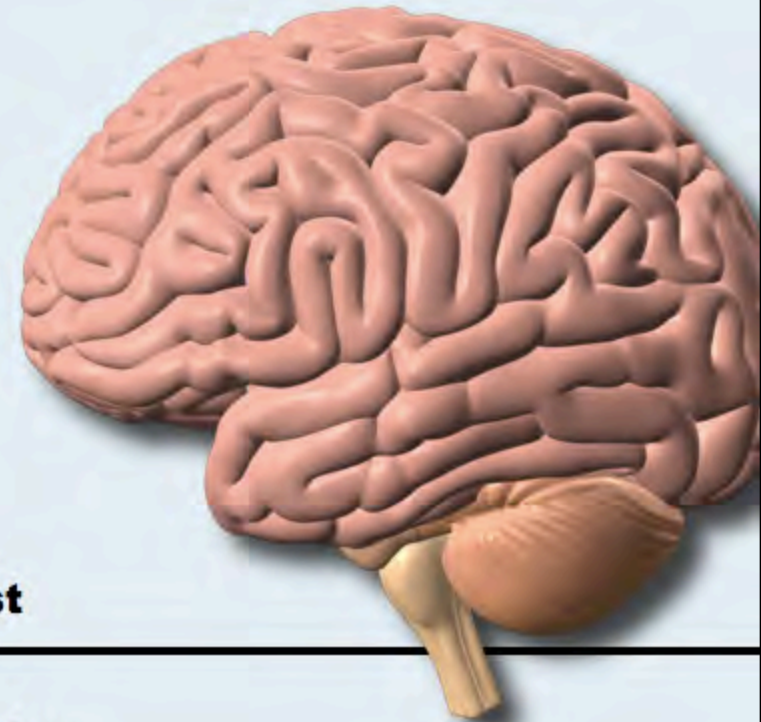
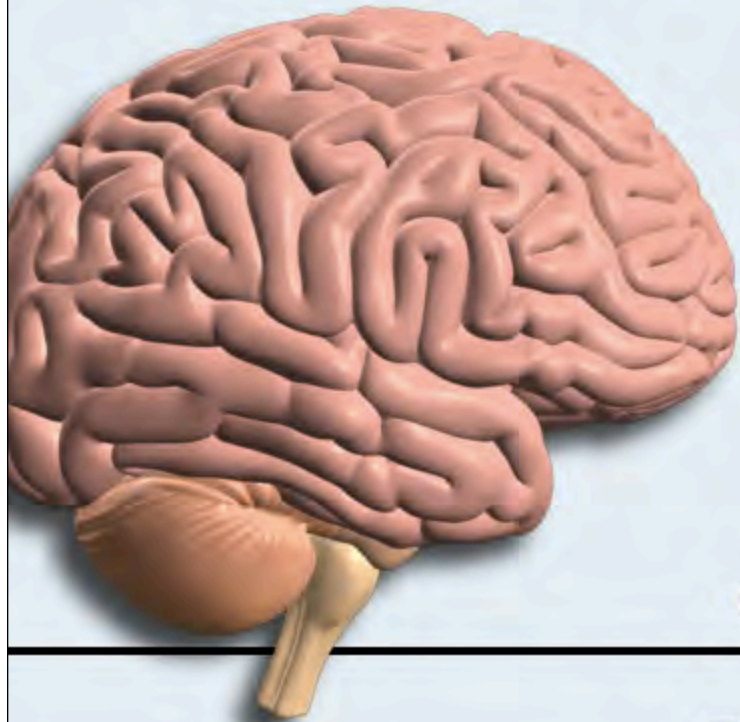


The ADHD Brain

A USER'S GUIDE



DON DUNCAN

Child & Youth Psychiatrist

**Clinical Director
BC Interior ADHD Clinic**

**The F.O.R.C.E.
Presents**

An 'in the know' Information Session

Overview

- ✓ **What is ADHD and how is it diagnosed.**
- ✓ **What's different about the ADHD brain.**
- ✓ **What is the cause of ADHD?**
- ✓ **What other problems are common.**
- ✓ **What is the treatment for ADHD.**



How Common Is ADHD?



5-9 % of Children/Youth (1/15)

3-6 % of Adults (1/23)

ADHD

Estimated ADHD In BC

	ADHD in children (age 5–19 years)	ADHD in adults (age 20–59 years)
Canadian population	8,398,933	25,602,976
ADHD frequency	6%	4.4%
ADHD population	503,936	1,126,531
% undiagnosed	67%	92%
# undiagnosed	332,598	1,047,674
Undiagnosed in British Columbia	341,700	344,080

Significant Complications

Repeating a grade	Visits to family doctor	Depression
Truancy	Hospitalization	Anxiety
Teen pregnancy	Family uses medical services	Tics
STD	Theft	Suicide
Substance Abuse	ER visits	Substance
Accidental injury	Marital Difficulties	Dependence
Serious car accident	Lower job achievement	Oppositionality
Arrest	Family stress	
Incarceration	Maternal depression	
Vandalism	Not completing high school	
Fired from job	Motor vehicle license infractions	
Math disability	Needing extra academic help	
Reading disability	Starting to smoke earlier	
Smoking	Placed in Special Classroom	

The History of Names

- [**1937** • Minimal Brain Damage
- [**1960** • Minimal Brain Dysfunction
- [**1968** • Hyperkinetic Reaction of Childhood
- [**1980** • Attention Deficit Disorder (+/- Hyperactivity)
- [**1987** • Attention-Deficit Hyperactivity Disorder
- [**1994** • Attention Deficit/Hyperactivity Disorder

Diagnosis (DSM-IV Criteria)

✓ **6/9 Symptoms of Inattention**

And / Or

6/9 Symptoms of Hyperactivity/Impulsivity

✓ **Onset before 7 years old**

✓ **Symptoms across situations**

✓ **Symptoms cause impairment**

✓ **Symptoms not caused by another disorder**

Diagnosis (DSM-IV Criteria)

- Do you have the symptoms?**
- Have they always been there?**
- Do they go where you go?**
- Are they causing a problem?**
- Are we sure it's not another disorder?**

Symptoms (Inattention)

- Careless mistakes
- Difficulty sustaining attention
- Seems to not listen when addressed
- Fails to finish tasks
- Difficulty organizing
- Avoids tasks requiring sustained mental effort
- Loses things
- Easily distracted
- Forgetful

Often

Not Sometimes

Not Always

Symptoms (Hyperactivity / Impulsivity)

- Fidgeting
- Unable to stay in seat
- Moving excessively (restlessness)
- Difficulty engaging in leisure activities quietly
- "On the go"
- Talks excessively
- Blurting out answers
- Difficulty awaiting turn
- Interrupting/intruding

Often

Not Sometimes

Not Always

Typical Report Card

- **Kindergarten**

There are times when he is inclined to be too noisy... especially during free time.

- **Grade 2**

Well behaved though he does at times talk and disturb those near him.

- **Grade 4**

Has worked quite well over the past year and despite his tendency to chatter has made fairly good marks although I think if he cut down on the talking he could do even better. Good luck and less chatting in Grade 5.

Typical Report Card

- **Grade 5**

Messy work and not good behaviour have affected his performance this term. Good grasp of concepts studied but did poor work on assignments and did not bother to keep his notebook complete. I hope he will apply himself more consistently in Grade 6.

Typical Report Card

- **Grade 6**

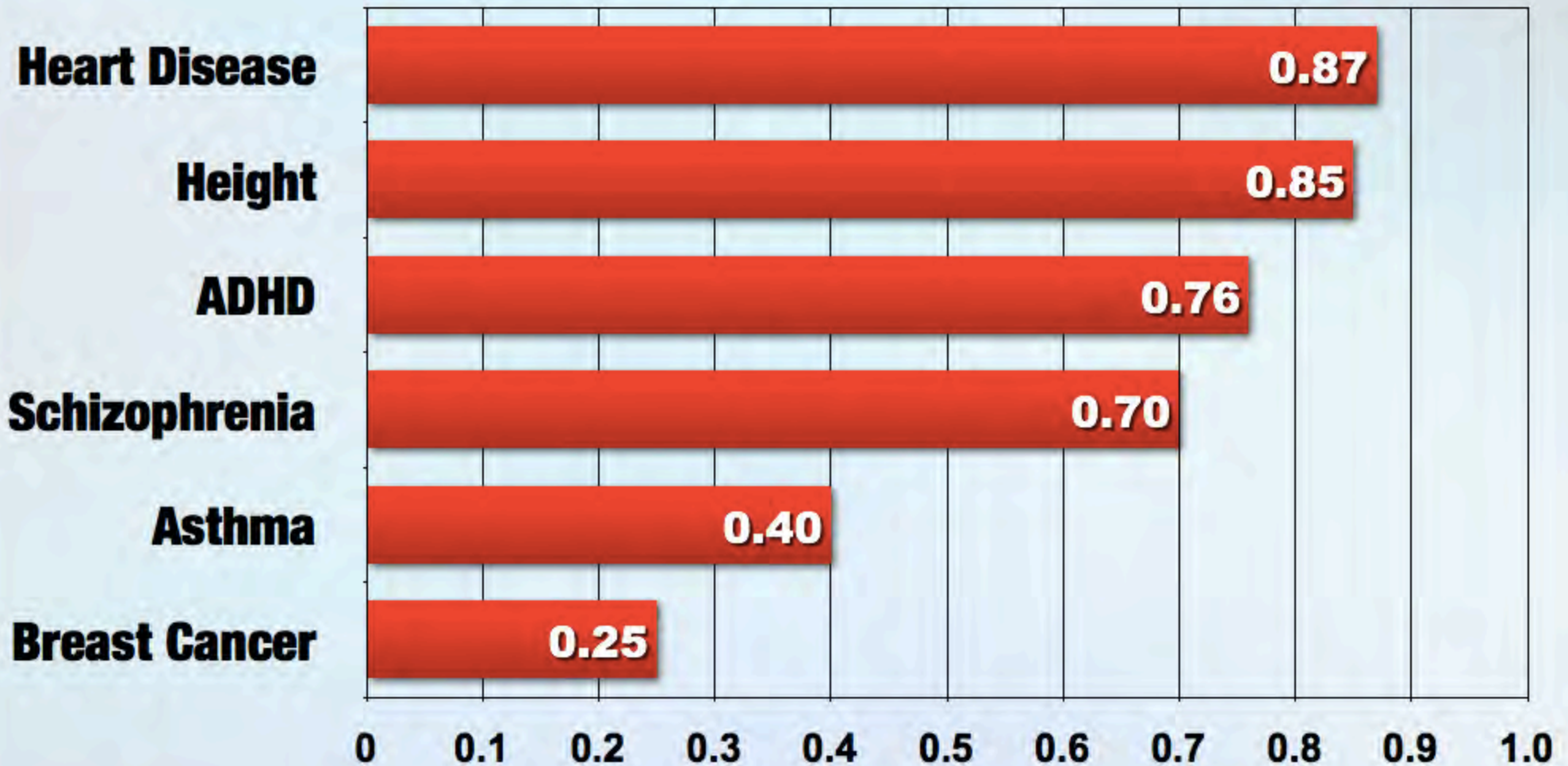
If a little more careful attention was put into reading, important points would be more easily noted.

A little less wasting of class time would be an asset.

Mastered the skills but work habits need improvements.

Frequently wastes time in class and as a result assignments are often incomplete. His written work is often untidy, which causes unnecessary errors in computation. His major problem has been with novel work due to desire to be outside rather than reading.

ADHD is Genetic



Faraone 1998

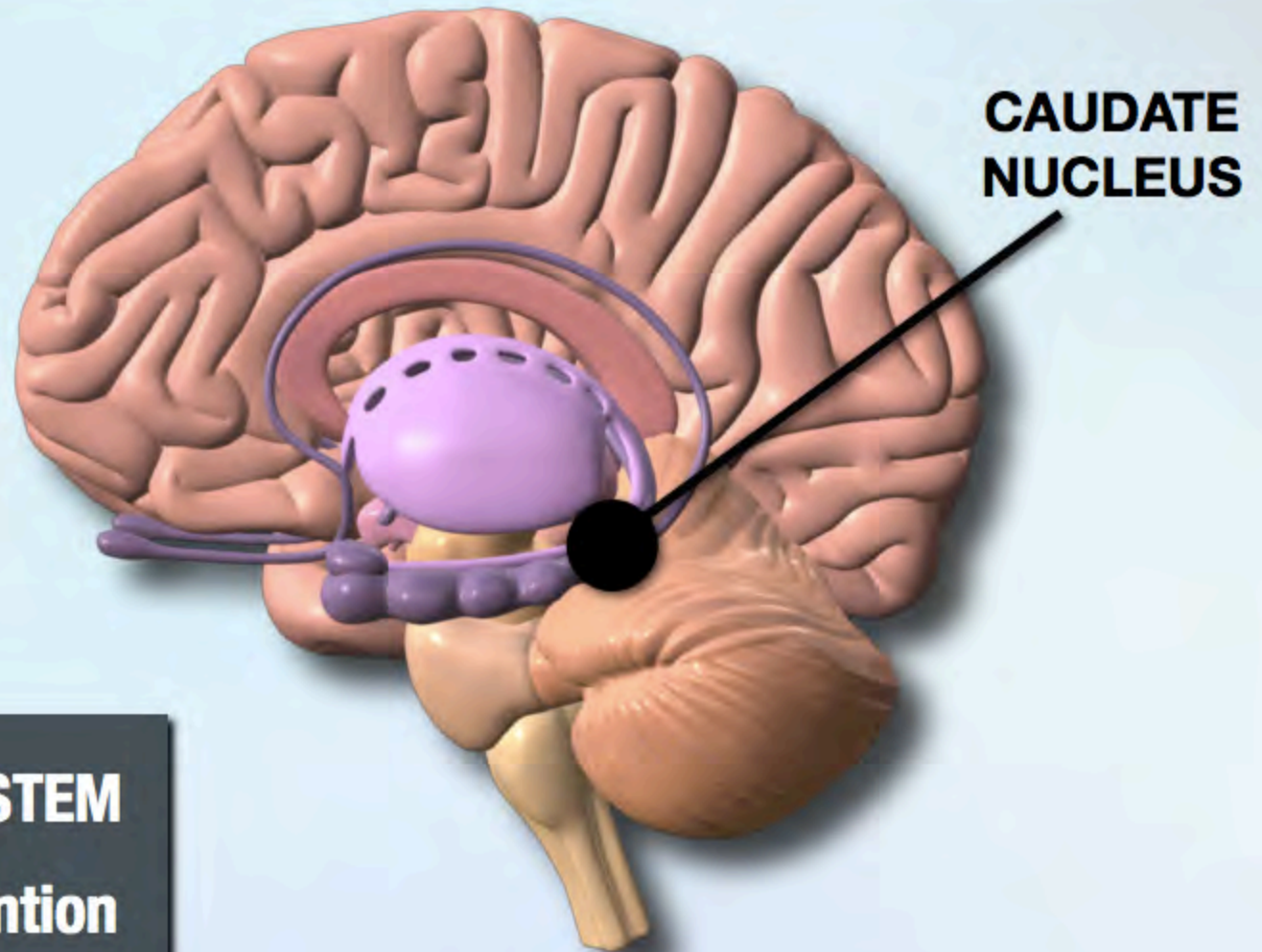
Understanding The ADHD Brain

- **Why don't they get more hyper on stimulant medication?**
- **Why can they pay attention "when they want to"?**
- **Why are they less likely to learn from punishment?**
- **How and where do medications work in the brain?**
- **Why is reactive anger a common problem?**



**THE KEY TO
"Getting It"**

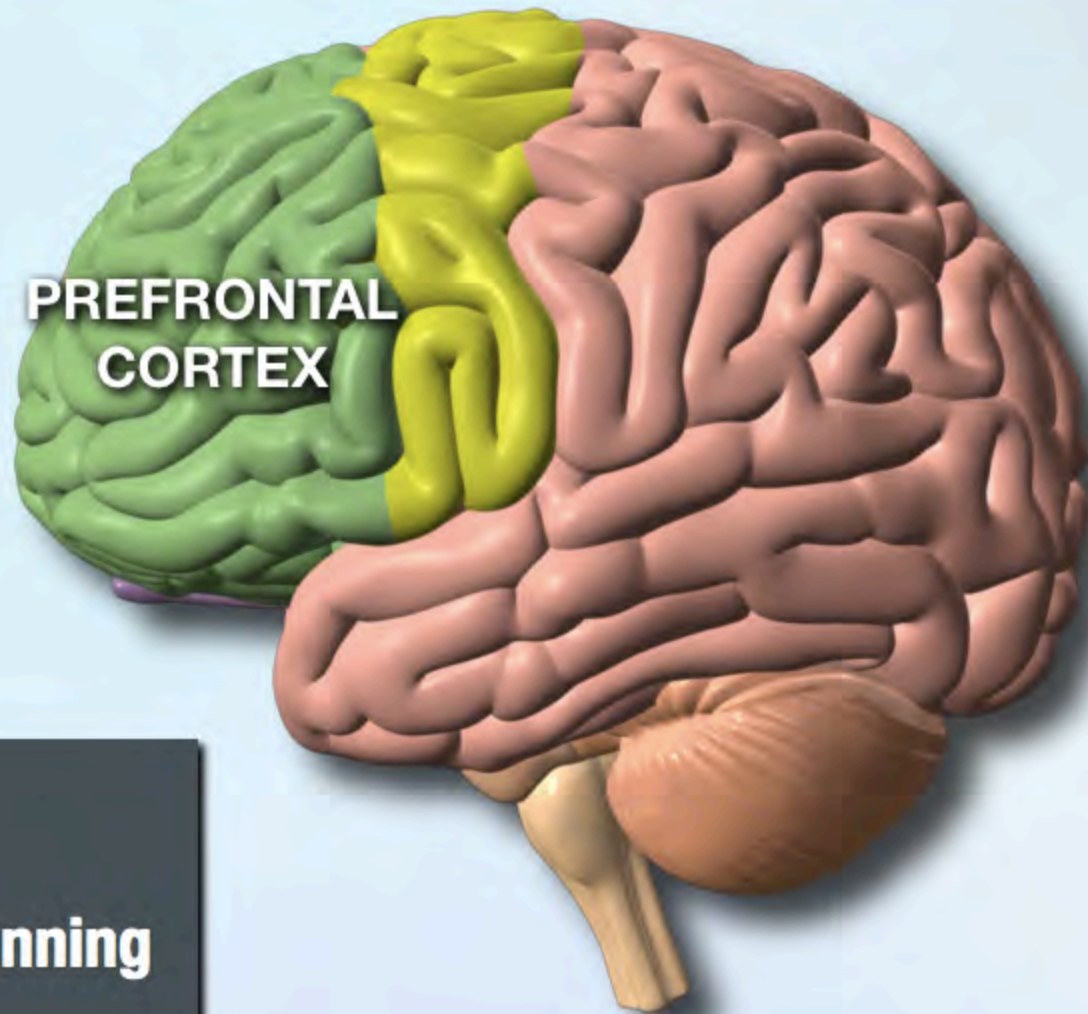
The ADHD Brain



THE BRAKING SYSTEM

- Tone and intention

The ADHD Brain



THE EXECUTIVE

- Attention and planning

The ADHD Brain

The Parietal Lobe “notices” automatically



BRIGHT



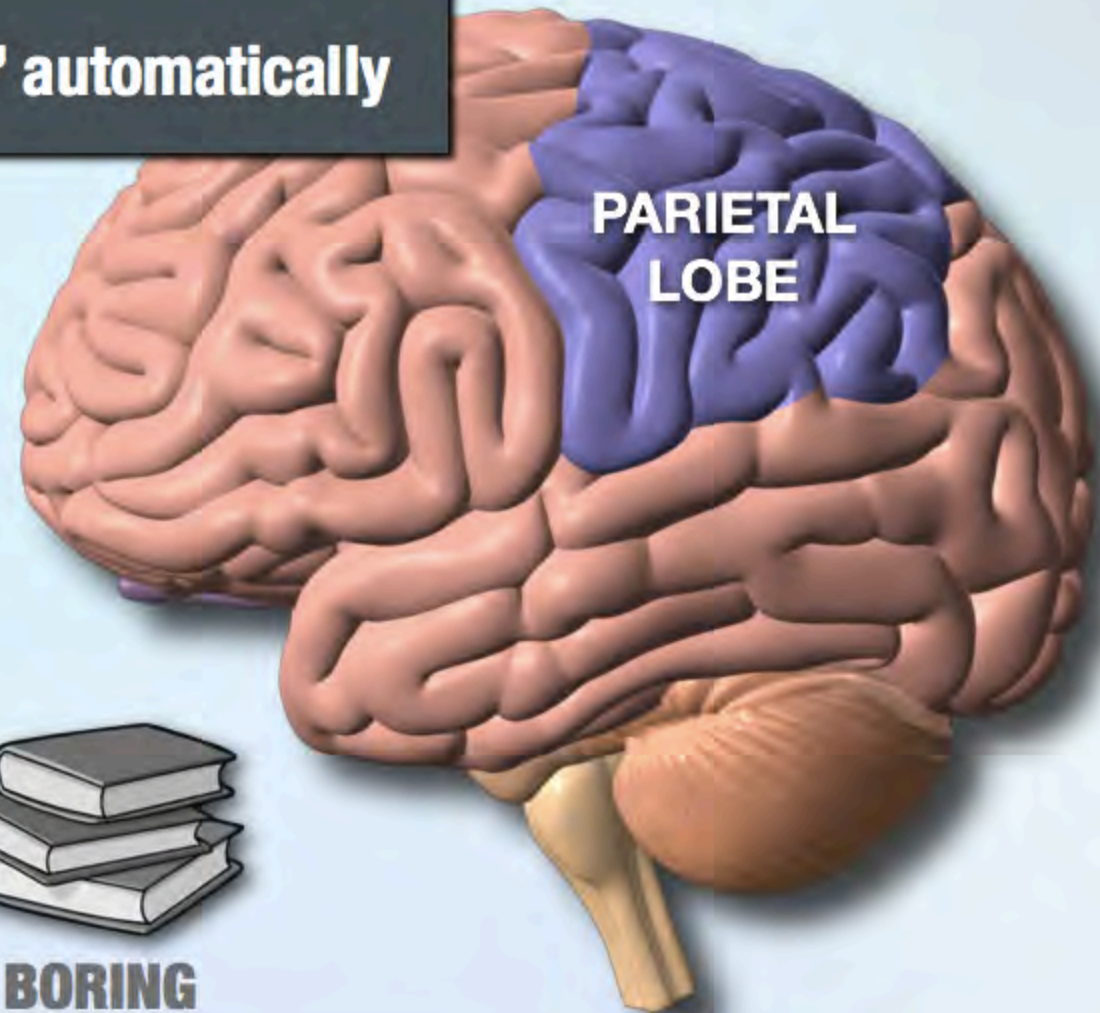
MOVING



LOUD



BORING



ADHD

EVEN PEOPLE WITH ADHD FIND IT EASY TO FOCUS WHEN SOMETHING “CATCHES YOUR ATTENTION” (ie. It is interesting).

The ADHD Brain

The Parietal Lobe “notices” automatically



PARIETAL
LOBE

ADHD

HARD TO FOCUS ON BORING....AND HARD TO IGNORE INTERESTING!!!!

The ADHD Brain

The Prefrontal Cortex "Tunes"



BRIGHT



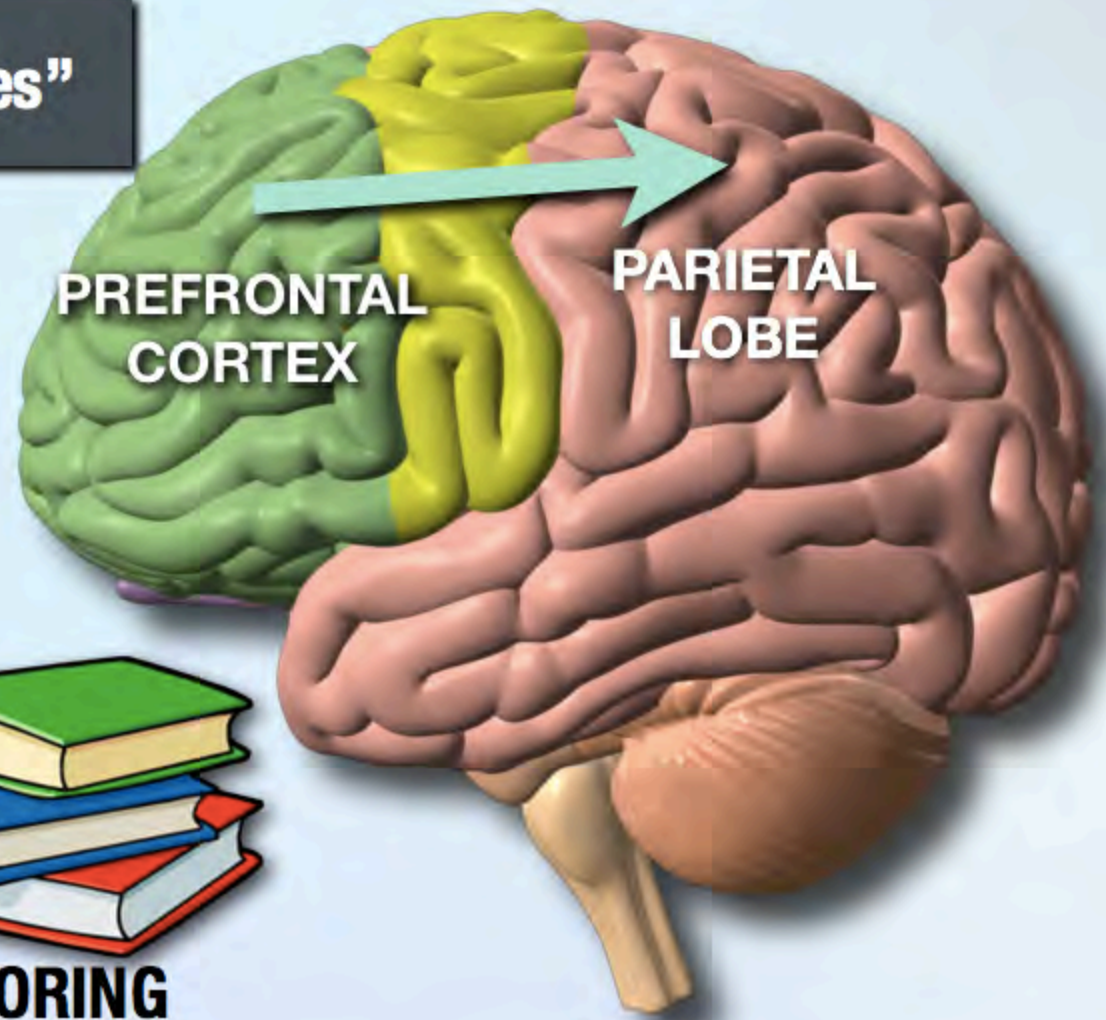
MOVING



LOUD



BORING



ADHD

TUNING DOWN THE UNWANTED SIGNAL AND TUNING UP THE WANTED

“Bad Parent” and ADHD Kids

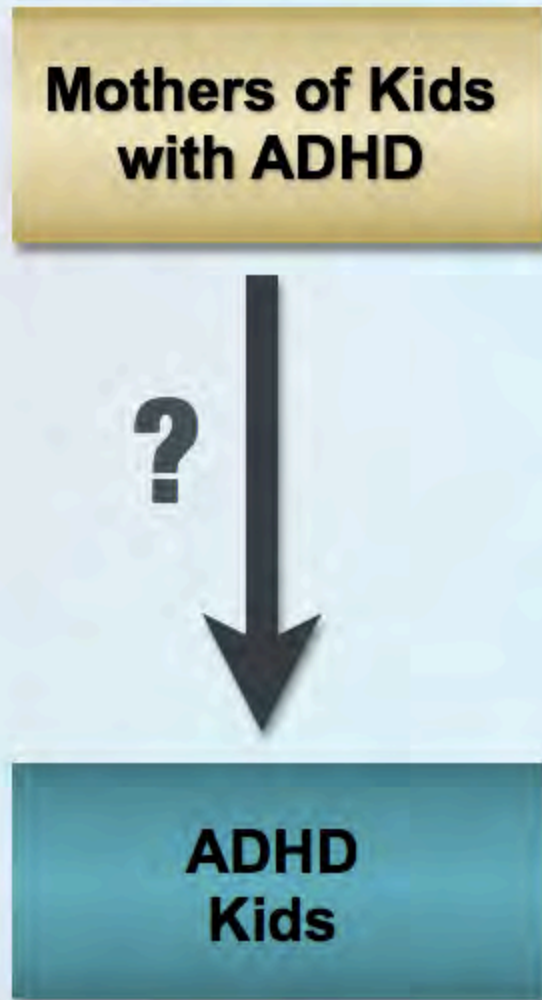
**Mothers of Kids
with ADHD**



**ADHD
Kids**

- **more likely to impose control on their child**
- **less likely to respond positively to compliance**
- **more likely to use coercive methods to gain compliance**
- **less likely to initiate social interaction**
- **less likely to respond to the child's initiated interaction**

“Bad Parent” and ADHD Kids



- medications improve kids and mothers' behaviour
- genetic studies contradict a “toxic parent” model
- “normal moms” experience lower self-esteem, more negative emotions, lower self-efficacy with ADHD kids.
- the best predictor of maternal stress is child variables, not maternal or environmental factors

“Bad Parent” and ADHD Kids

**Mothers of Kids
with ADHD**



**ADHD
Kids**

**“Bad parents” don’t create kids
with ADHD.**

**Kids with ADHD commonly bring
out the worst in parents!!
(and teacher, and doctors, etc)**

Causes (Other Theories)

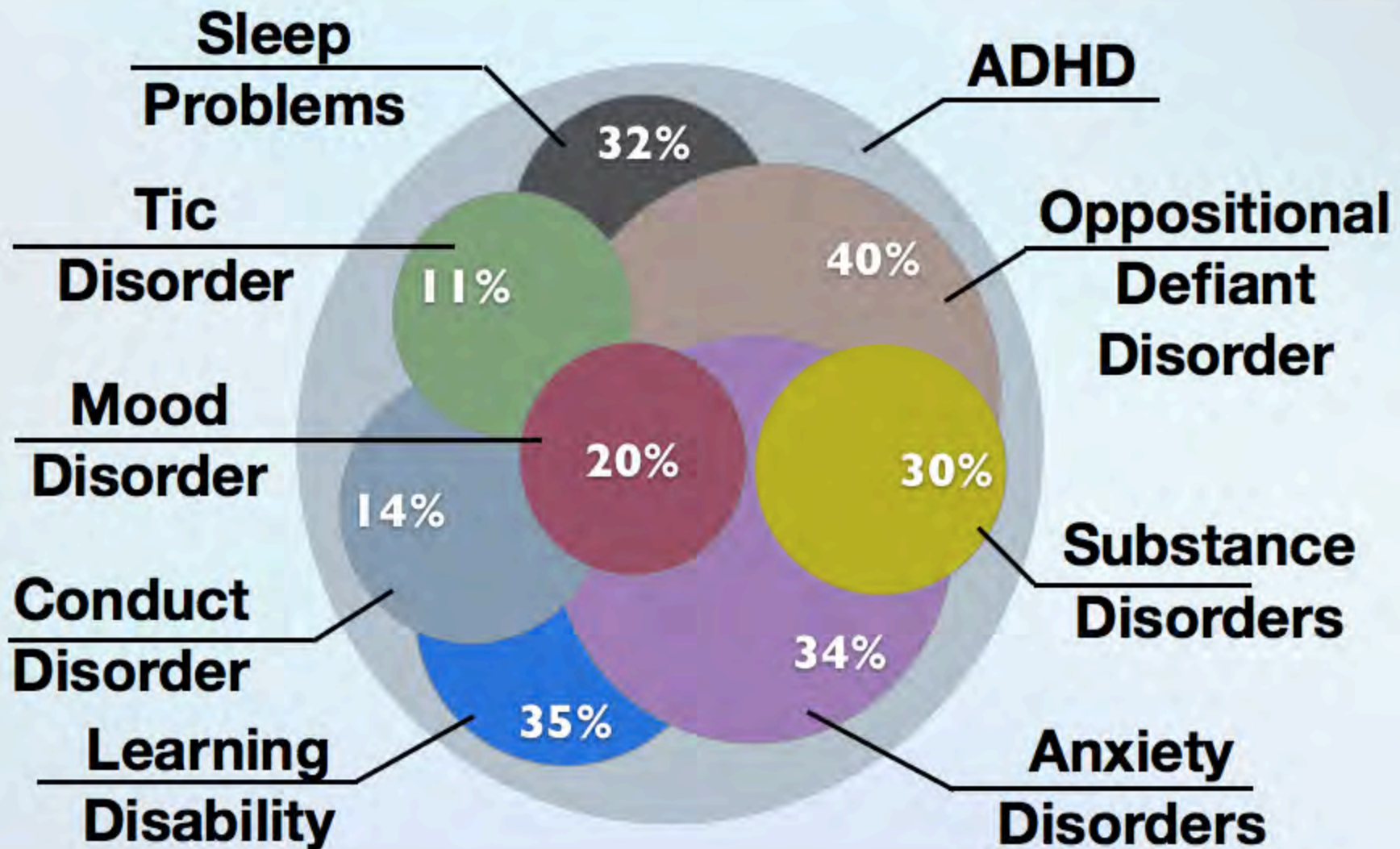
- **Toxins**
- **Parent Management**
- **Diet/Nutrition**
- **Culture**
- **Allergies**

Associated Problems (Non-diagnostic)

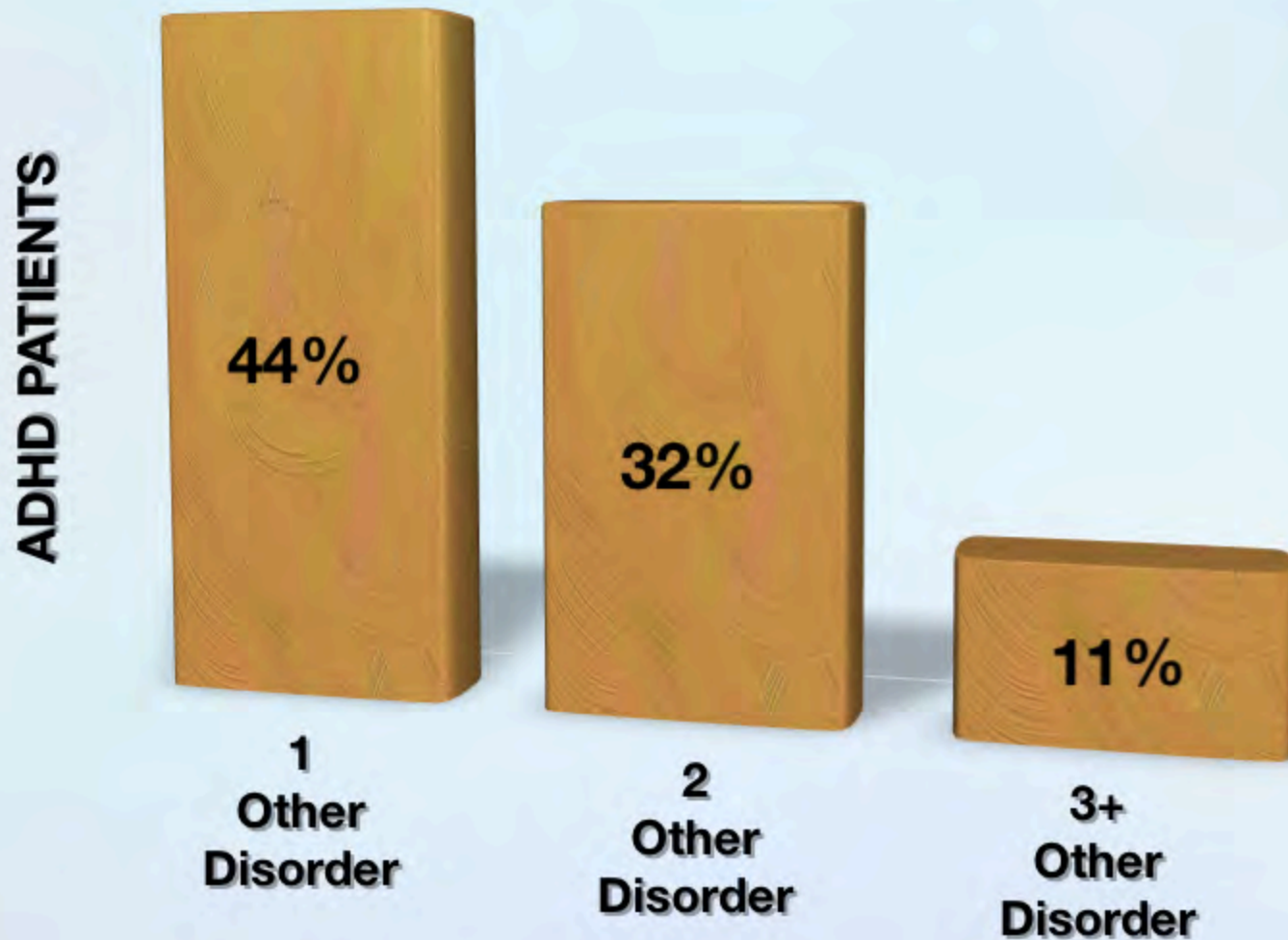
- **Social skills deficit**
- **Emotional reactivity**
- **Personal sensitivity**
- **Working memory problems**
- **Motivational difficulties**
- **Family conflict**
- **Prone to injuries/accidents**



Co-occurring Disorders



Co-occurring Disorders



The ADHD Road

Primary Symptoms

Inattentiveness
Hyperactivity
Impulsivity

Associated Symptoms

Social Skill Deficit
Personal Sensitivity
Emotionality

Other Disorders

Mood / Anxiety
Learning Disability
Tic Disorder

Poor Functioning

Peer Conflict

School Problems

Family Conflict

The ADHD Road (cont'd)

Peer Conflict

School Problems

Family Conflict

Chronic Assault On Self-Esteem

Protection Against Emotional Pain

CONDUCT DISORDER / OPPOSITIONAL DEFIANT DISORDER / SUBSTANCE ABUSE

The Wrong Approach



ADHD

A few words on “Discipline”

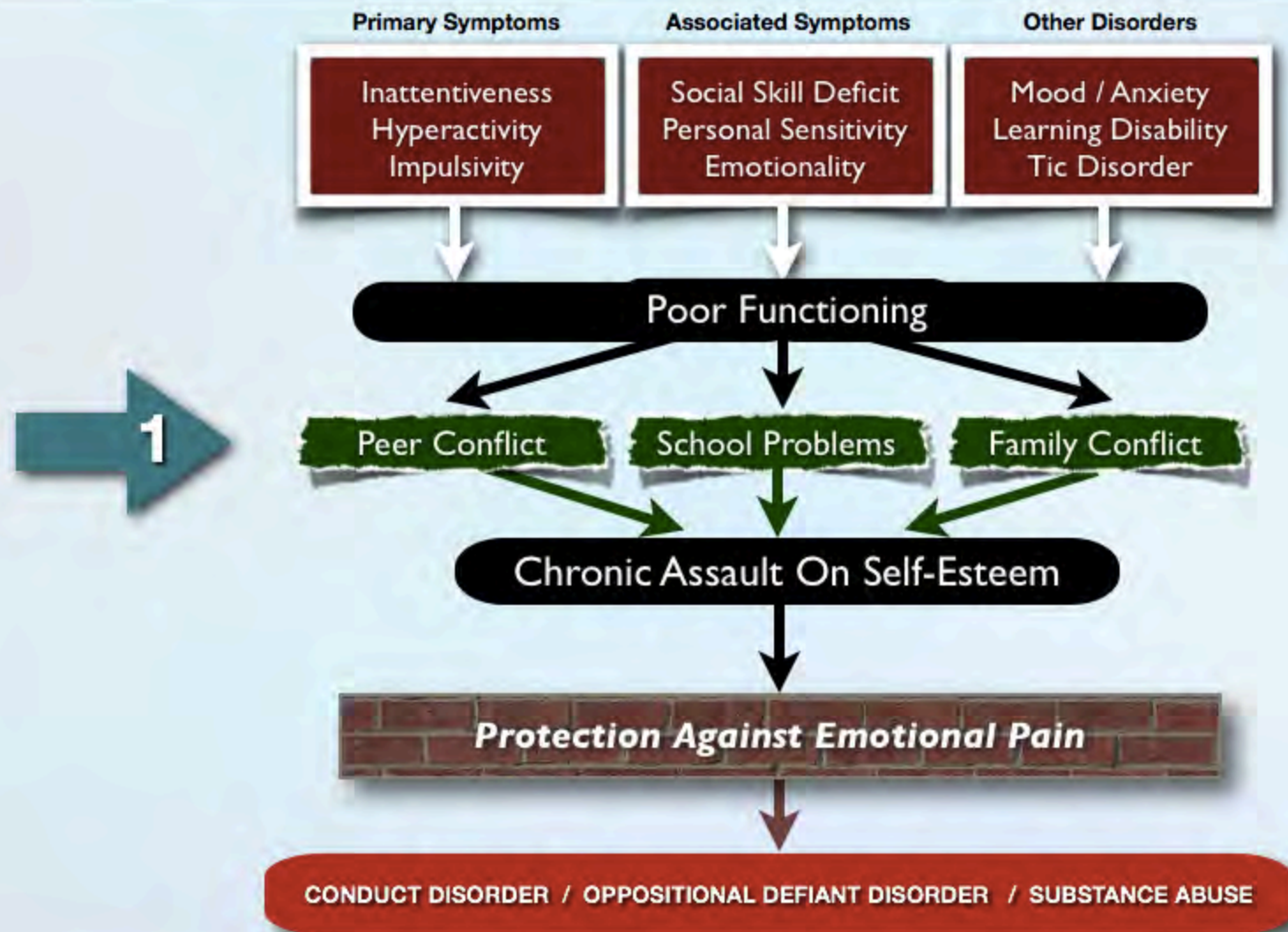
REWARD AND PUNISHMENT (“Behavioural Strategies”)

- ▶ **It “works”**

HOWEVER:

- ▶ **It only influences motivation...doesn't teach skills**
- ▶ **Tends to work only as long as you are using it**
- ▶ **Can have serious side-effects:**
 - **“Negative affective pairing”**
 - **Damaged relationships**

TREATMENT OVERVIEW



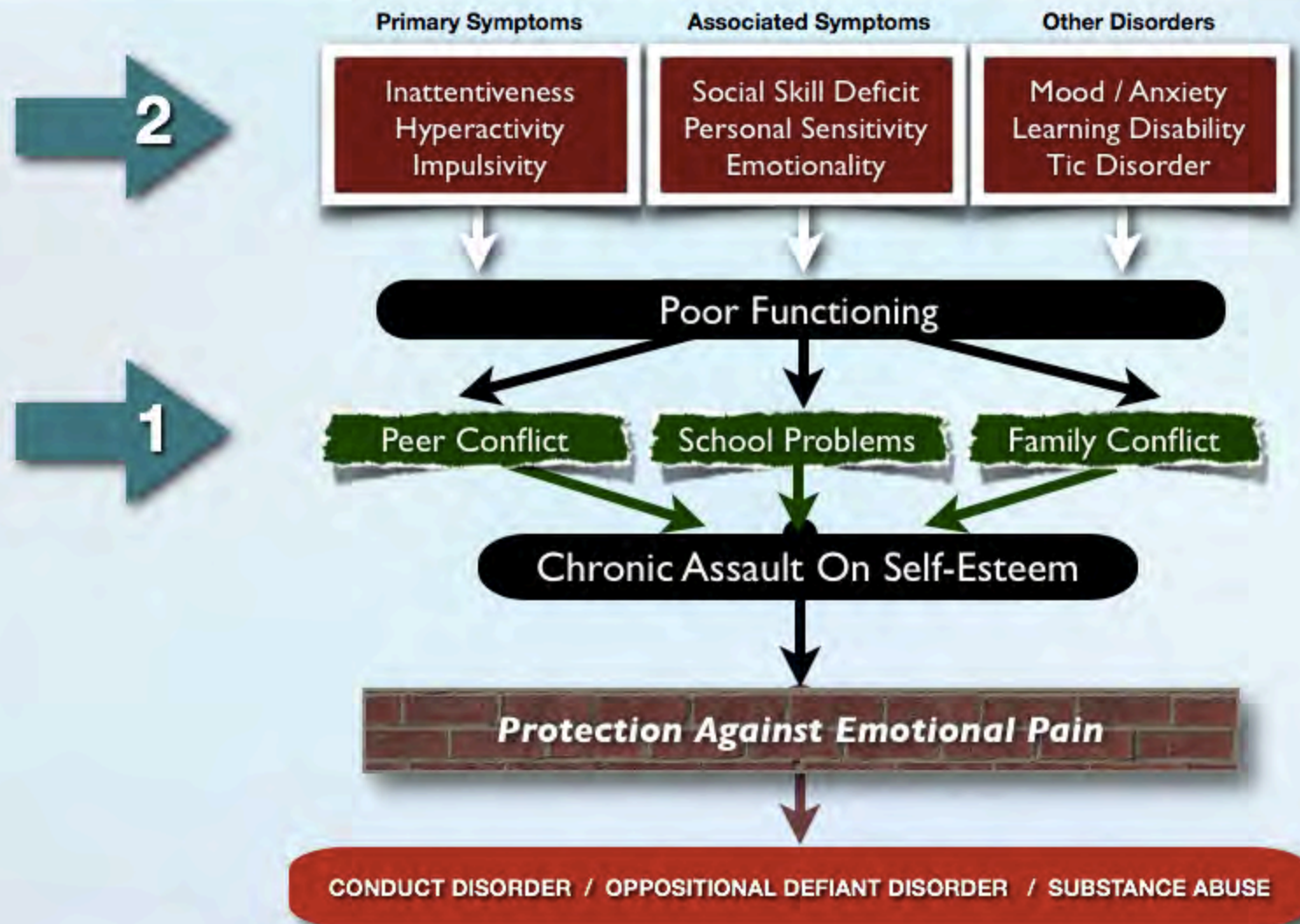
Treatment #1

Psychosocial Treatment

Aimed at minimizing impact and consequences of the symptoms.

- ✓ **Parental**
- ✓ **Child/Teen**
- ✓ **Family**

TREATMENT OVERVIEW



Treatment #2

Biological

Aimed at minimizing the impairment itself.

“Natural”

Medication



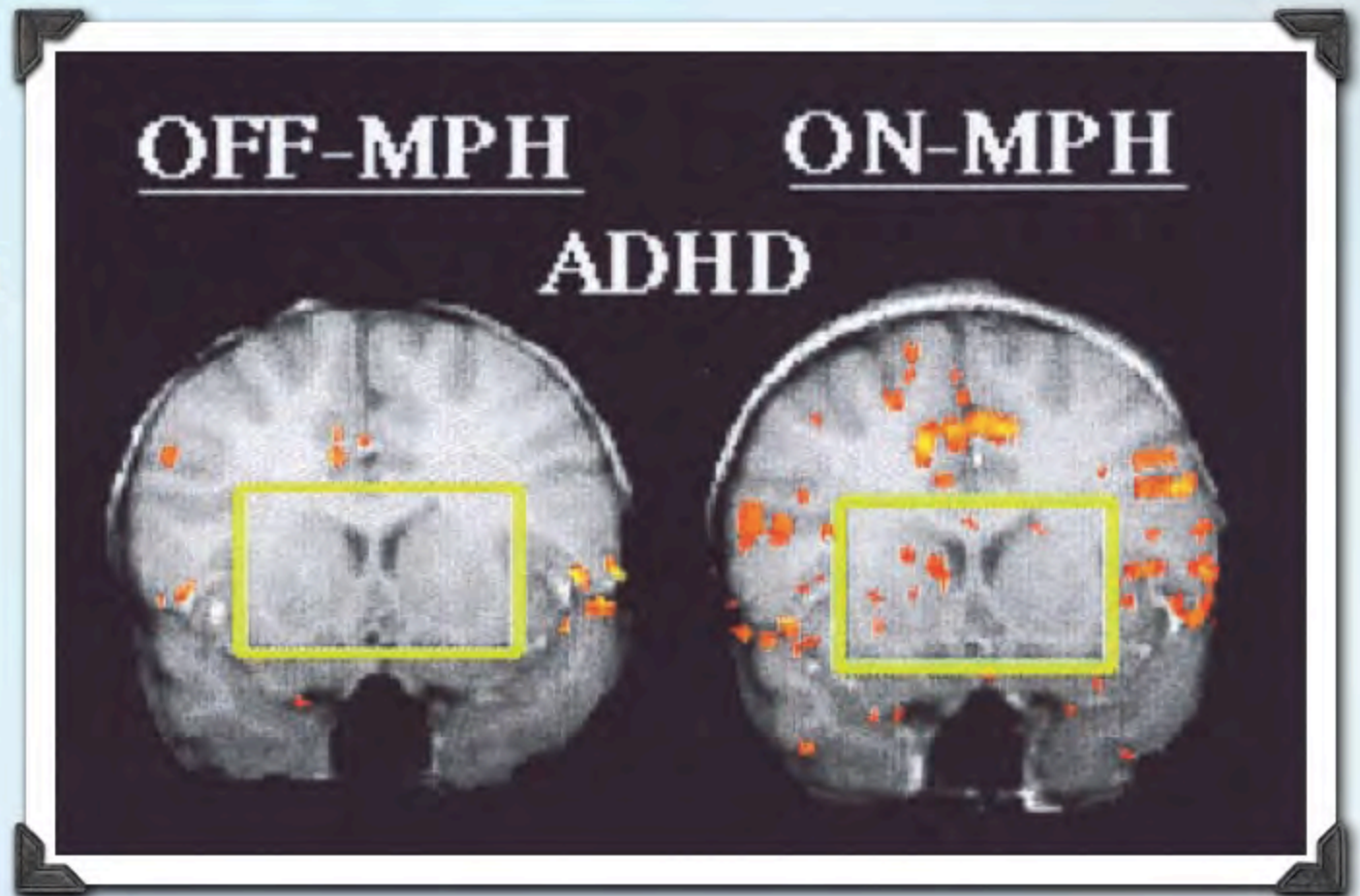
“Natural” Treatments

- ✓ **Becoming popular generally**
- ✓ **Anecdotal evidence**
- ✓ **Little scientific evidence supporting**
- ✓ **Symptomatic, not curative**
- ✓ **Side effects exist**
- ✓ **Nothing know about mechanism of action**

Medication

- **Much misinformation available**
- **Much information available**
- **Stimulants / Nonstimulants**
- **Symptomatic, not curative**
- **Stimulates underactive brain regions**
- **Increases functioning by decreasing impairments**

Medication Action In The Brain



ADHD

WORKS BY STIMULATING THOSE UNDERACTIVE AREAS OF THE BRAIN

Medications in Canada

Medication Name	12+ Hour Products	8 Hour Products	Short Acting	Untested
Methylphenidate	Concerta	Biphentin	Ritalin	Generics
Dextroamphetamine	Vyvanse, Adderall		Dexedrine	
Non-Stimulants	Strattera			

ADHD

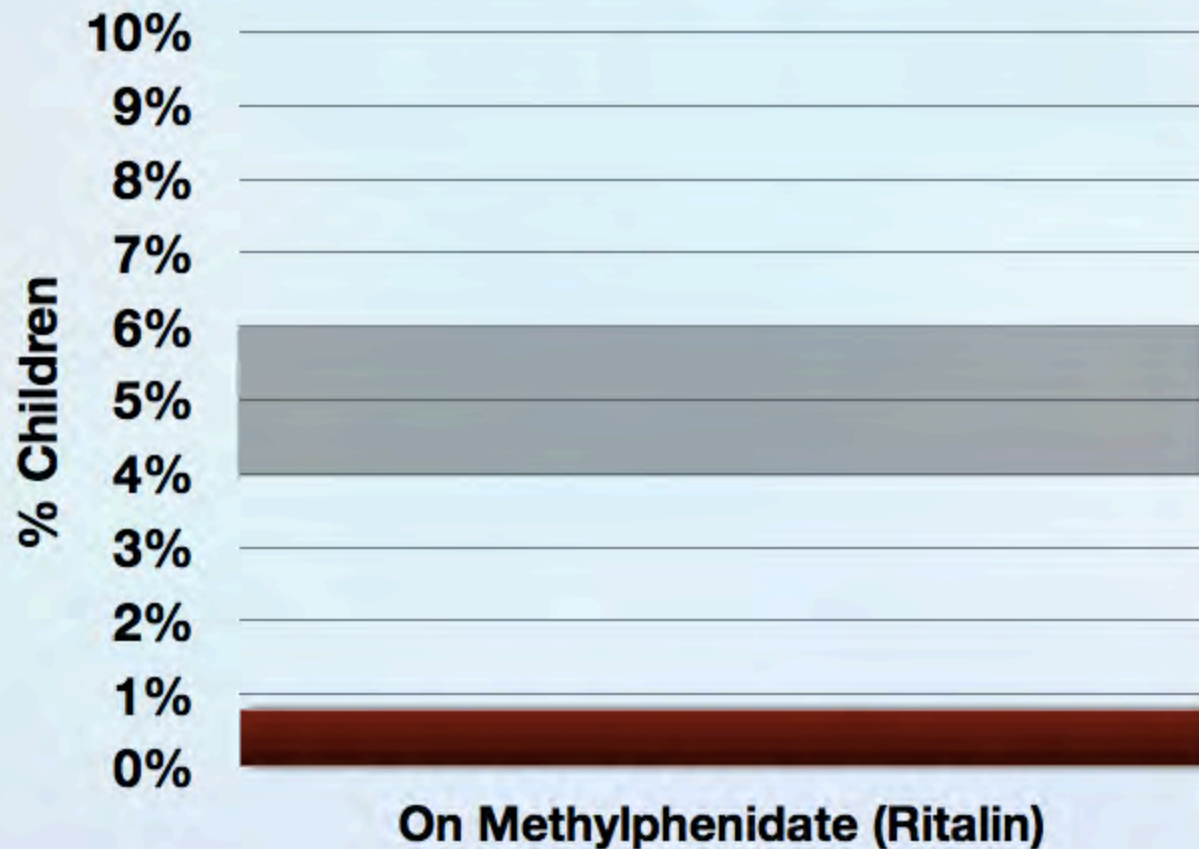
LONGER ACTING MEDICATIONS WORK BETTER AND ARE TOLERATED BETTER THAN SHORT ACTING MEDICATIONS

Stimulants

- **Methylphenidate / Dextroamphetamine**
- **Most studied medications in medicine**
- **Very safe**
- **Side effects are “nuisance” type**
- **Not addictive**
- **Growth suppression not an issue**
- **Available in old “short acting” and newer “once-a-day” versions**

Treatment

Prescription Rate of MPH in Children in B.C.



Does Ritalin cause drug abuse?

- ▶ **Children NOT TREATED with stimulant medications are TWICE AS LIKELY TO ABUSE substances as children who are treated with stimulants.**
- ▶ **Therefore, stimulants have a protective effect against substance abuse.**

Benefits of Medication

- **Reduced symptoms - increased function**
- **Improved social skills**
- **Improved self-esteem**
- **Reduced family conflict**
- **Reduced risk of secondary complications**
- **Improved environmental feedback**

Biederman J (1999) Pediatrics • Frankel F, J Chil Adol Psychopharm 9:185-194

Review

- **ADHD is a neurobiological disorder**
- **Numerous commonly associated problems**
- **Numerous commonly associated disorders**
- **Impairs function - school, home, peers**
- **Places child “at risk” for problems**
- **Risk is partly mediated through experience**
- **Caregiver’s views are extremely important**
- **Treatment is multimodal**