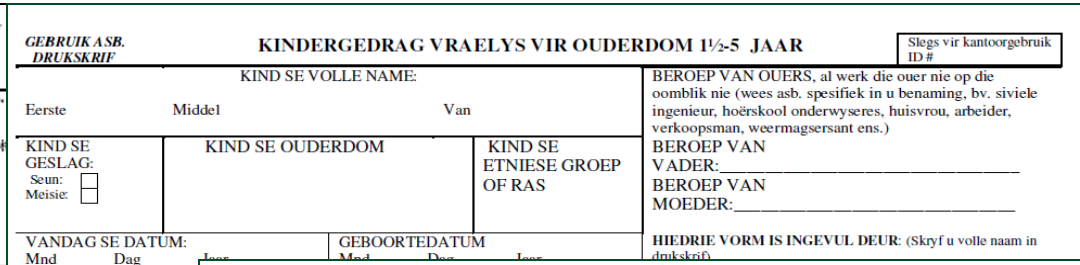
Aggressive Behavior~DSM ODD, CD, and SUD

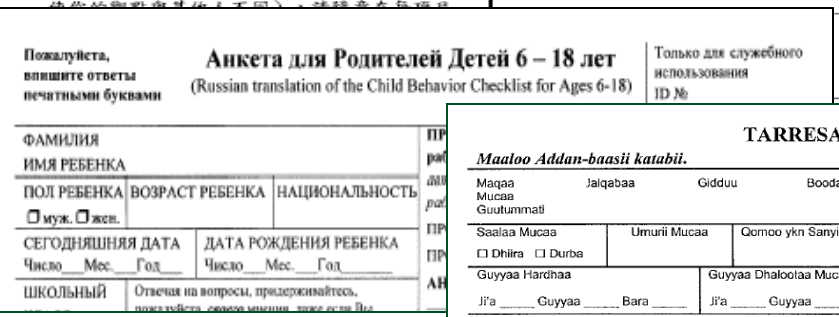
Obsessive Compulsive Syndrome

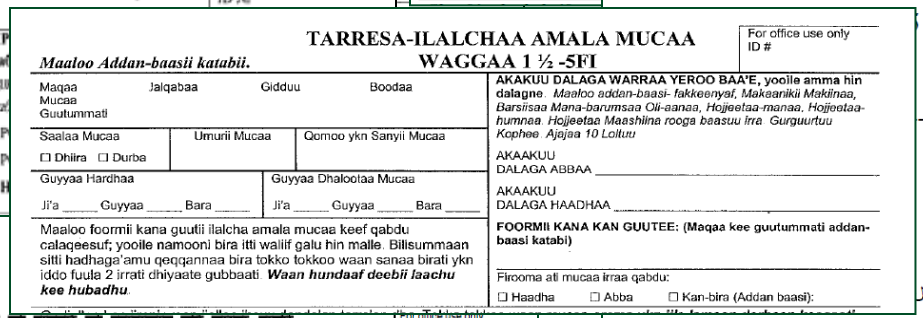
Juvenile Bipolar Disorder

Forms Translated Into Over 90 Languages

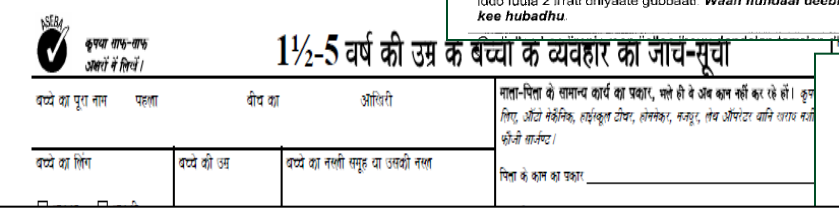

兒童行為調查問卷（一歲半至五歲）
(Child Behavior Checklist for Ages 1½-5)

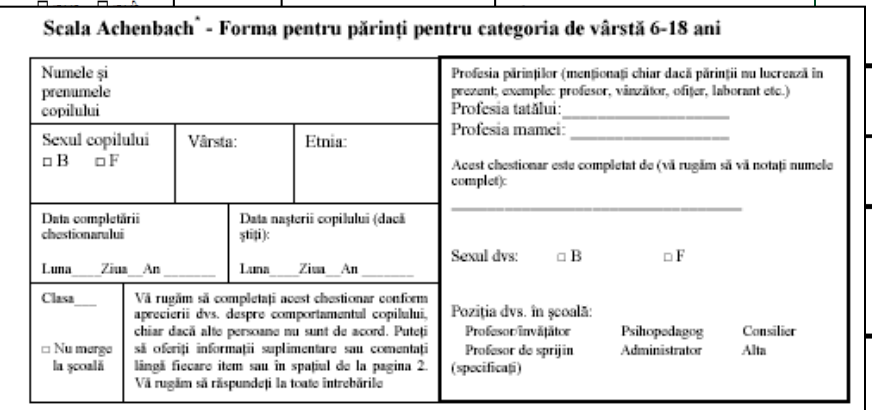

GEBRUIK ASB. DRUKSKRIF
KINDERGEDRAG VRAELYS VIR OUDERDOM 1½-5 JAAR
KIND SE VOLLE NAME:
KIND SE OUDERDOM
KIND SE GESLAG:
KIND SE ETNIESE GROEP OF RAS
BEROEP VAN VADER:
BEROEP VAN MOEDER:

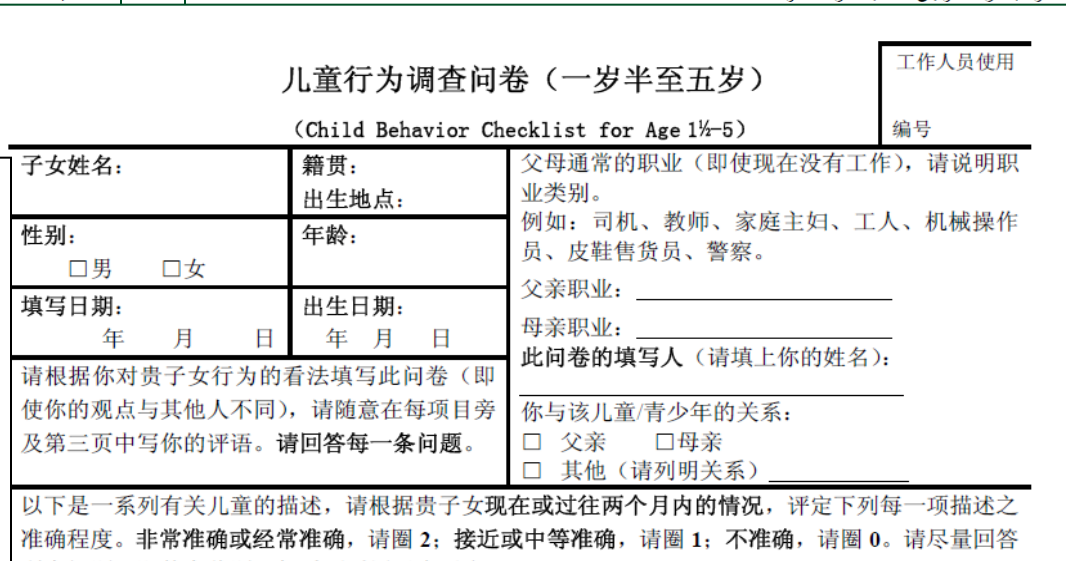

Анкета для Родителей Детей 6 – 18 лет
(Russian translation of the Child Behavior Checklist for Ages 6-18)


TARRESA-ILALCHAA AMALA MUCAA WAGGAA 1 ½ -5FI
Maaloo Addan-baasii katabii.

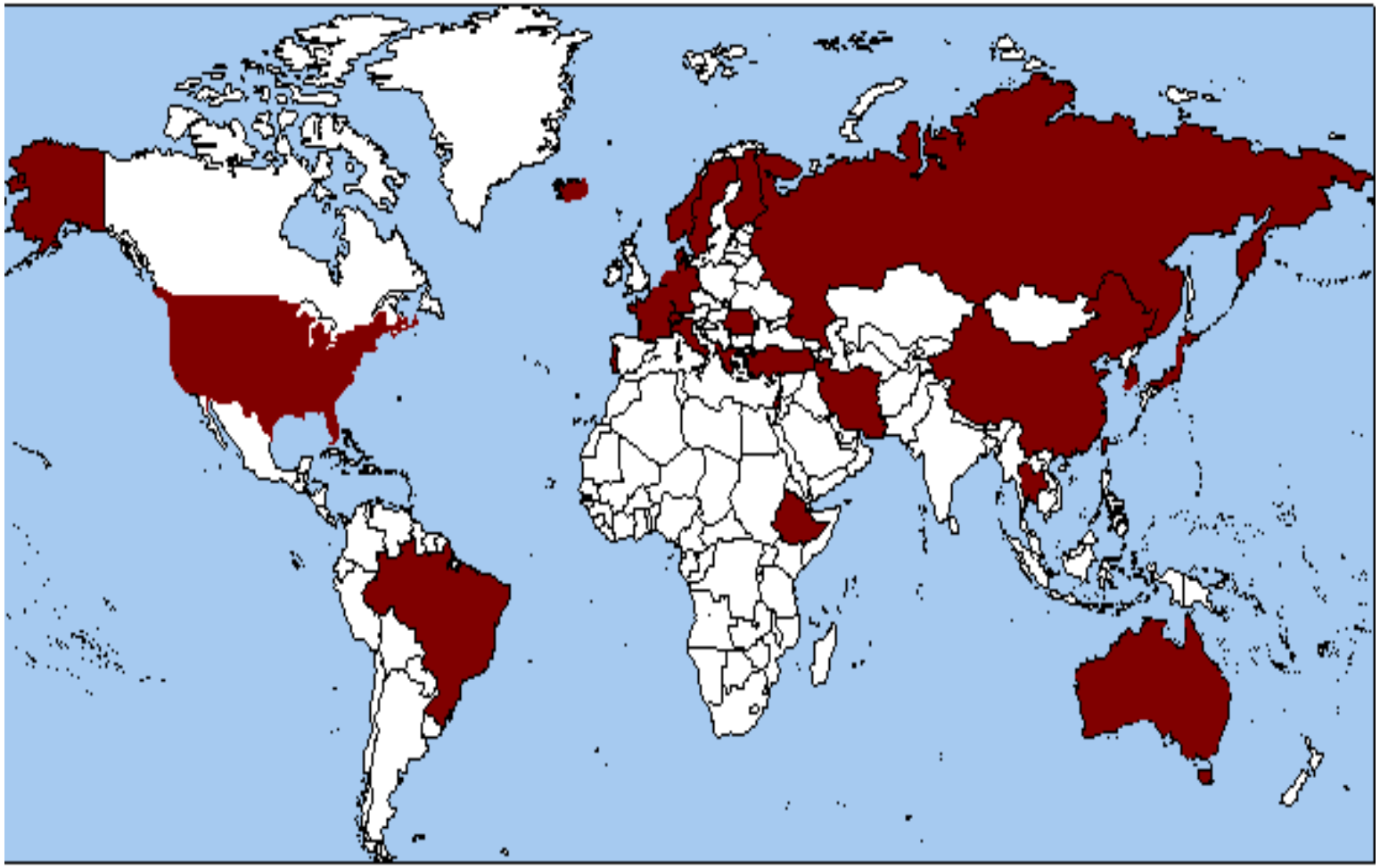

CHILD BEHAVIOR CHECKLIST FOR AGES 1½ - 5
استبيان سلوك الأطفال للأعمار من 1.5 إلى
أولاً : بيانات عامة عن الطفل:
ثانياً: بيانات عن الوالدين:


1½-5 वर्ष की उम्र के बच्चों के व्यवहार का जांच-सूची


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


儿童行为调查问卷（一岁半至五岁）
(Child Behavior Checklist for Age 1½-5)
工作人员使用
编号
子女姓名：
籍贯：
出生地点：
性别：
□男 □女
年龄：
填写日期：
年 月 日
出生日期：
年 月 日
请根据你对贵子女行为的看法填写此问卷（即使你的观点与其他人不同），请随意在每项目旁及第三页中写你的评语。**请回答每一条问题。**
父母通常的职业（即使现在没有工作），请说明职业类别。
例如：司机、教师、家庭主妇、工人、机械操作员、皮鞋售货员、警察。
父亲职业：
母亲职业：
此问卷的填写人（请填上你的姓名）：
你与该儿童/青少年的关系：
□ 父亲 □母亲
□ 其他（请列明关系）
以下是一系列有关儿童的描述，请根据贵子女**现在或过往两个月内的情况**，评定下列每一项描述之准确程度。**非常准确或经常准确**，请圈 **2**；**接近或中等准确**，请圈 **1**；**不准确**，请圈 **0**。请尽量回答所有问题，即使有些题目似乎不适用于贵子女。

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

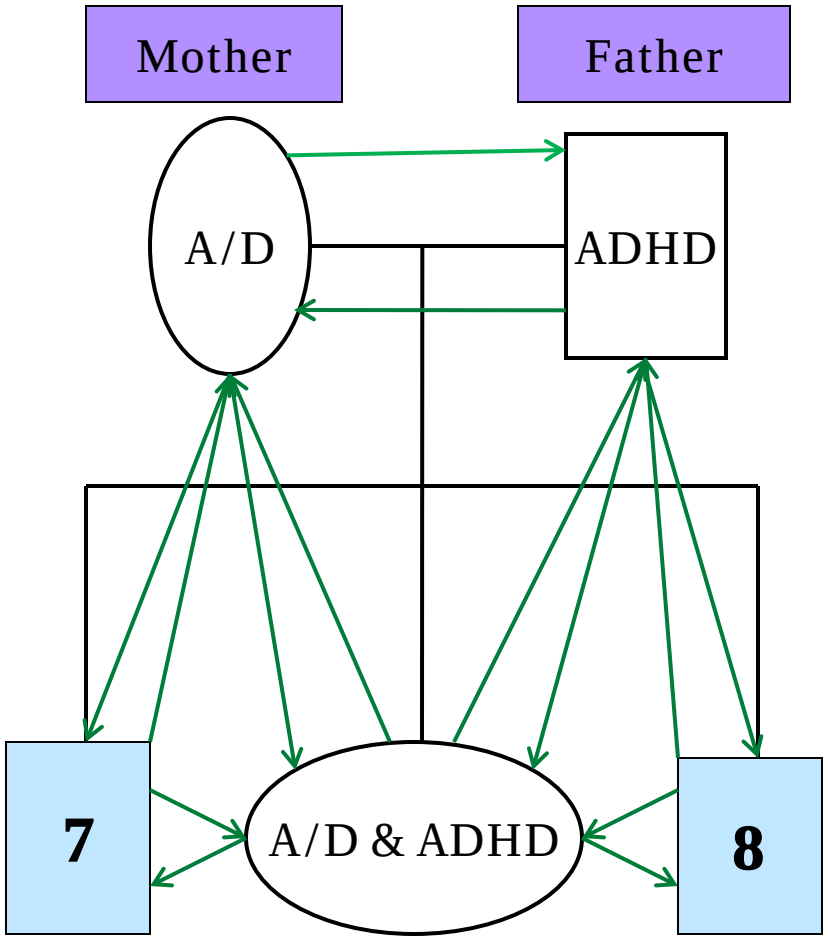
- Health – all health emerges from emotional behavioral health.
- Promotion – is more powerful than prevention.
- Prevention – is more powerful than intervention.
- Intervention – should be family based.

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

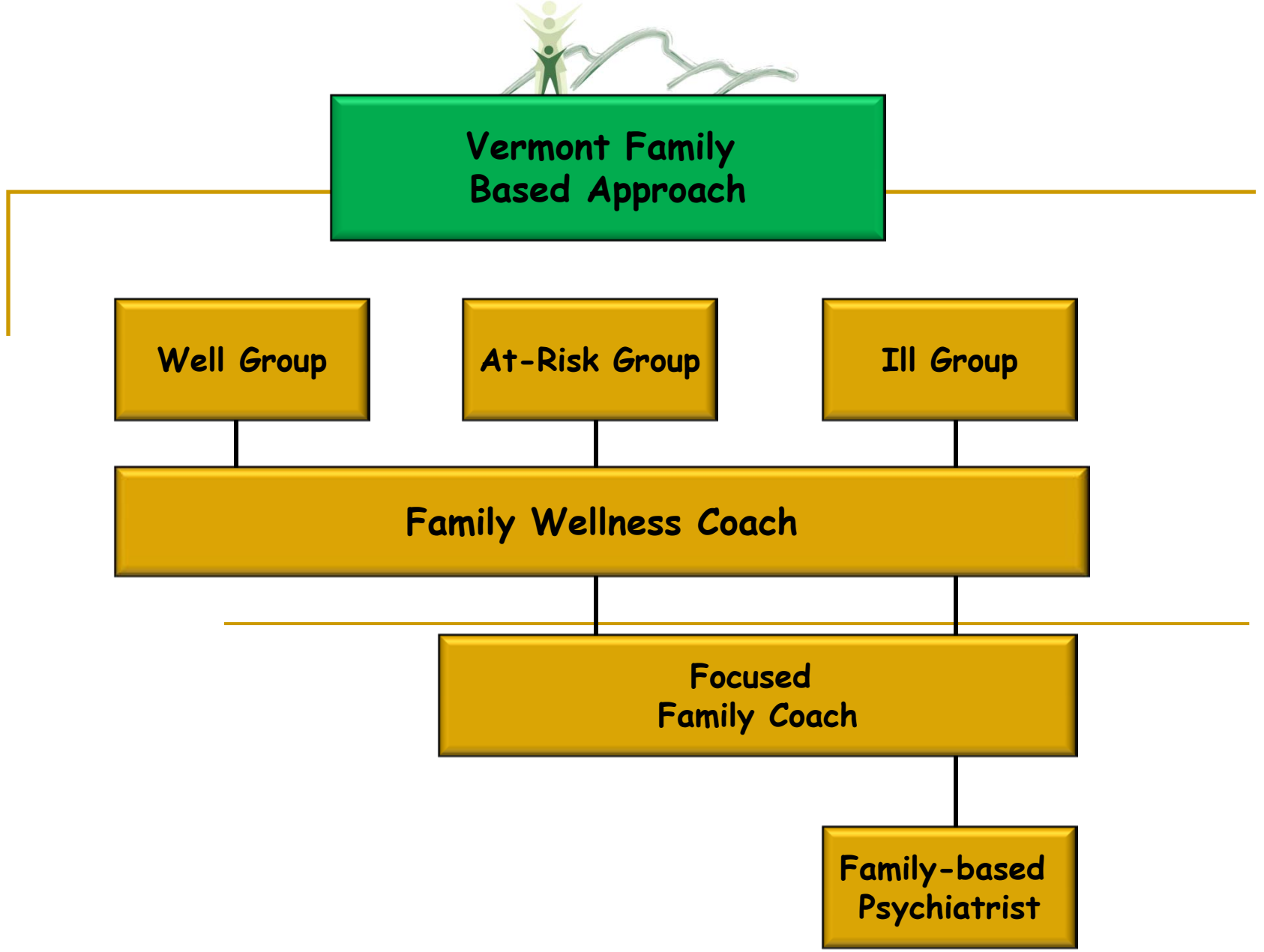


If Mother suffers from Anxious Depression (50/50),

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

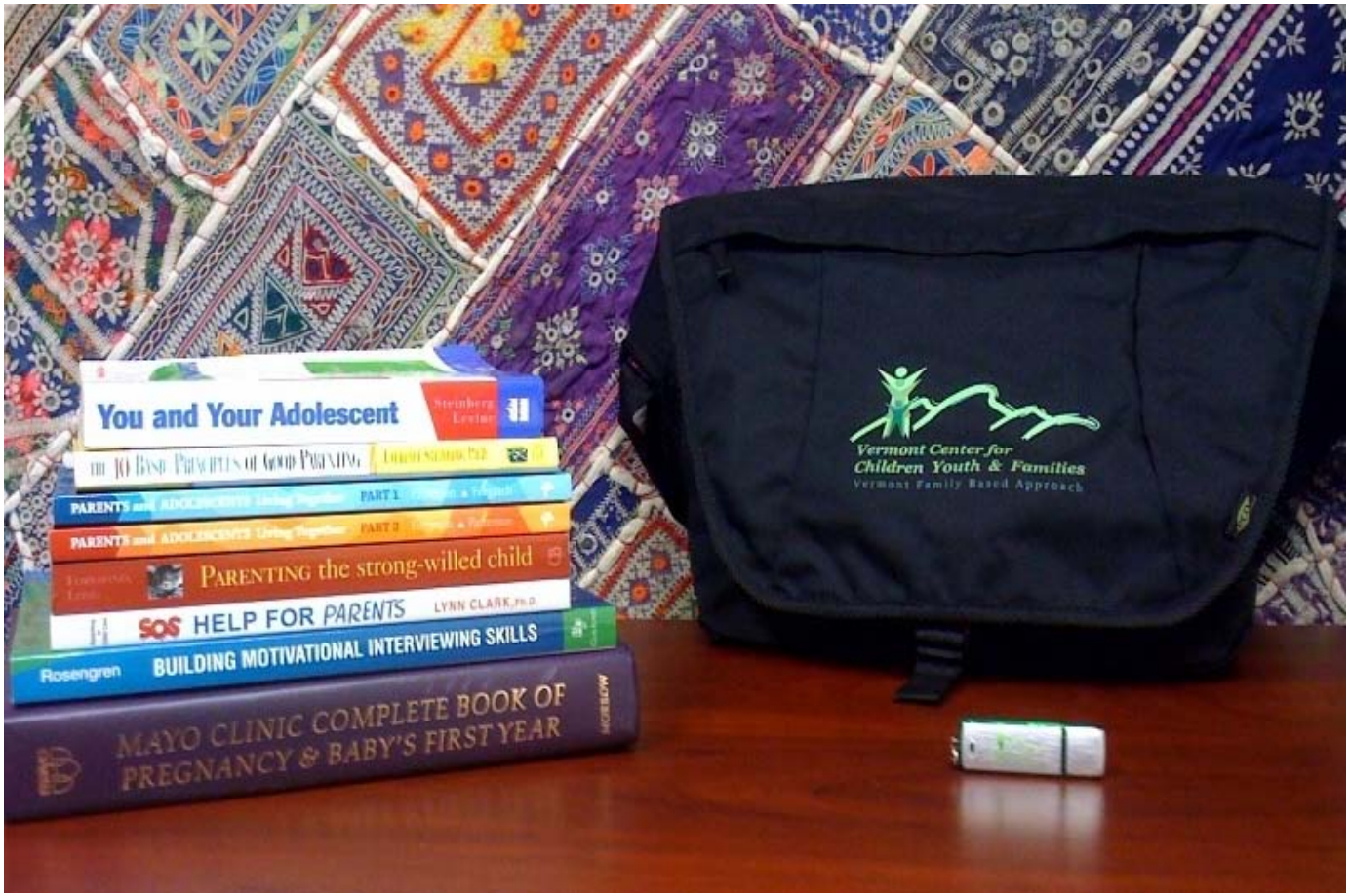
Session # (Date)	Topic
Session 1 (//2010)	(1) Introduction to the *Family Based Approach* (2) Defining *Focused Family Coaching*
Session 2 (//2010)	Elements of the Family Based Approach: *Family-Based Assessment* (the Achenbach System of Empirically Based Assessment and the Vermont Health Behavior Questionnaire)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

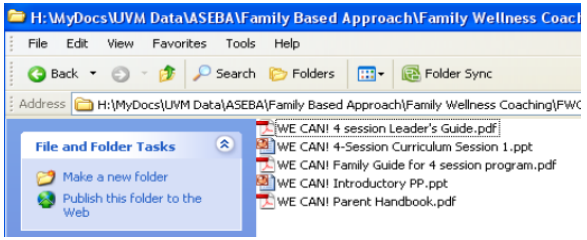
Vermont Center for Children Youth & Families
Vermont Family Based Approach

Family Wellness Coaching Toolkit

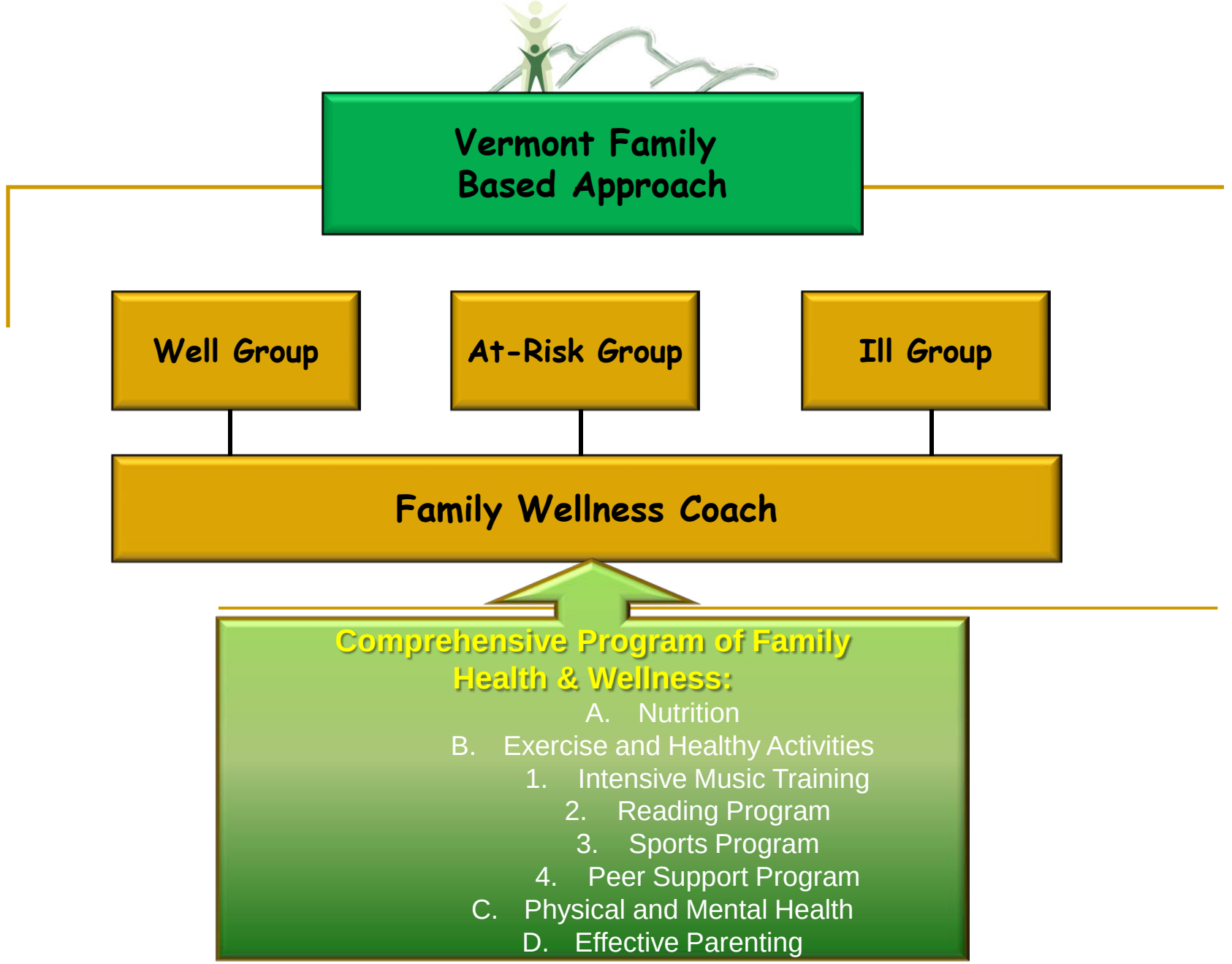
(Draft date: 03-16-2010)

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


You and Your Adolescent
PARENTING the strong-willed child
SOS HELP FOR PARENTS
LYNN CLARK, Ph.D.
Rosengren
BUILDING MOTIVATIONAL INTERVIEWING SKILLS
MAYO CLINIC COMPLETE BOOK OF PREGNANCY & BABY'S FIRST YEAR
Vermont Center for Children Youth & Families
Vermont Family Based Approach

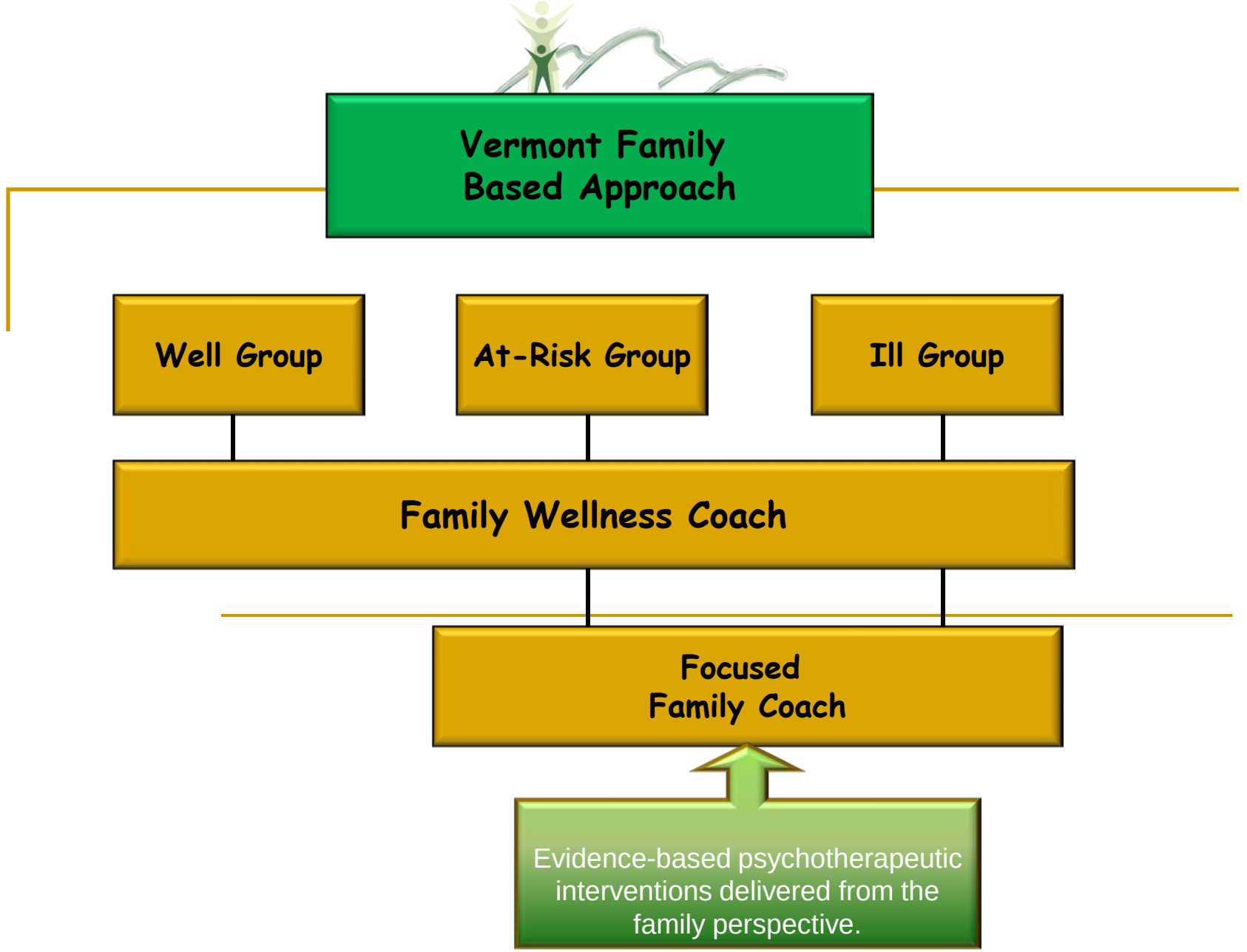

H:\MyDocs\UVM Data\ASEBA\Family Based Approach\Family Wellness Coach
File Edit View Favorites Tools Help
Back Search Folders Folder Sync
Address H:\MyDocs\UVM Data\ASEBA\Family Based Approach\Family Wellness Coaching\FWC
File and Folder Tasks
Make a new folder
Publish this folder to the Web
WE CAN! 4 session Leader's Guide.pdf
WE CAN! 4-Session Curriculum Session 1.ppt
WE CAN! Family Guide for 4 session program.pdf
WE CAN! Introductory PP.ppt
WE CAN! Parent Handbook.pdf

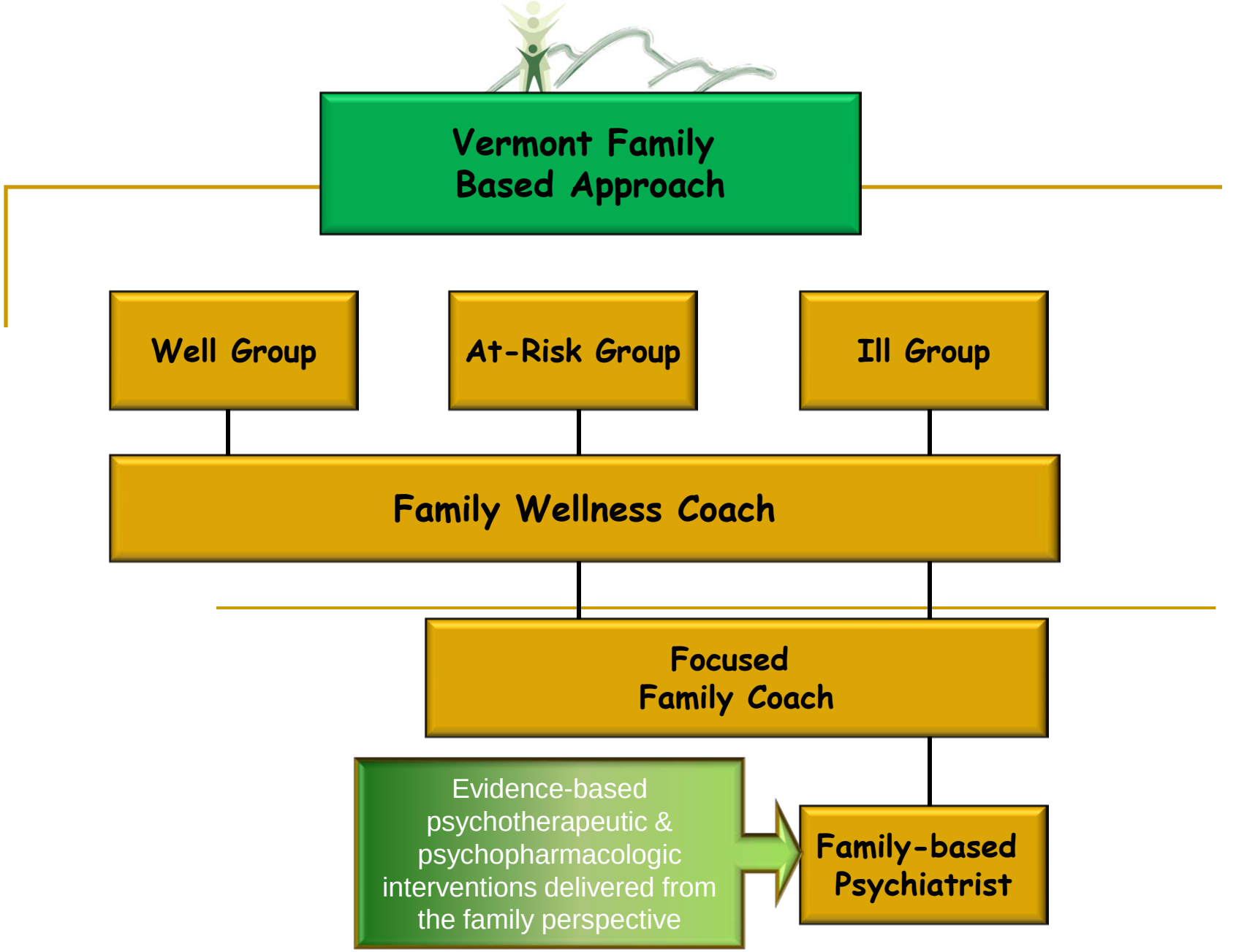
Universal Screening


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

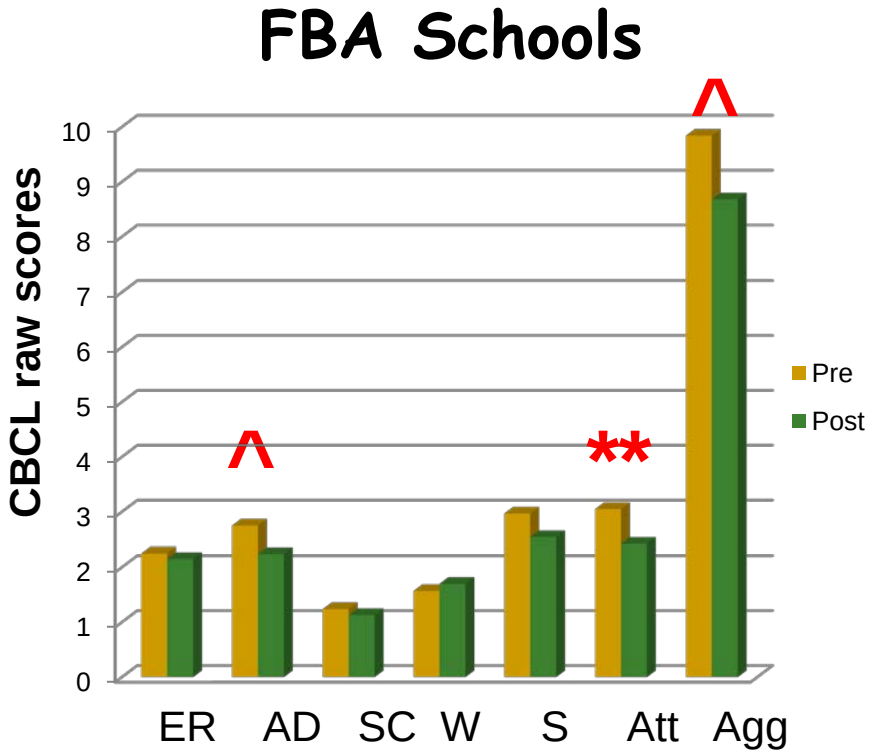
Garfield Wellness Program

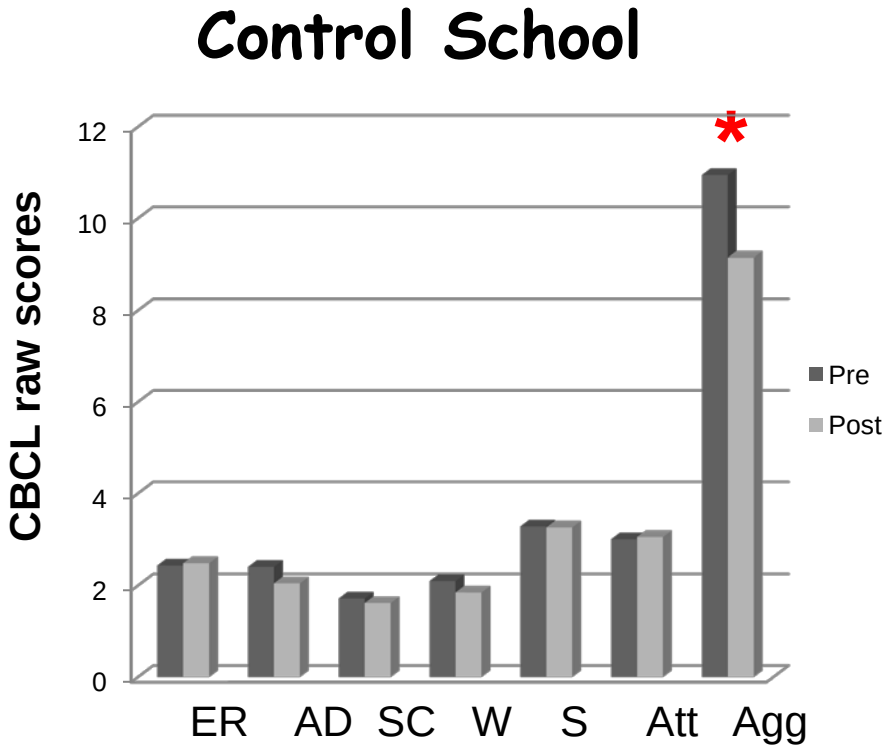
Garfield 50 May 2009

"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

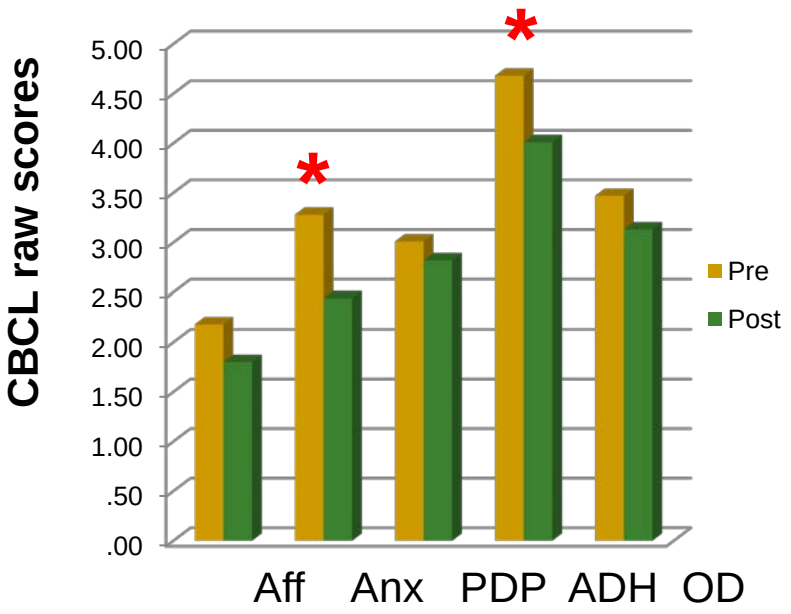




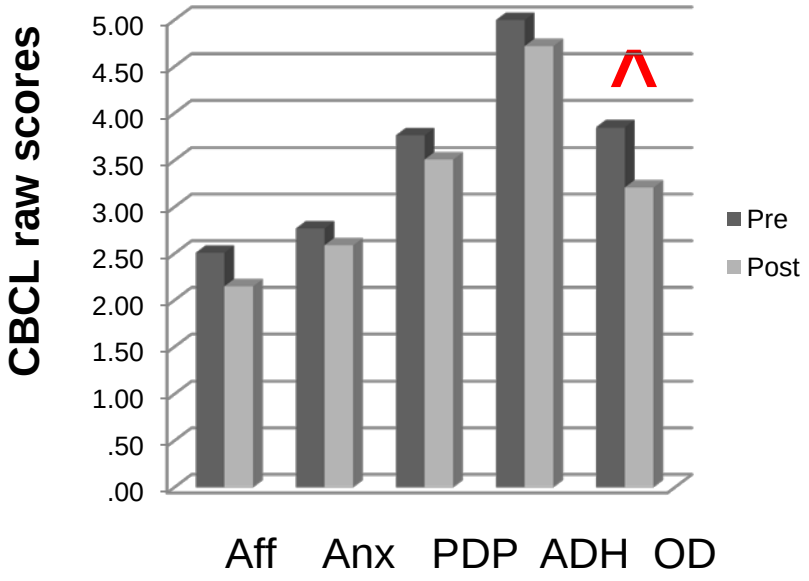
Notes. ER = Emotionally Reactive, AD = Anxious/Depressed, SC = Somatic Complaints, W = Withdrawn, S = Sleep Problems, Att = Attention Problems, Agg = Aggressive Behavior.
Npairwise comparisons = 79 Treatment, 39 Controls; ^ - p < .10, * - p < .05, ** - p < .01.

South Dakota Project: CBCL Data

FBA Schools



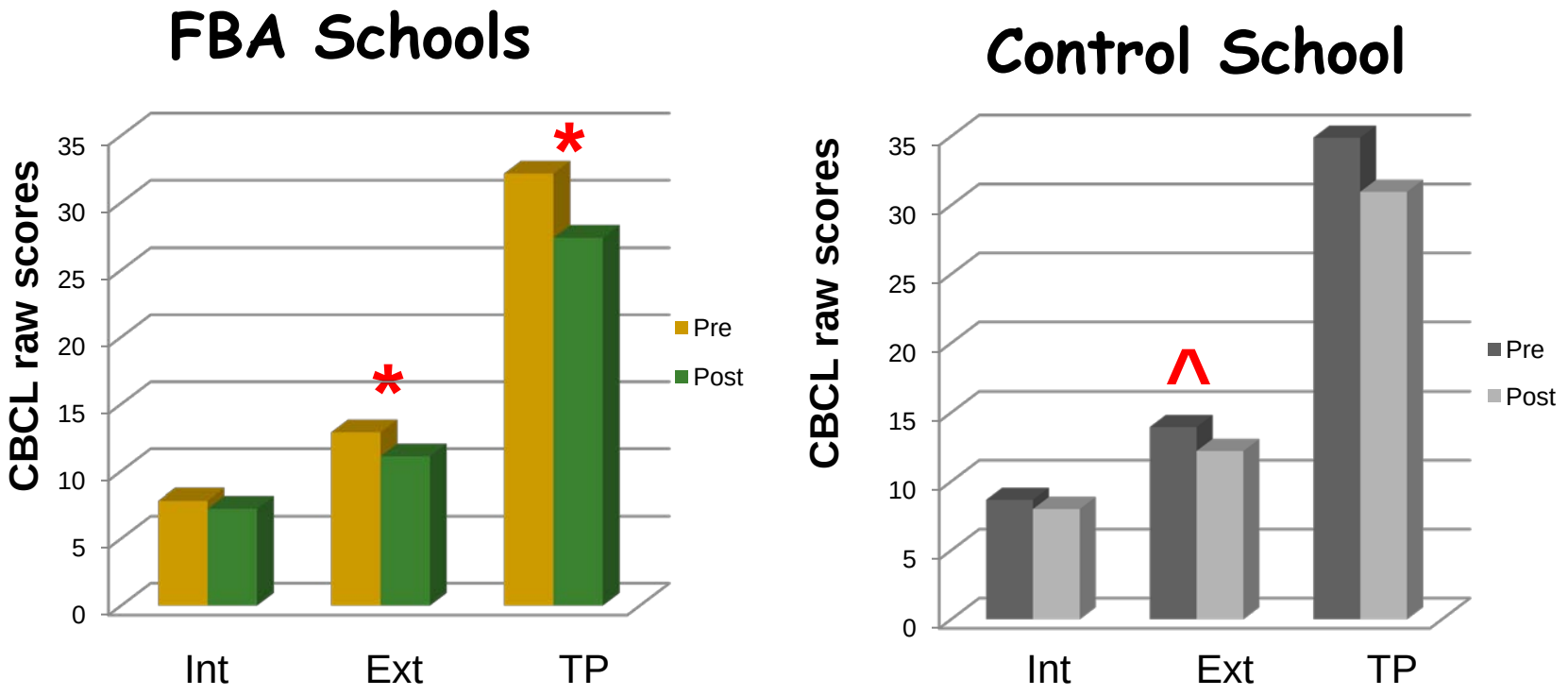
Control School



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.

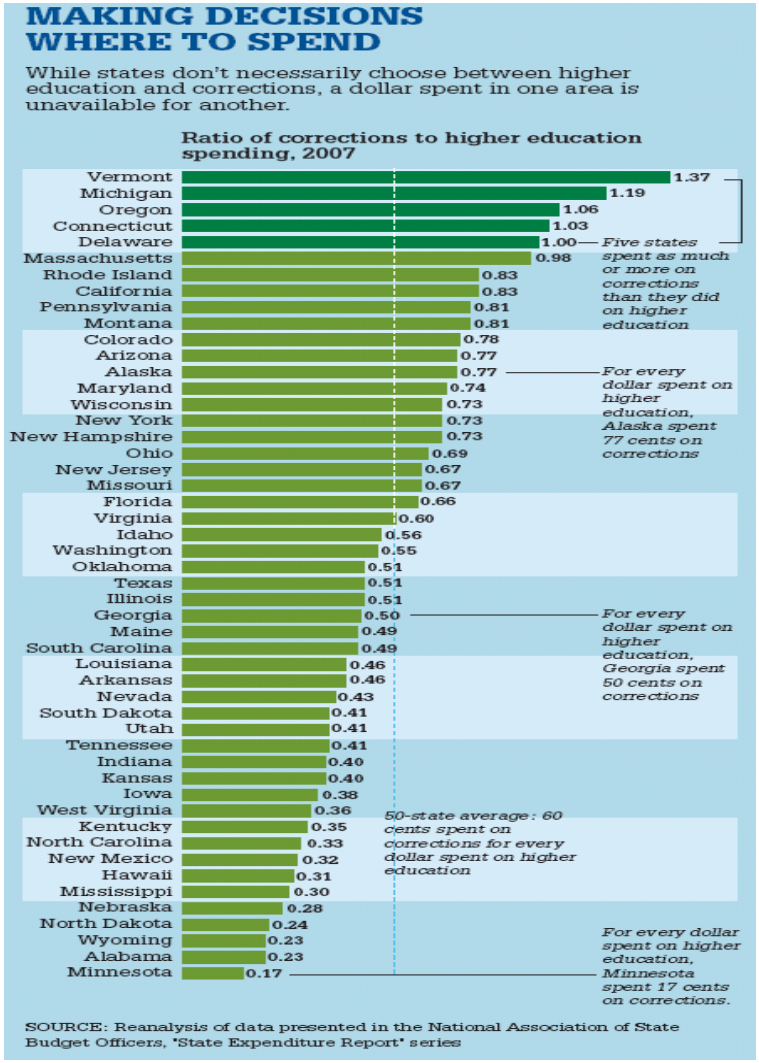
South Dakota Project: CBCL Data

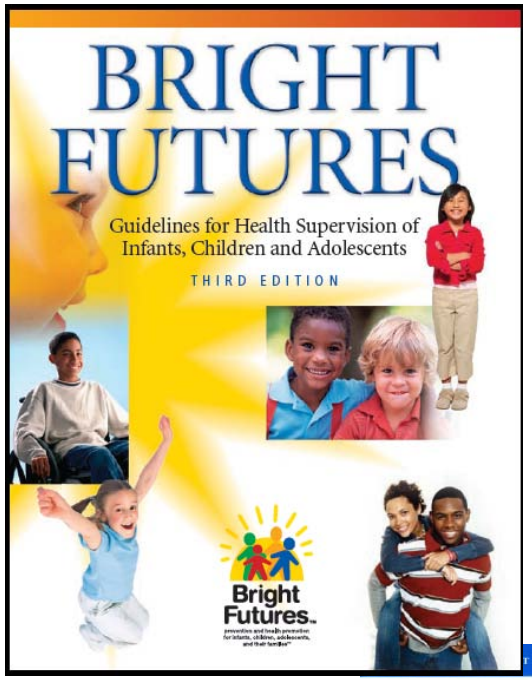


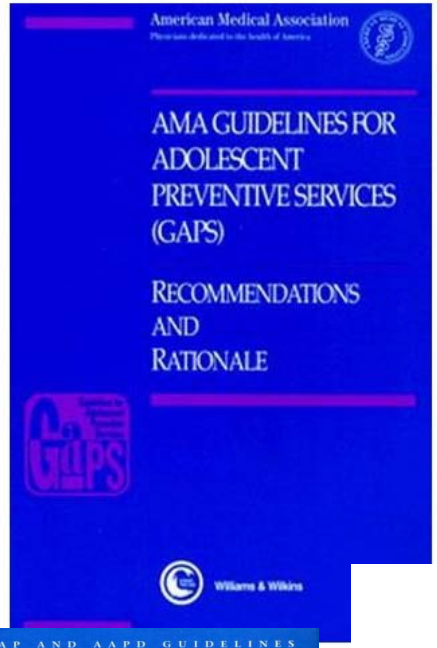
Notes. Int = Internalizing, Ext = Externalizing, TP = Total Problems.
Npairwise comparisons = 79 Treatment, 39 Controls; ^ - p < .10, * - p < .05.

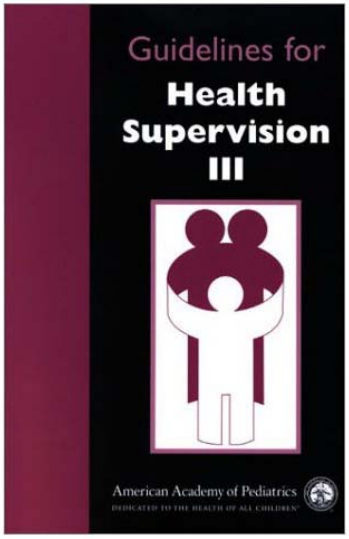
In Summary:

- 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.
Ratio of corrections to higher education spending, 2007
Vermont 1.37
Michigan 1.19
Oregon 1.06
Connecticut 1.03
Delaware 1.00
Massachusetts 0.98
Rhode Island 0.83
California 0.83
Pennsylvania 0.81
Montana 0.81
Colorado 0.78
Arizona 0.77
Alaska 0.77
Maryland 0.74
Wisconsin 0.73
New York 0.73
New Hampshire 0.73
Ohio 0.69
New Jersey 0.67
Missouri 0.67
Florida 0.66
Virginia 0.60
Idaho 0.56
Washington 0.55
Oklahoma 0.51
Texas 0.51
Illinois 0.51
Georgia 0.50
Maine 0.49
South Carolina 0.49
Louisiana 0.46
Arkansas 0.46
Nevada 0.43
South Dakota 0.41
Utah 0.41
Tennessee 0.41
Indiana 0.40
Kansas 0.40
Iowa 0.38
West Virginia 0.36
Kentucky 0.35
North Carolina 0.33
New Mexico 0.32
Hawaii 0.31
Mississippi 0.30
Nebraska 0.28
North Dakota 0.24
Wyoming 0.23
Alabama 0.23
Minnesota 0.17
Five states spent as much or more on corrections than they did on higher education
For every dollar spent on higher education, Alaska spent 77 cents on corrections
For every dollar spent on higher education, Georgia spent 50 cents on corrections
50-state average: 60 cents spent on corrections for every dollar spent on higher education
For every dollar spent on higher education, Minnesota spent 17 cents on corrections.
SOURCE: Reanalysis of data presented in the National Association of State Budget Officers, "State Expenditure Report" series







2000 & 2002

…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.*