17th International Conference on Tourette Syndrome & Tic Disorders

TS school

Athens

Attention Deficit Hyperactivity Disorder

A frequent and complex comorbidity

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ADHD

A frequent and complex co-occuring condition

ADHD : Main facts , core symptoms , comorbidities

- Neurodeveloppemental disorder
- Prevalence : 5% school age children
  ~50% in clinical population
- Hifghly comorbid (85%)
- Gene X Environnement model

ADHD : core symptoms , clinical manifestations and neurocognitive profiles

ATTENTION CONTROL

- INTERNAL Distractibility
- HyperFocus
- EXTERNAL Distractibility
- Forgetfull dreamy

IMPULSIVE NESS

- Mottor and Verbal
- Cognitive
- Emotionnal

FIDGETTING

- Intolérance to delay
- Intolérance to monotonie
- Fidget, feeling of tension

- WORKING MEMORY
- PLANIFICATION
- FLEXIBILITY

ADHD and comorbidities

ATTENTION CONTROL

IMPULSIVE NESS

FIDGETTING

LEARNING DISABILITIES 30-45 %

Sleep disorders 50%

EMOTIONNAL
Anxiété Dépression
15-20%
Mood dysregulation
20%

BEHAVIORAL
symptômes

ODD, CD, ADDICTIONS
40%, 15%, OR>5

TICS and TOURETTE 20%

SOCIAL SKILLS
Lack of social adjustement: up to 60%
ASD: about 15%

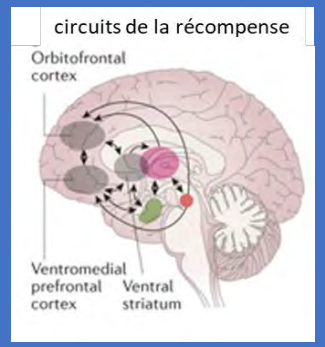
ADHD and Temperment

ATTENTION

IMPULSIVE NESS

FIDGETTING

- Prefence fort short term **reward**
- Aversion to delay
- Novelty seeking
- LACK of harm avoidance



Impact on SOCIALISTION LIFE TRAJECTORY

Clinical presentation

- impulsif/hyperactif
  - Unstable, fidgetty impulsivity, like on motor run
  - Speaks a lot or impulsively
  - Impossible to delay
  - Hates bordom
  - Qickly angry

- inattentive
  - Unexplained school difficuties
  - Dreamy, in his own world
  - Poor planner even to brush his/her teeth
  - Forgettfull, doesn’t answer, looses his stuff
  - Avoids long tasks

- Combined
  - A bit or a lot of both !

Criteria

-Starts before 11YO

-6 majors symptoms of inattention

and or 6 major symptoms of hyperactivity

(ADHD-RS is an interresting tool to assess and monitor symptoms)

-**<u>Not consistant with the developpemental age!</u>**

-Symptoms in at least 2 different environnements

-Impact on everyday life

-Not better explained by another condition

(let's say more or less)

AETHIOLOGY & PHYSIOPATHOLOGY

Explantation models

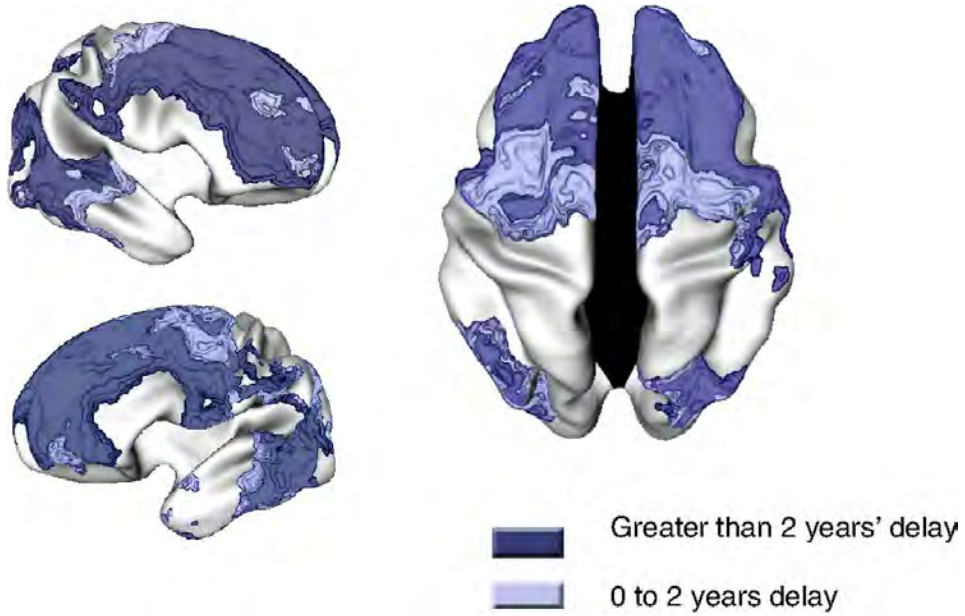
- Hypo activation of the frontal lobe and dopamin related executive deficit (Barckley)
- Aversion to delay and reward cicuitery impairement model of Sonuga Barcke
- Maturation delay model of Shaw
- Default mode Network dysrégulation model
- Iron depletion and sleep disorder model
- The Anxiety coping model

➔ Probabily ALL of above hold a part of the truth

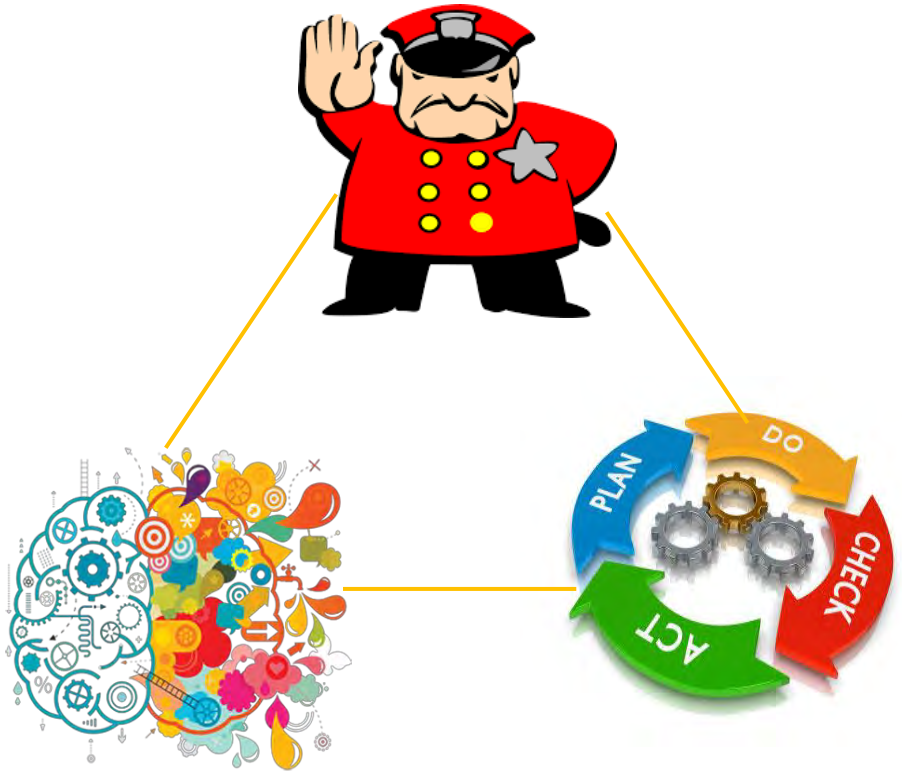
Etiologies

- Neurodeveloppemental delay

Shaw et al. 2007



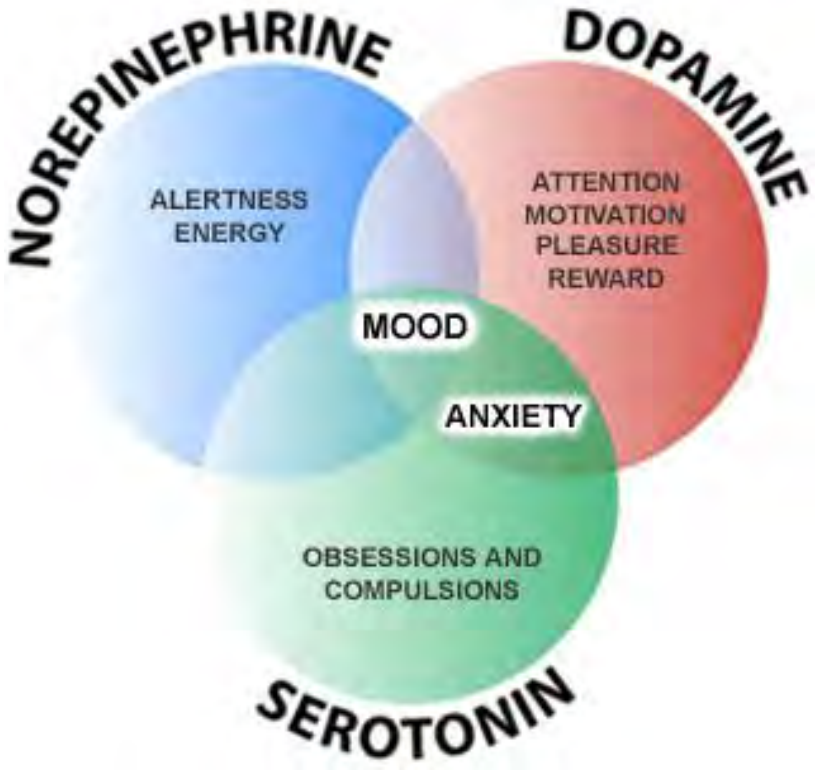
About 3 years delay

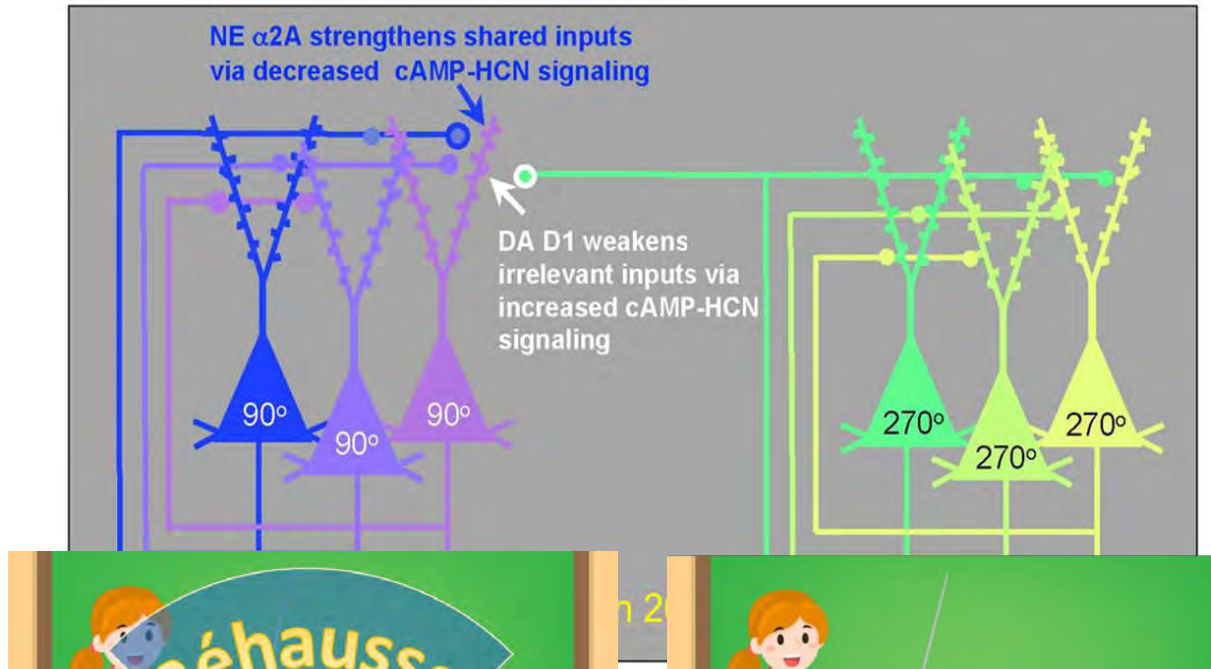


- EXECUTIVE DYSFUNCTION

Etiologies

Role of Norepinephrin and Dopamine





Etiologies

GENETICS

Twin studies, Adoption studies, CNV studies =>

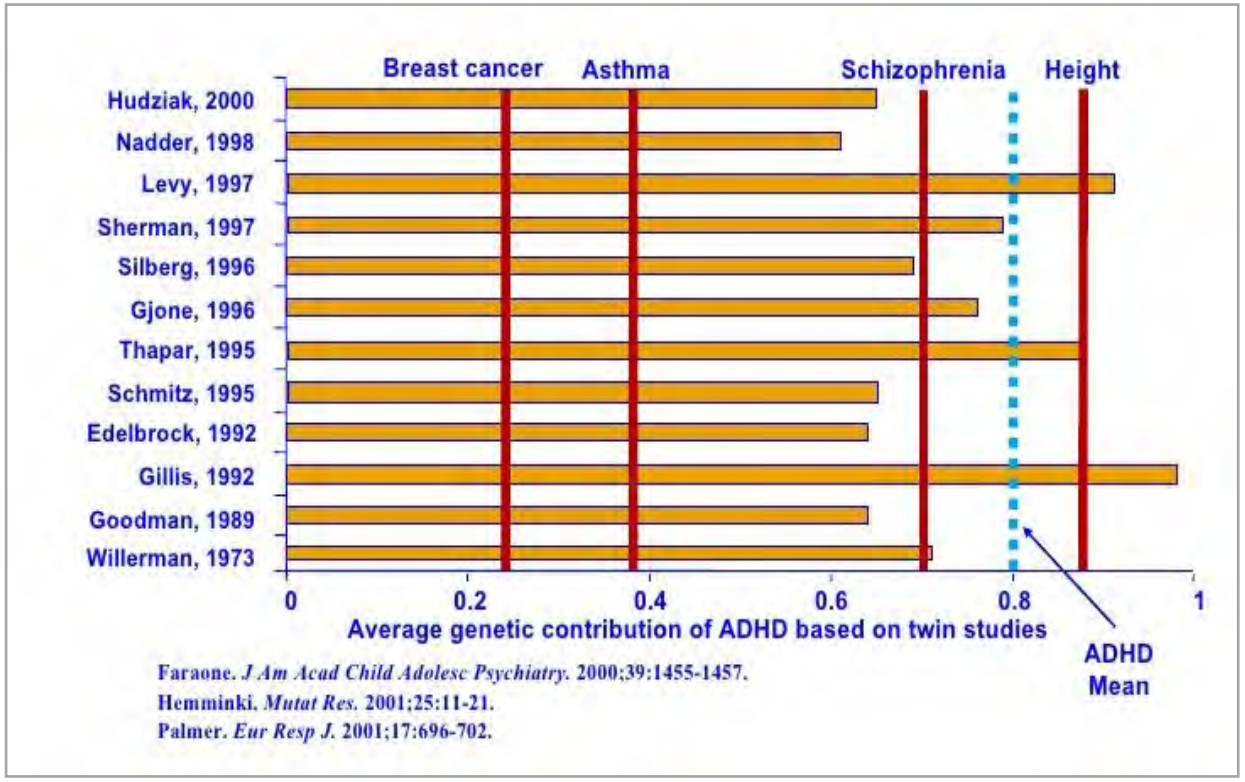
Gene Environnment interraction model

Heritability 75%

Environement factors: Tabaco? Prématurity? Child Care?

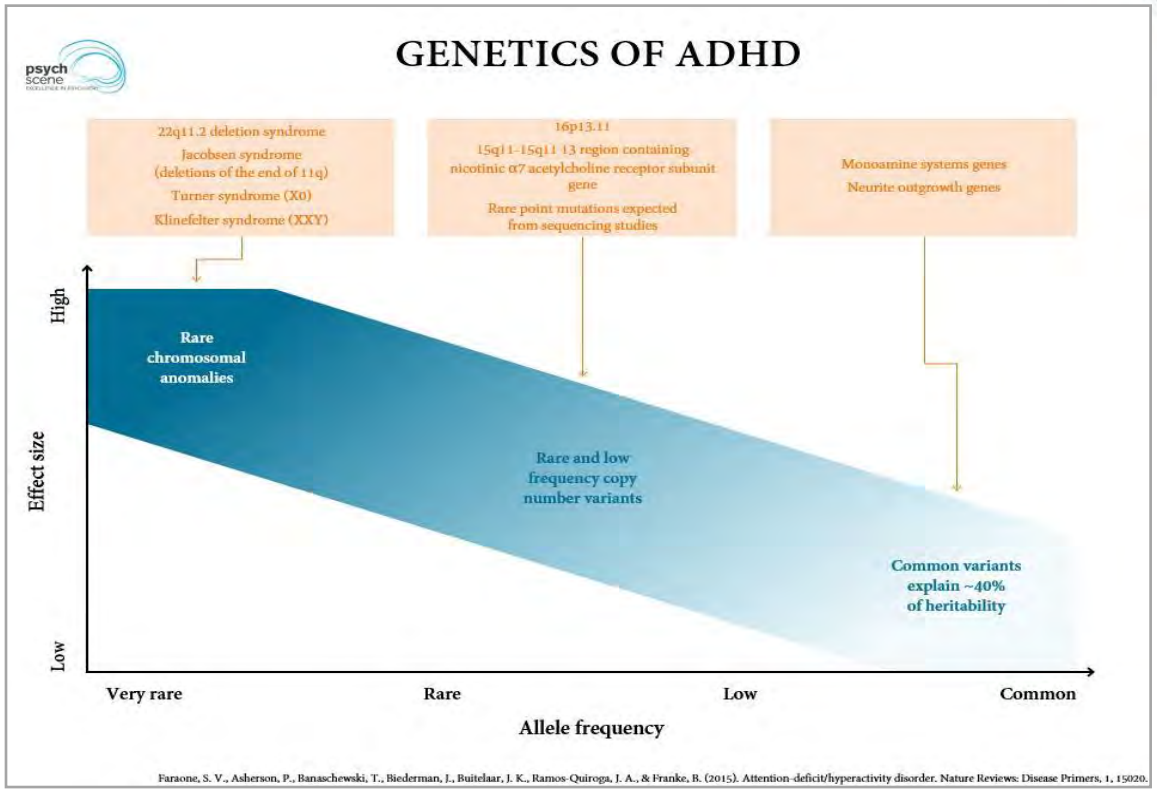
⇒ Causality or shared causality? Unclear

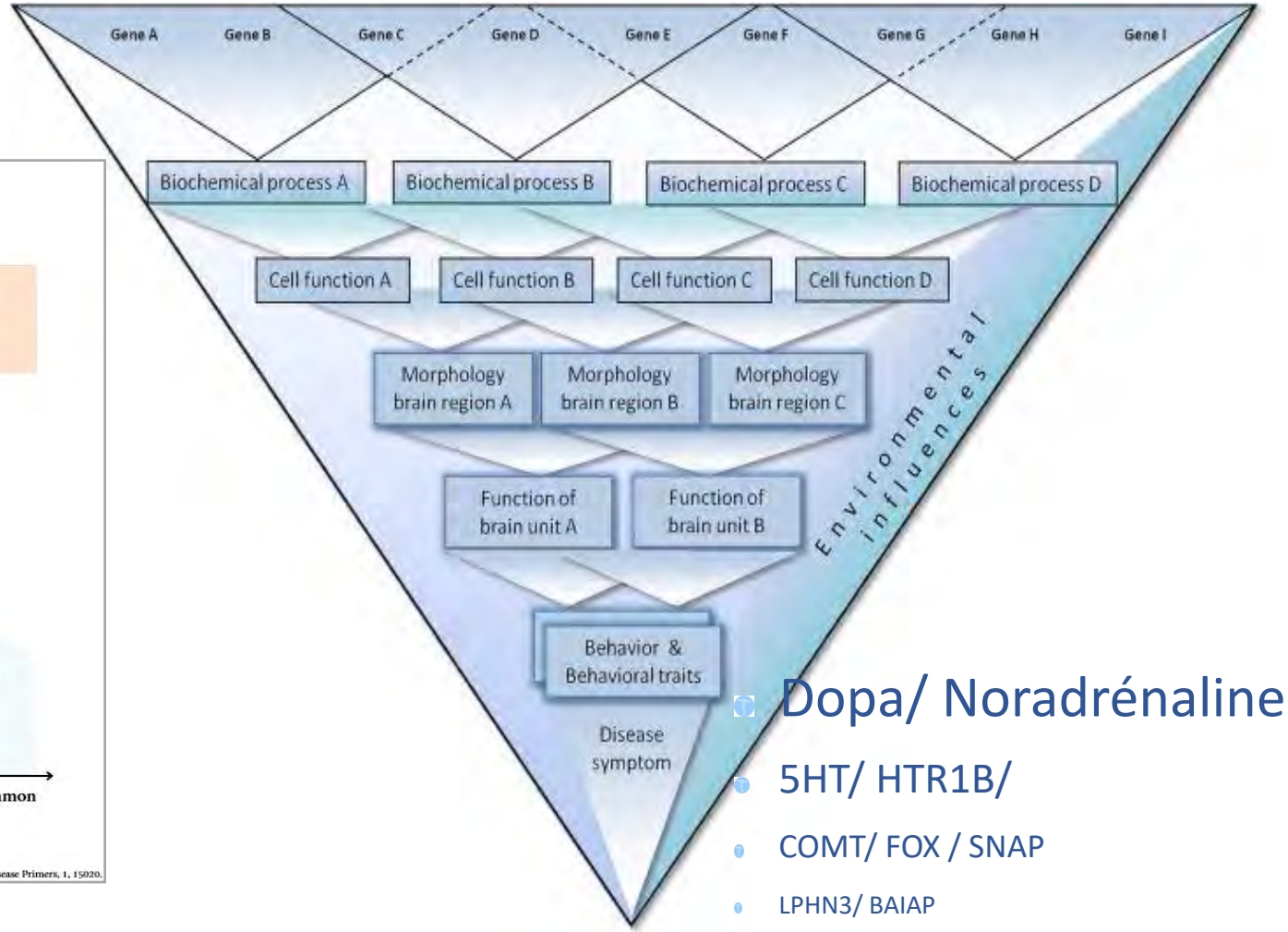
⇒ Existence of genetic factors making one more or less sensitive to adverse events? (COMT Rreceptor gene)



What genes

➔ Both rare ans common variants



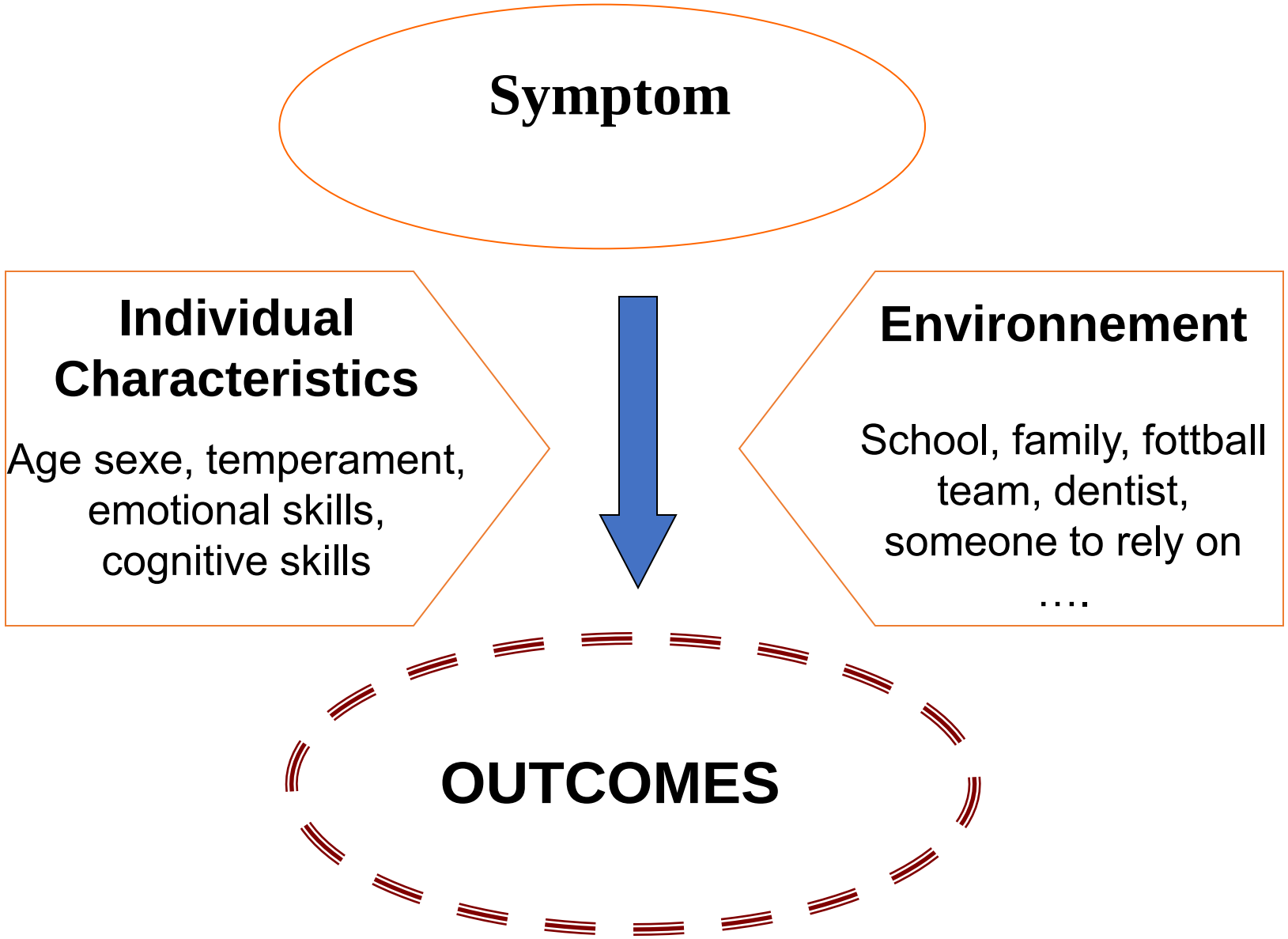


- SNP studies (cas/contrôles ou TDT)
- Multiplex family studies
- GWAS (SNP, CNV)

- Dopa/ Noradrénaline
- 5HT/ HTR1B/
- COMT/ FOX / SNAP
- LPHN3/ BAIAP
- DUSP6/ SEMA6D/
- ST3GAL3
- …

The Outcomes and evolution prospects

Symptom and the effect of environement



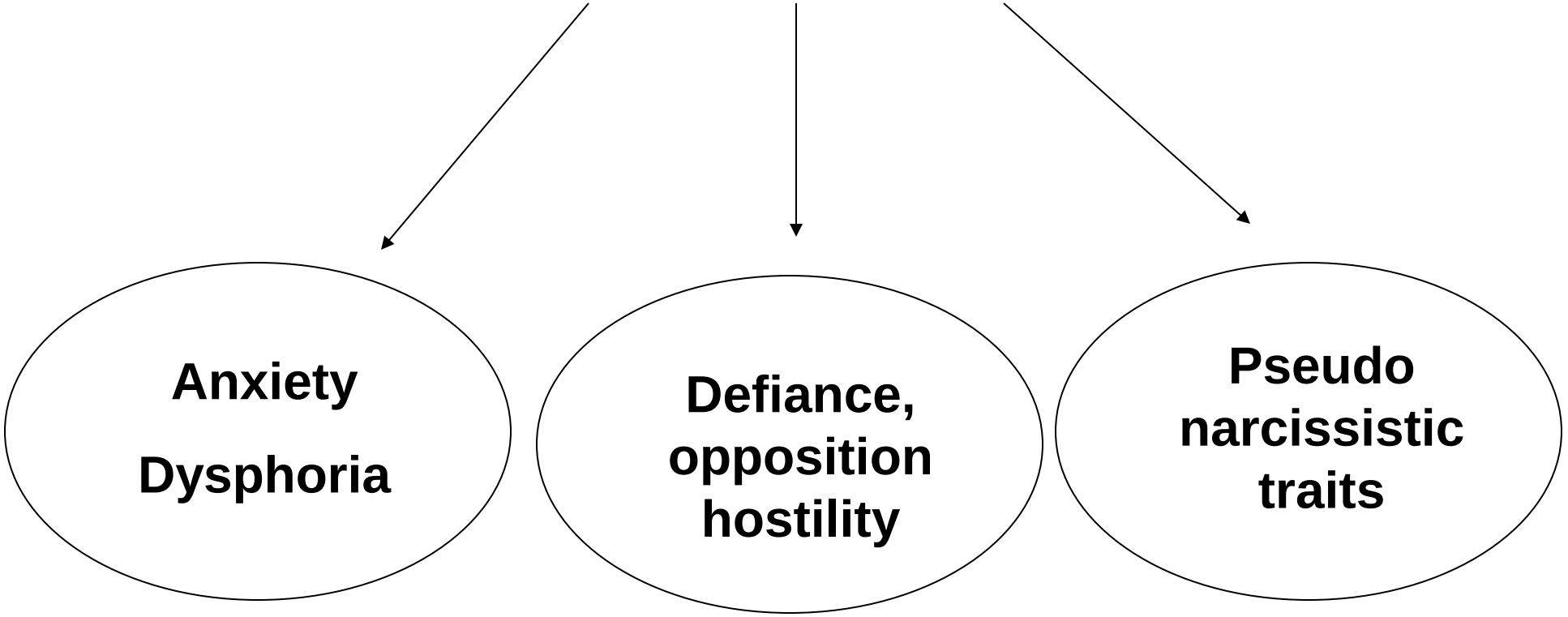
Symptom and the effect of environement

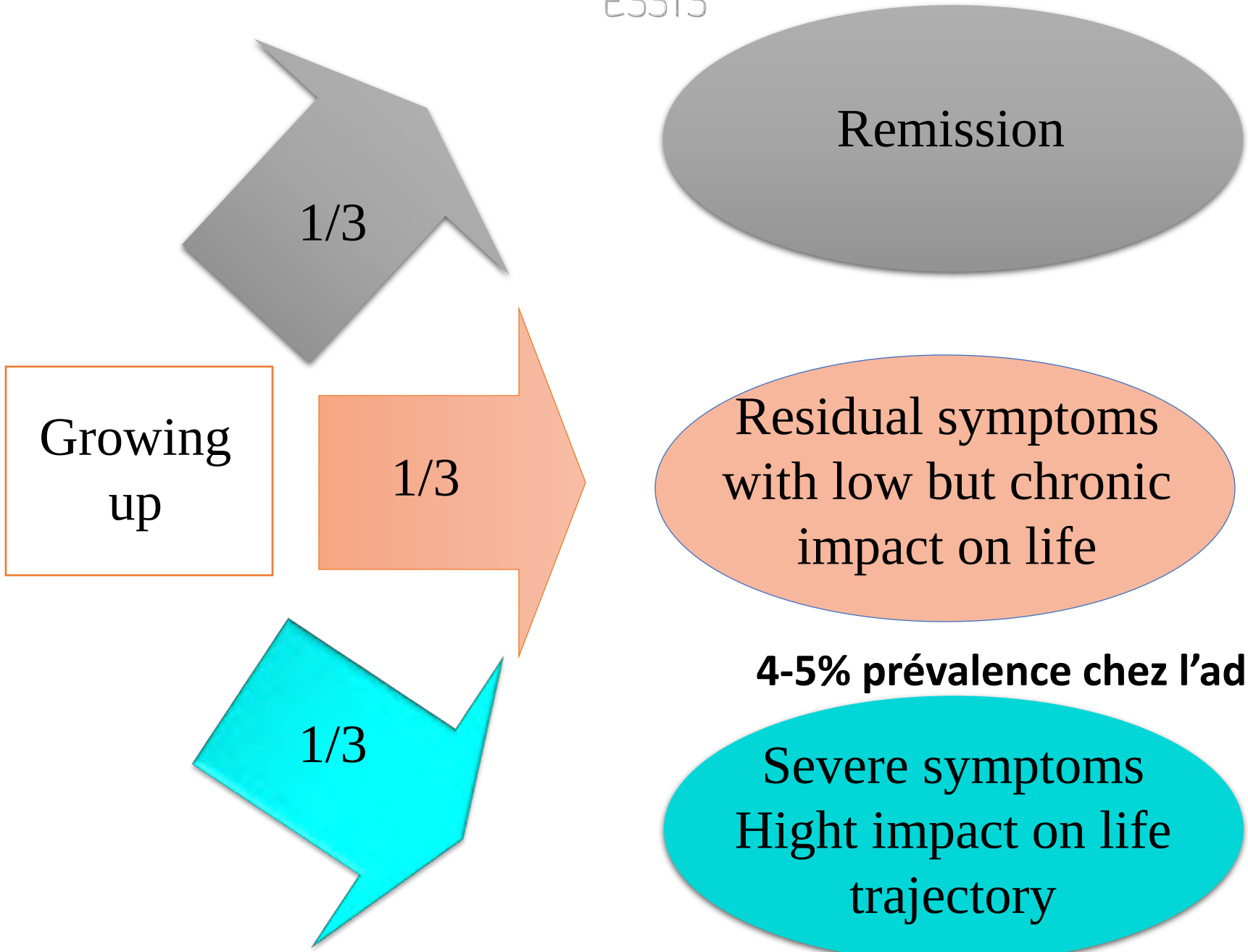
Symptoms UP	Symptoms DOWN
Sustained effort	Supervision / Monitoring
Dull and monotonous sit	screens (but it's a non lasting fix)
Unstructured & fuzzy sit	Immediat Renforcement
Groupe	Tea for two situation
Fatigue	Fractionned tasks
With mom	Avec papa

Emotional impact

Low self esteem

Chronic feeling of failure, helplessness,
Isolation, bad feed back from nurtureres and peers

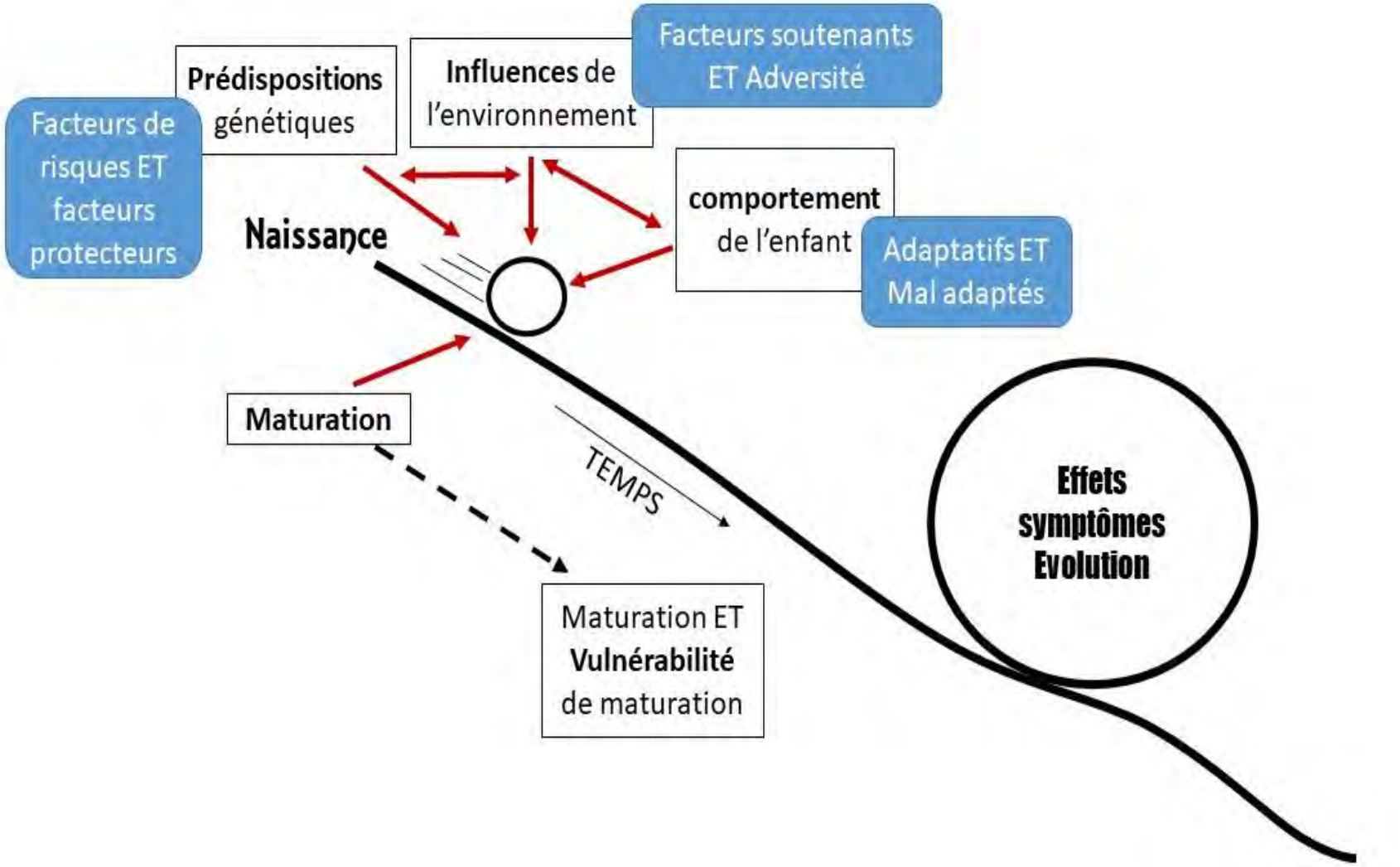




4-5% prévalence chez l'adulte

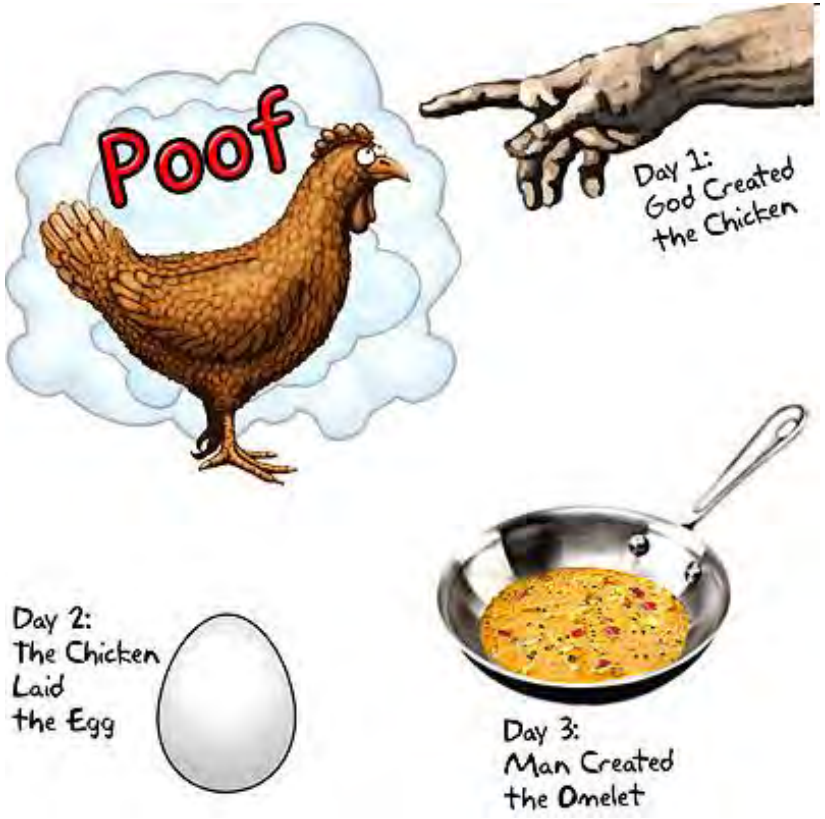
Manuzza 1998, Biederman 2000

The Snowball effect model



Adapté d'après Butilaar 2018

How does all that work?



ADHD : Attention

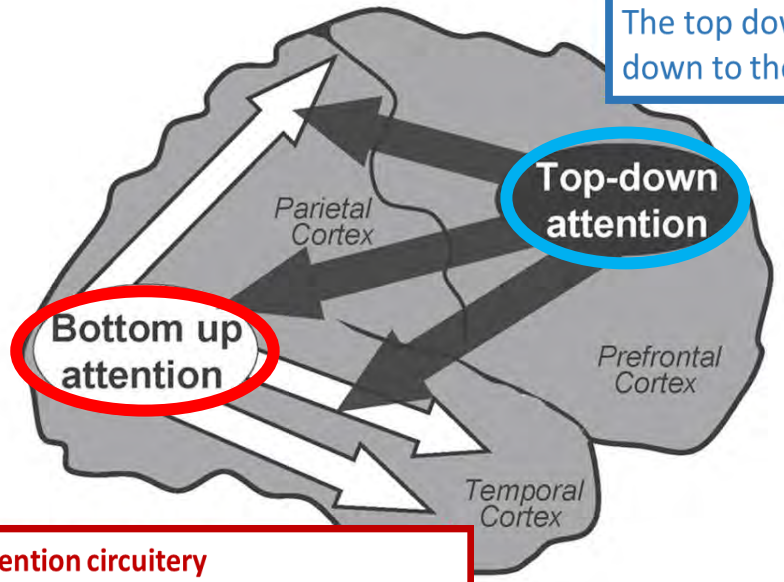
ATTENTION Control

Impulsive ness

Fideget ting

Orientation

Attention control : Top Down circuitery
Attention is guided with an internal objective or a goal to achieve and helps filtering (pertinent stimuli to that en end, for ex : finding food)
The top down signals starts in the frontal cortex down to the sensorial levels & psoterior cortex



Bottom Up attention circuitery
Attention is triggered by a stimulus with a great value in terms of survival (for ex something mooving fast)
The Simulus is pooshed Forward automatically

ORIENTATION

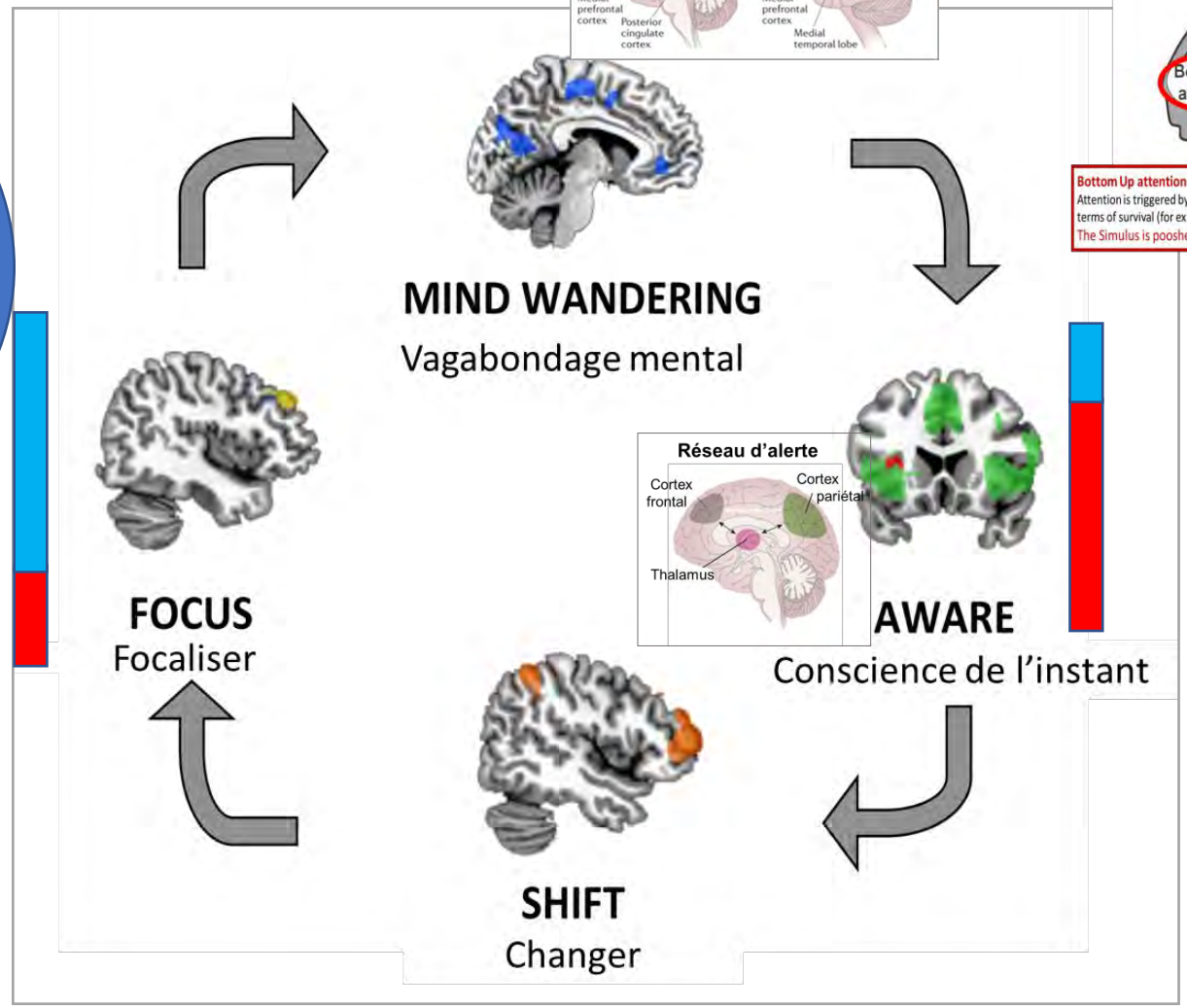
ALERT!

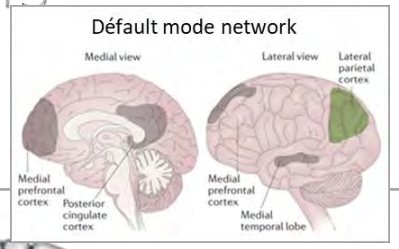
ADHD : Attention

ATTENTION

IMPULSIVENESS

FIDGETING





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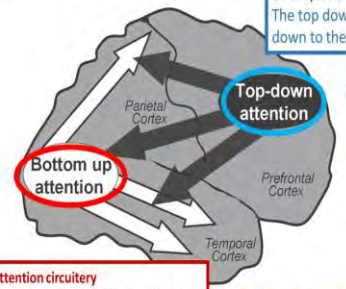


ORIENTATION

Bottom Up attention circuitery
Attention is triggered by a stimulus with a great value in terms of survival (for ex something mooving fast)
The Simulus is pooshed Forward automatically

ALERT!

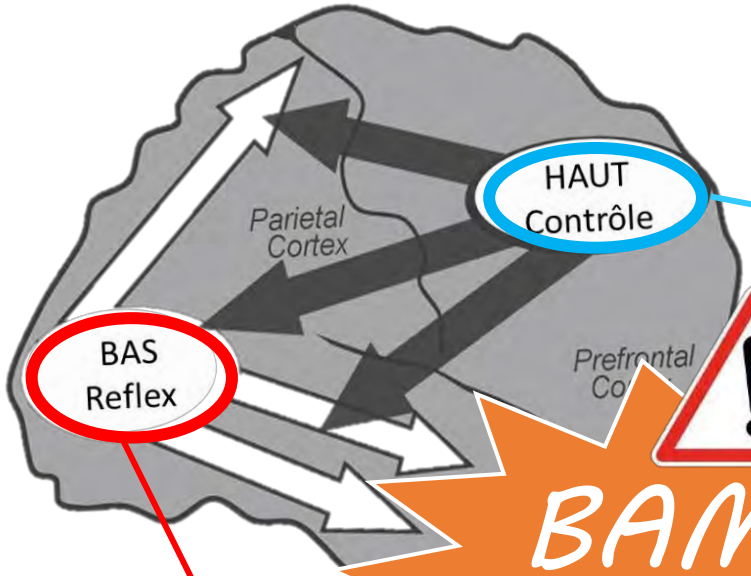
ADHD : impulsiveness

ATTENTION

MPULSIVENESS

Action!

BOUGE OTTE



BAM

ADHD: LACK OF INHIBITION

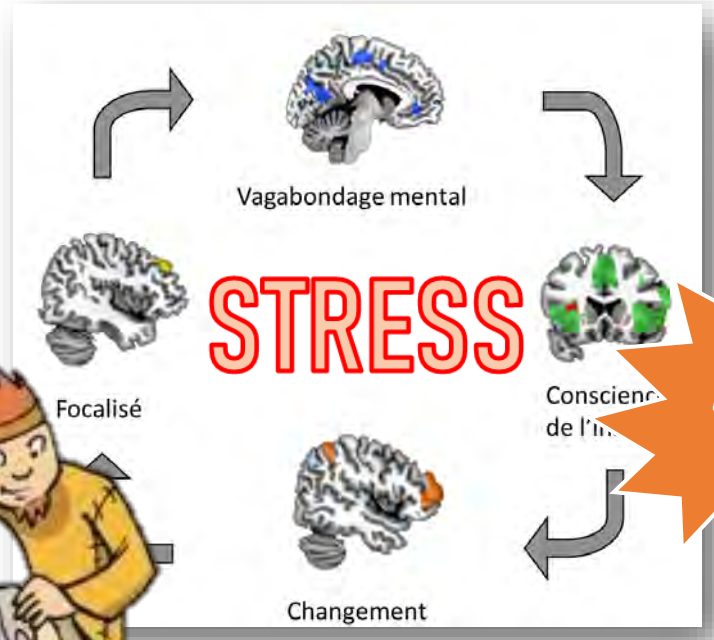
ADHD and STRESS!

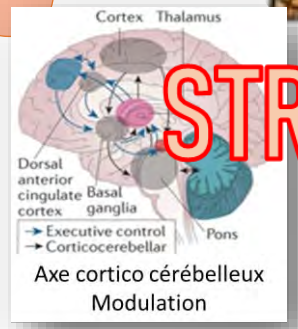
ATTENTION

IMPULSIVITE

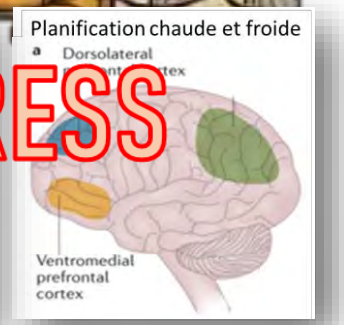
BOUGE OTTE

STRESS





STRESS



DECISION

FLEXIBILITY

PLANIFICATION

+ STRESS, ANGER, EXHAUSTION …

automatique response A takes over

RESTED, SERENITY, MINDFULLNESS, SATISFACTION

Response B becomes possible

ADHD and Négative Emotions (-): The vicious circle

ADHD

ATTENTION

IMPULSIVENESS

FIDGETTING

Inappropriate behaviour tentrums

Negative Feed Back Feeling rejected

Negative Emotions

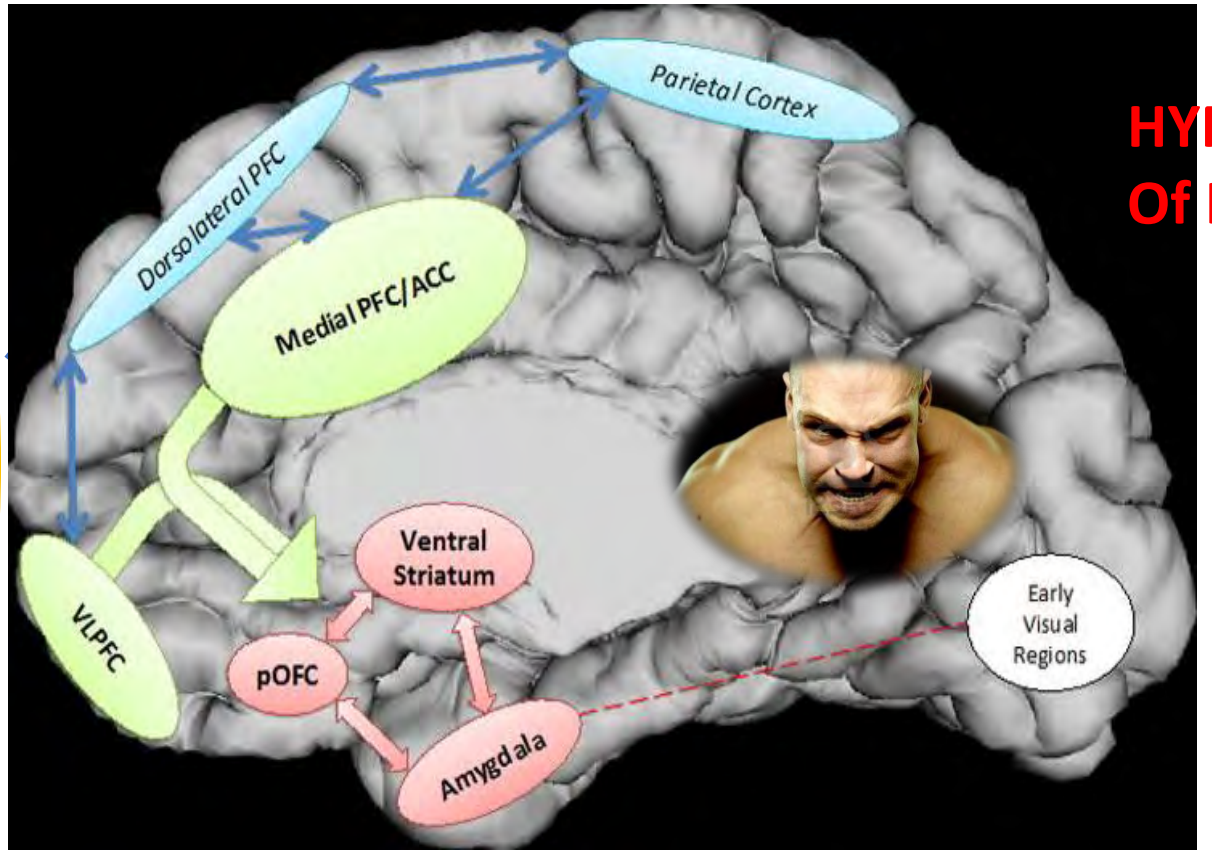
ADHD and Négative Emotions (-): The dysrégulation model

ATTENTION

IMPULSIVENESS

BOUGEOTTE

TOO MUCH ORIENTATION twds Negative Stimuli



HYPER SAILLANCE Of HOSTILITY

BOTTOM UP OVER Activation (survival mode)

Shaw et al. 2014

A word about outburst and tentrum

A tale of overload

Explosion of rage
For « no reason »
Impossible to
Cool off

A tale of overload

I DON'T LIKE THE SMELL OF BROCOLY !

Explosion of rage
For « no reason »
Impossible to
Cool off

+ STRESS, ANGER, EXHAUSTION …

automatique response A takes over

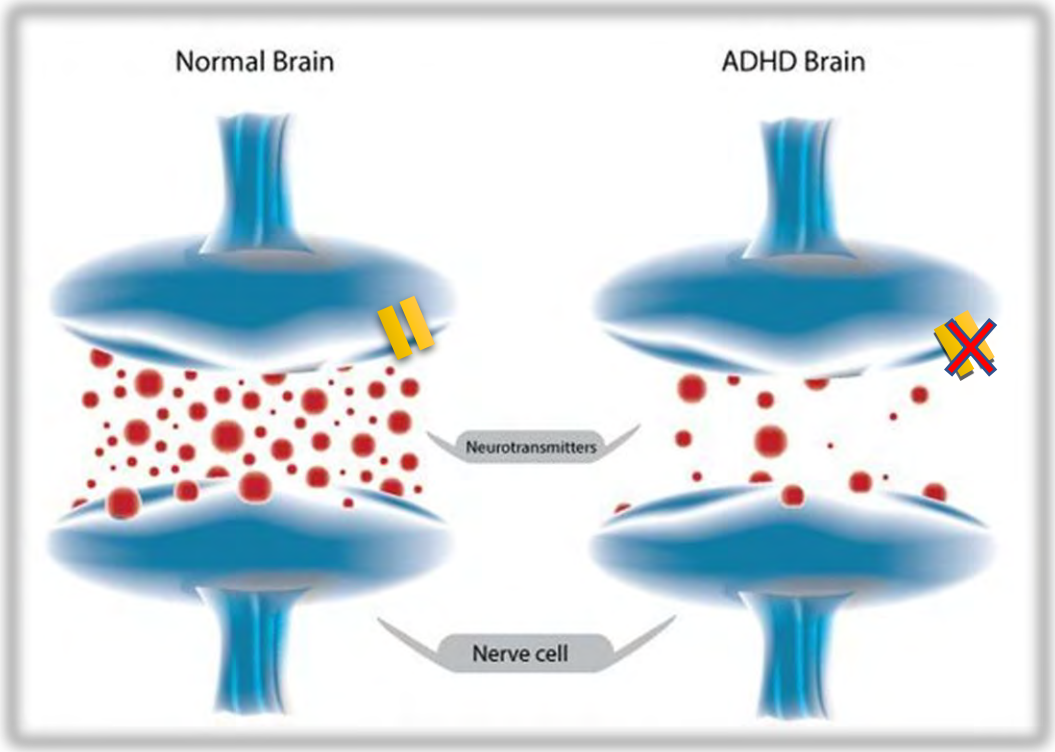
RESTED, SERENITY, MINDFULLNESS, SATISFACTION

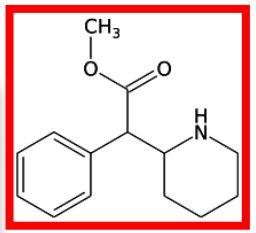
Response B becomes possible

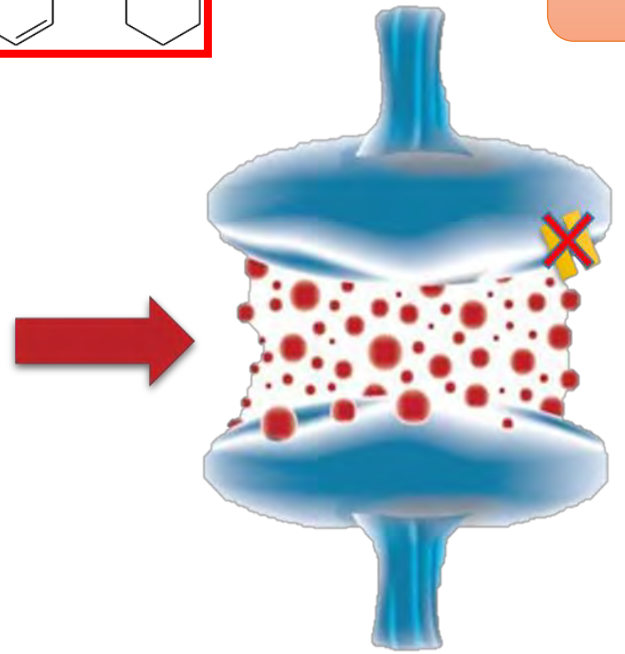
TREATMENT and CARE

Pharmacological approch: Méthylphénidate

- Methylphénidate
- Target: DAT1/ NET1 Transporter
- Inhibits dopamine reuptake

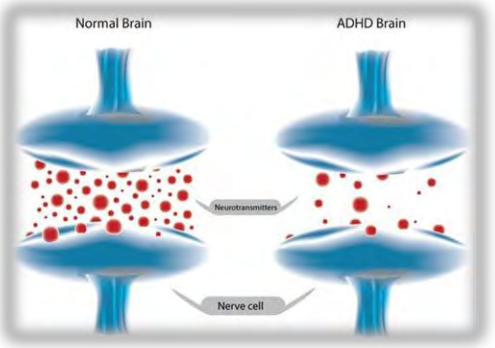




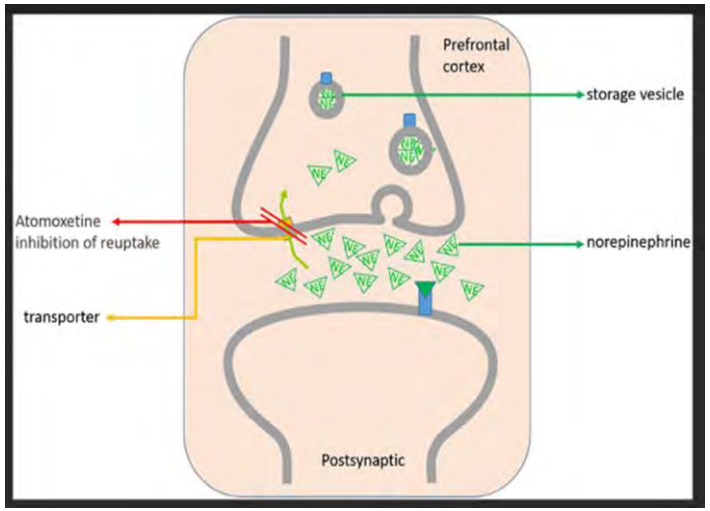


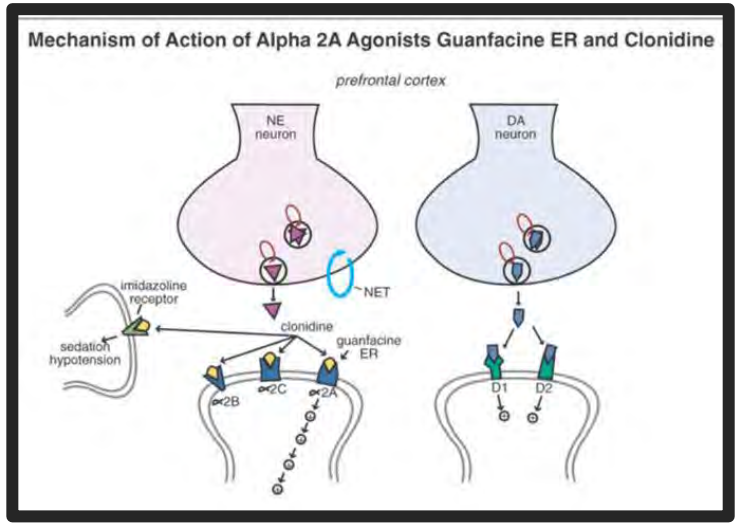
D'avantage de DA dans la synapse

Other prescriptions



- Guanfacine
- Dexamphetamin
- Atomoxetine



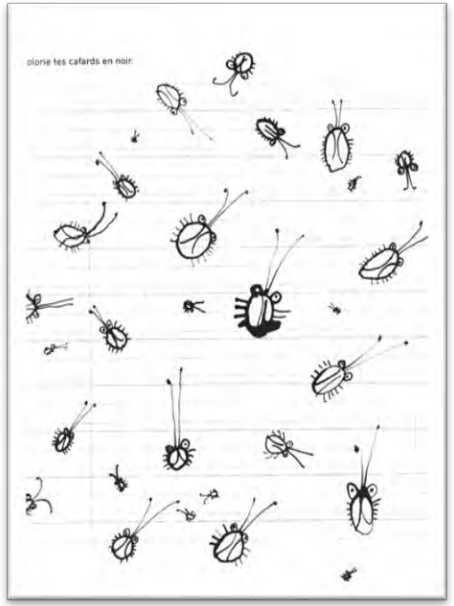


Non pharmacological approch : School adaptations

4 strategies

INFORM and EDUCATE teachers

Non pharmacological approch : School adaptations



Non pharmacological approch: Parenting programs and CBT

Each child had its own modalities. You can bot have « one fits all » strategy

- Behavioral Angle
- Change the parental response to change the child behaviour
- Teach parents the art of cristal clear command
- Lean on
  - Positive reinforcement of good behavior with positive attention
  - Do not reinforce bad behavior with negative attention
- Reinforce parents with their proress (modeling)

Non pharmacological approch: Parenting programs

Each child had its own modalities. You can bot have « one fits all » strategy

- Controled Studies
  - Reduces defiant opposing behaviour
  - Maintains un to 2 years
  - Other effects
    - Reduces parental stress
    - Augments parental sense of efficency
    - Improuves family interactions
    - Improuves problem solving
    - Improuves emotionnal control
    - Improuves child's self esteem

Exemple of positive parenting systems

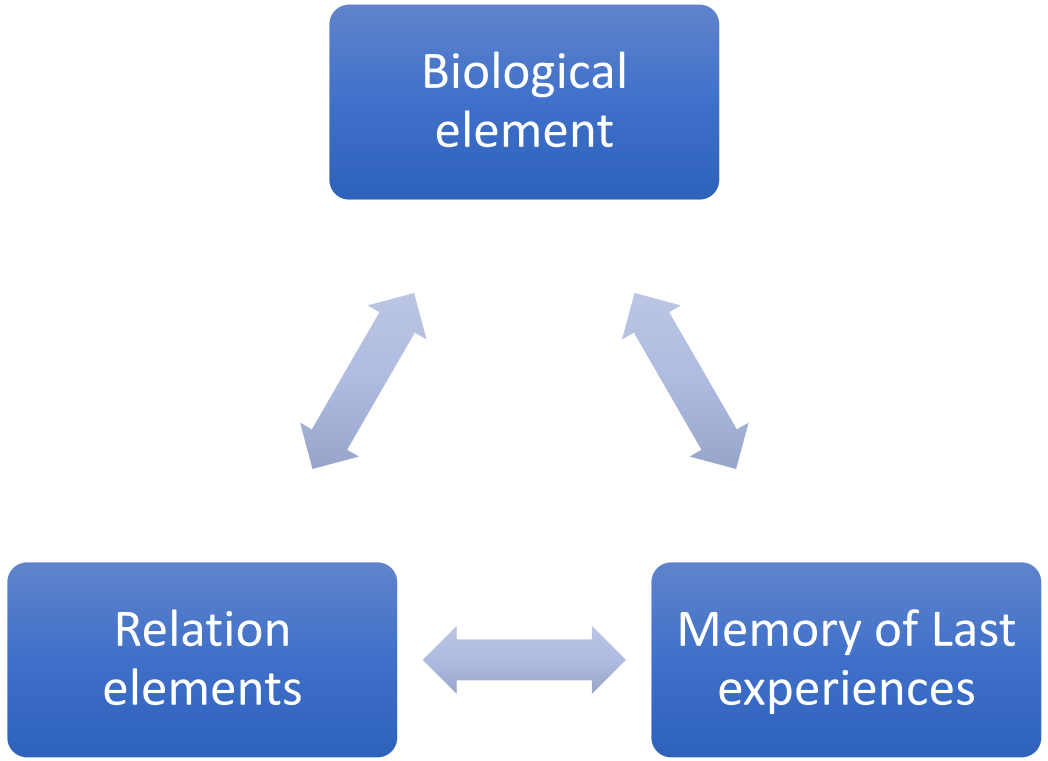
- **Triple P**
- **Invredible Years**

Kazdin A, Oxford Press 2005

The good behavior trade system: The super tool of positive psychologie
Trade good behaviour coins for privileges

Emotionnal Dysrégulation a trans diagnostic thing

Impossible to control the automatic emotionnal response



Thank you for your attention