Adolescent Attachment: *From Brain to Culture*

16th INTERNATIONAL ESCAP CONGRESS | FROM RESEARCH TO CLINICAL PRACTICE: LINKING THE EXPERTISE | MADRID, SPAIN 20-24 JUNE 2015

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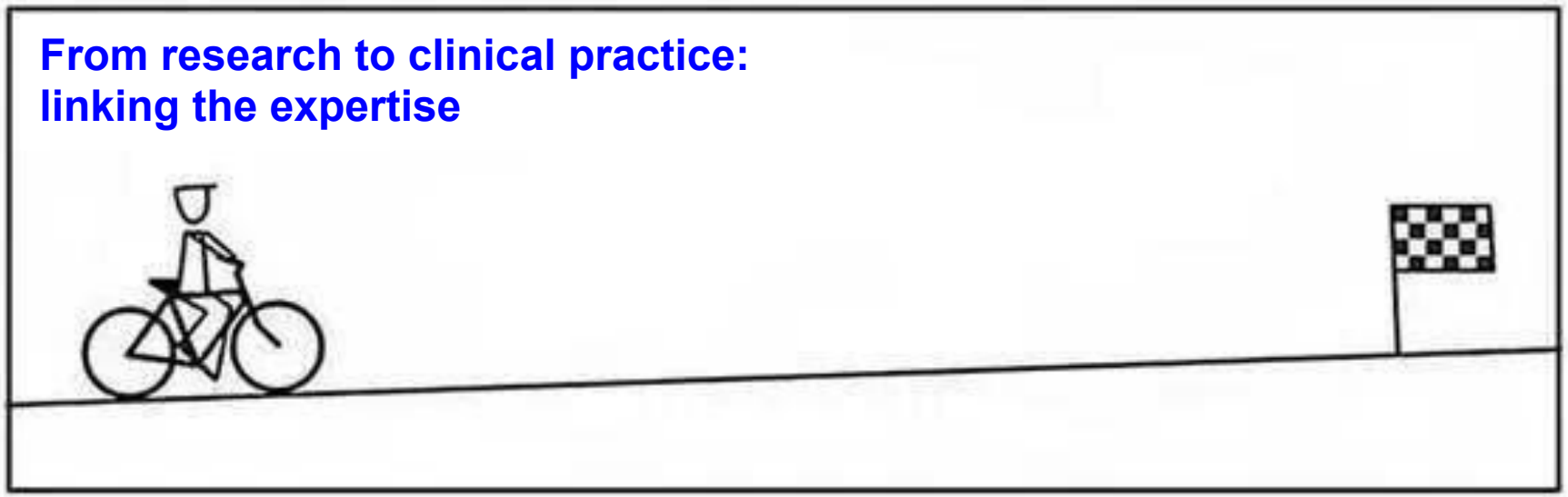
Gerry Byrne
Peter Fonagy
Patrick Luyten
Trudie Rossouw

WARNING

From research to clinical practice:
linking the expertise



Introduction

Why are we interested in (adolescent) attachment?

Why we are interested in attachment

1. **Proven clinical relevance**

- Attachment disorganisation **strong predictor** of psychopathology during life course (Fearon et al., 2010; Fonagy et al., 2014)
- Insecure attachment with both parents associated to increased **externalising** behaviors (Kochanska & Kim, 2013)
- Some evidence that insecurity links to **internalising** disorders (Groh et al., 2012)

2. **Infant attachment insecurity associated developmental health and risk factors for psychopathology**:

- Adolescence obesity (x 2) (Anderson et al., 2012)
- Adult risk of inflammatory illness (Puig et al., 2012)
- Linked to earlier pubertal maturity (Belsky et al., 2010)

Why we are interested in attachment

3. **Biological Pertinence**

- « Adaptive » addiction disorder (mesolimbic **dopamine** reward feelings motivate reproductive behavior and offspring caring; **oxytocin/vasopressin** systems love feelings motivate proximity and affiliation) (Insel, 2003)
- Processes such as gene expression and neuron receptor density can be influenced by the infant's environment (Meaney & Szyf, 2005)

4. **Adaptive (Evolutionary) Value**

- Attachment is the mechanism by which **infants** elicit care, garanties **survival**. In **adolescence**, it sustains **social integration**; in **adults**, **reproductive behavior**.
- The brain is **experience expectant** (Siegel, 1999), and attachment constitute one of the main **experiencial influence** shaping the developing brain.

Fonagy et al., *Why we are interested in attachment*, 2014

Secure / Insecure ≠ Good / Bad

*Insecure attachment may **signal** environmental **adversity**;*
In environments where resources are limited, non-mentalising may be adaptive; the lack of mirroring behavior may signal to the child that he will have to use physical force / interpersonal violence to survive. Violence is incompatible with mentalising.

Fonagy et al., *Why we are interested in attachment*, 2014

THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY
ACAMH THE ASSOCIATION FOR CHILD AND ADOLESCENT MENTAL HEALTH
Journal of Child Psychology and Psychiatry 55:9 (2014), pp 1033–1041 doi:10.1111/jcpp.12171

Genetic and environmental influences on adolescent attachment

Pasco Fearon,[1] Yael Shmueli-Goetz,[1] Essi Viding,[1] Peter Fonagy,[1] and Robert Plomin[2]
[1]Clinical, Educational & Health Psychology, Division of Psychology & Language Sciences, University College London, London, UK; [2]King's College London, MRC Social, Genetic & Developmental Psychiatry Centre, Institute of Psychiatry, London, UK

« Adolescence represents a key period in the life span for attachment, in part because it may represent a phase in which Internal Working Models of attachment ***become consolidated*** *and converge on their adult pattern of organisation (Allen & Land, 1999). »*

« ... the transformation that presumably occurs when ***attachment shifts*** *from a primarily behavioural and relational construct (where children may display different attach- ment patterns with different caregivers).. . ..to one that is* ***more cognitive*** *in nature and more like a generalized style or '****state of mind****'. »*

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551 twin pairs aged 15 years recruited from the larger Twins Early Development Study (TEDS).

Attachment was assessed using a semistructured interview, the Child Attachment Interview.

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Study	Heritability	Shared-Environment	Non-shared Environment
Twin studies with children (Bokhorst et al., 2003;O'Connor & Croft, 2001; Roisman & Fraley, 2008)	nil	52%	48%

Why we are interested in ADOLESCENT attachment

Non-shared environment acquires increased influence during adolescence, which means that intra-familial factors (differential parenting, sibling rivalry) but also **extra-familial factors** (peer relationships and relationships with adult figures of identification).

Adolescence may be a period where key **genetic influences kick in** and influence attachment, internal working models, and vulnerability to psychopathology.

"Psychopathology as an arrest in resilience/learning from experience" *P. Fonagy et al.*

What is specific about *HOW* they learn?

brain development and social cognition

From *WHOM / WHAT* do they learn?

minding two socio-historical trends

Adolescent attachment: @ the contemporary interface b/w the brain and today's society

What is specific about *HOW* they learn?

brain development and social cognition

L'inévitable…

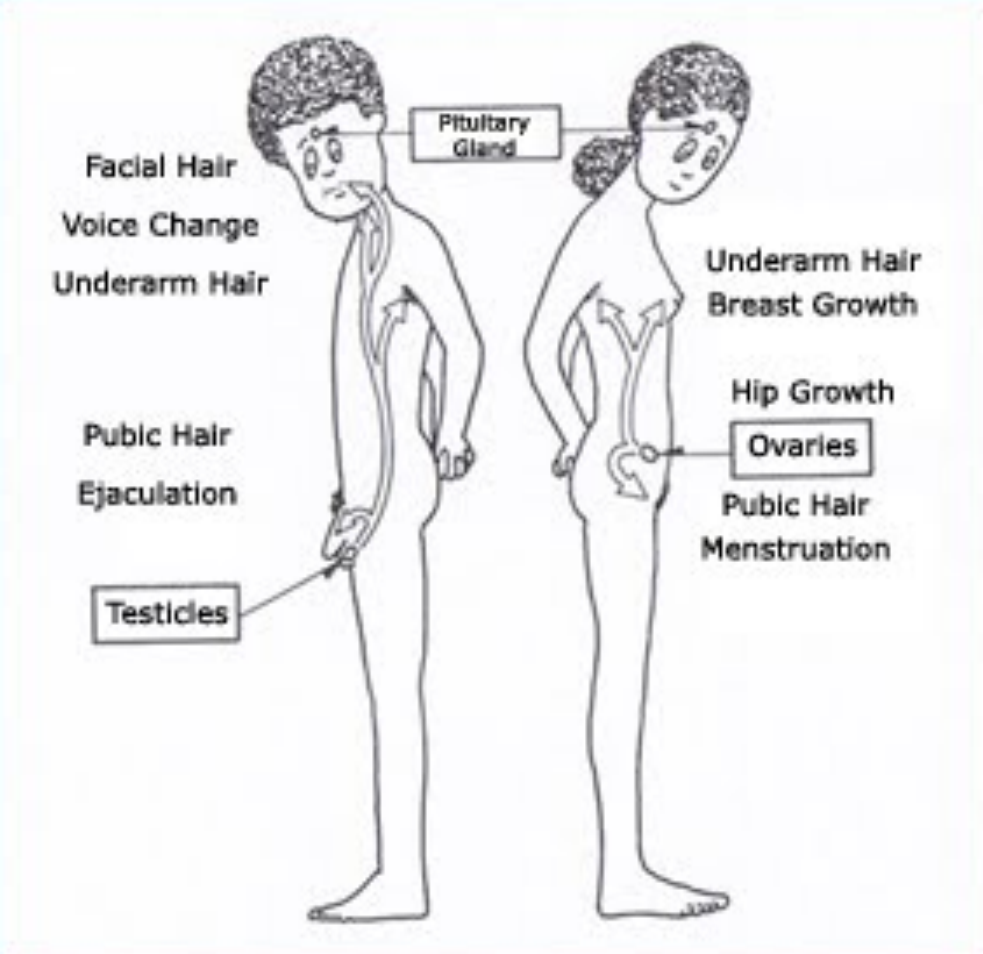
« *Nothing is certain but death and taxes* »

B. Franklin

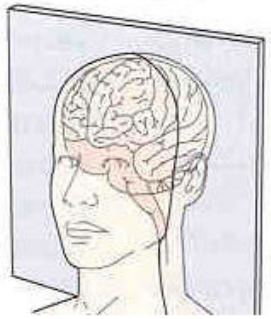
There are ~~TWO~~ THREE things that are certain in life

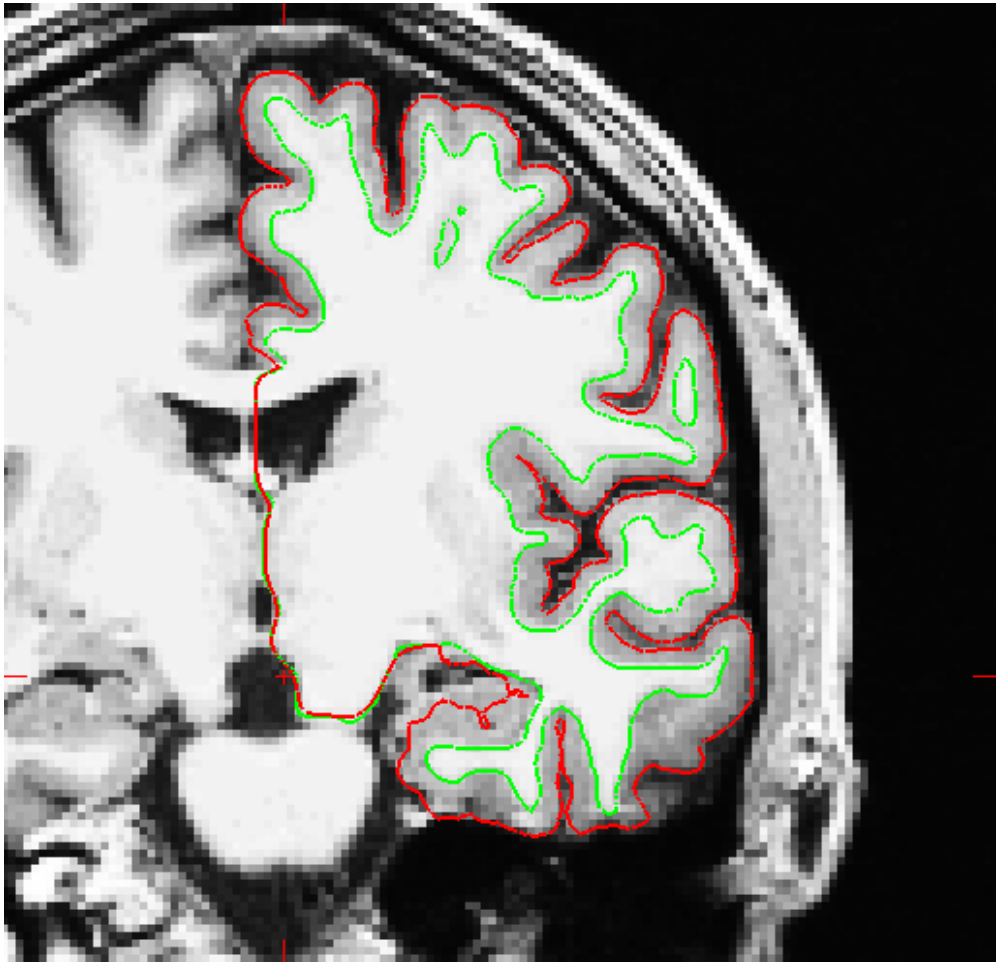
Death, Taxes, and PUBERTY

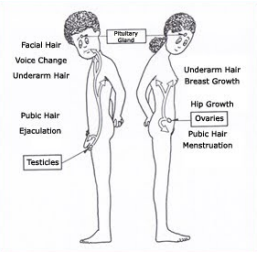
Puberty: inevitable transformation



Adolescent Body/Brain Maturation







Grey matter
« Pruning »

White matter
« Myelination »

Hormones and Behavior 64 (2013) 195–202

Contents lists available at ScienceDirect

Hormones and Behavior

journal homepage: www.elsevier.com/locate/yhbeh

Review

How environment and genes shape the adolescent brain

Tomáš Paus

Rotman Research Institute, University of Toronto, 3560 Bathurst Street, Toronto, Ontario M6A2E1, Canada

ARTICLE INFO

Available online 23 April 2013

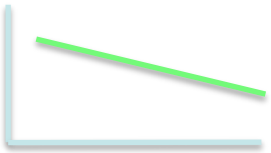
ABSTRACT

This article is part of a Special Issue "Puberty and Adolescence".

Gonodal hormones - Linked to grey matter « pruning » and increased axonal diameter

Adolescent brain development: pre-wired consequence of the neuroendocrine cascade called puberty

Grey matter maturation: *Trajectories*



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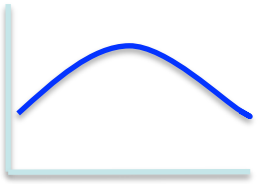

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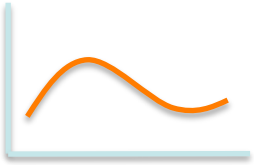
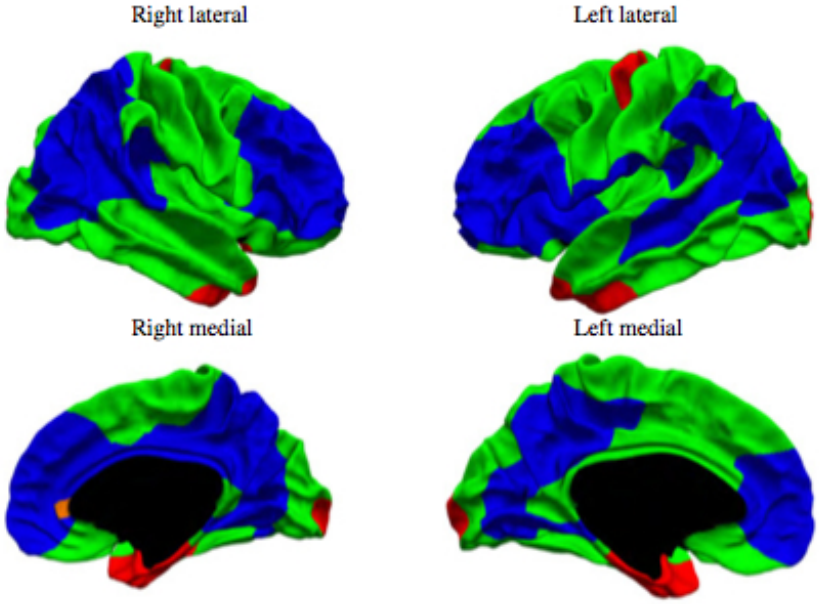


Cubic

Constant

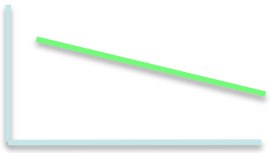
6 to 30 years old

Cortical thickness development from 6 to 30 years, based on 209 longitudinally-acquired MRI scans



Mutlu, Schneider, Debbané, Badoud, Eliez & Schaer, *Neuroimage*, 2013

Grey matter maturation: *Trajectories*



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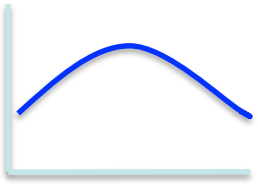

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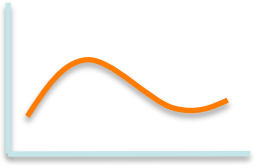

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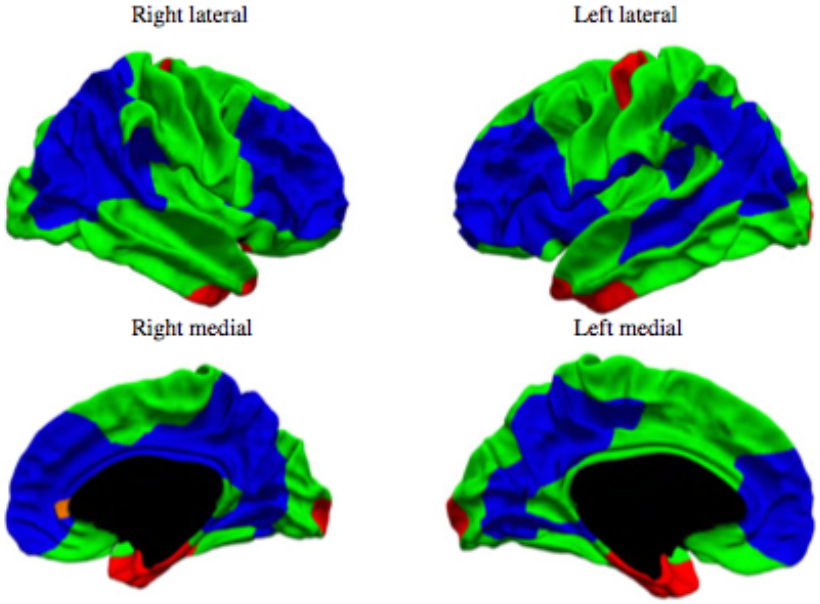
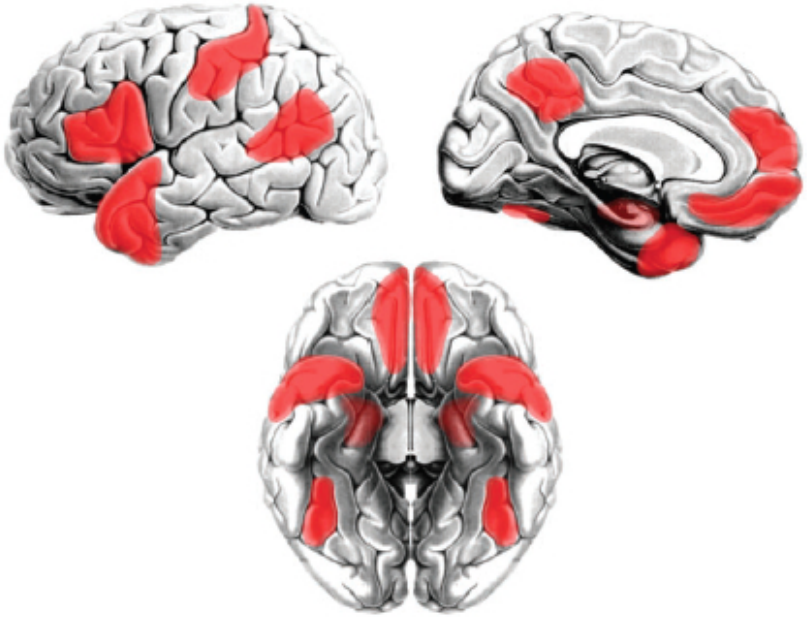


Mutlu, Schneider, Debbané, Badoud, Eliez & Schaer, *Neuroimage*, 2013

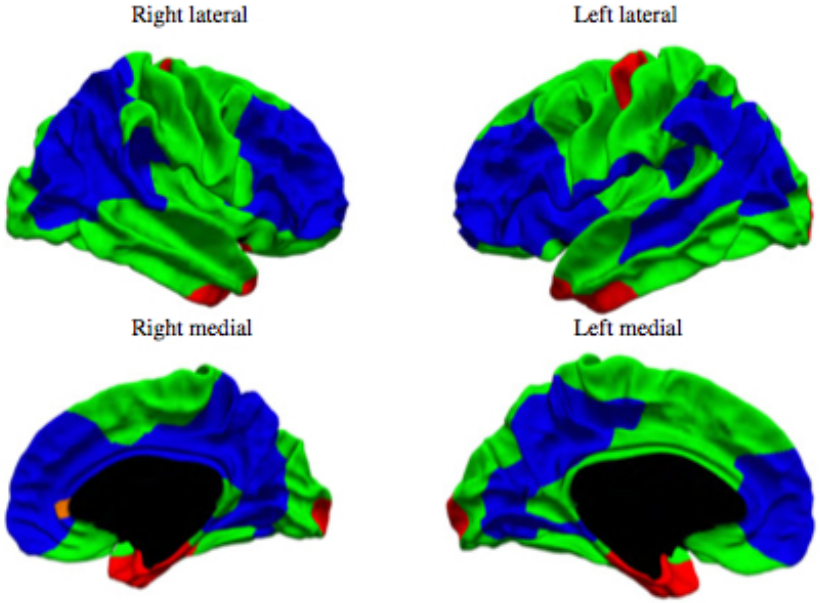
Brain maturation Trajectories

The « Social Brain »
(red areas)



Gotts, Simmons, et al., *Brain*, 2012

Cortical thickness development from 6 to 30 years, based on 209 longitudinally-acquired MRI scans



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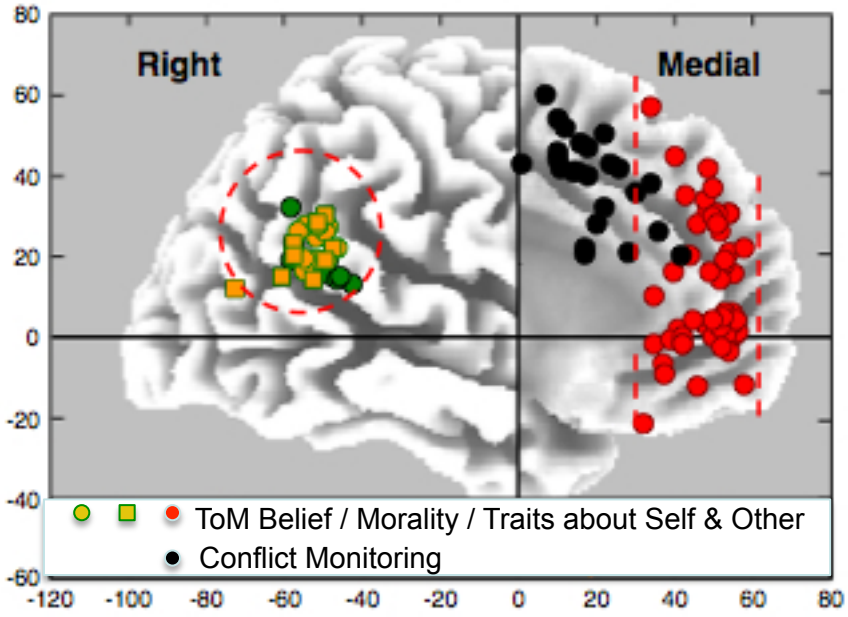
Brain maturation Trajectories



Van Overwalle, *NeuroImage*, 2011

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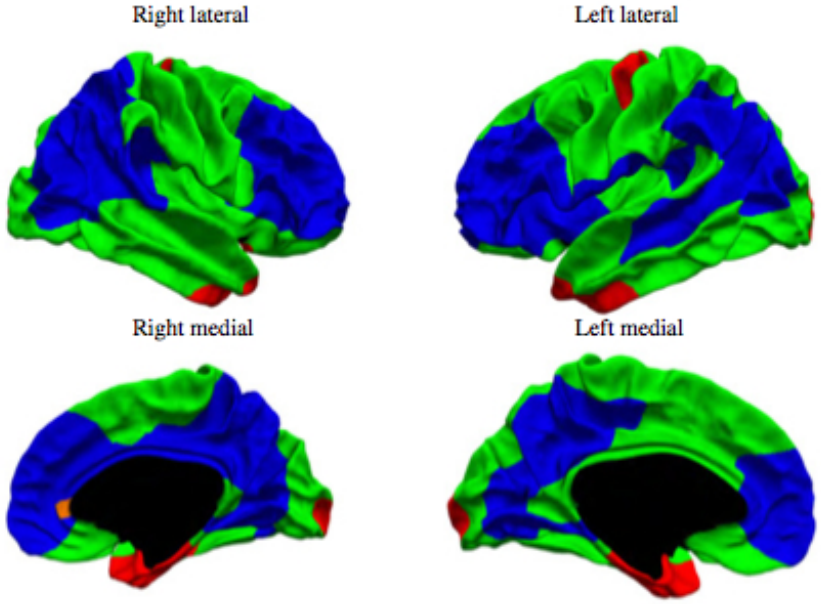
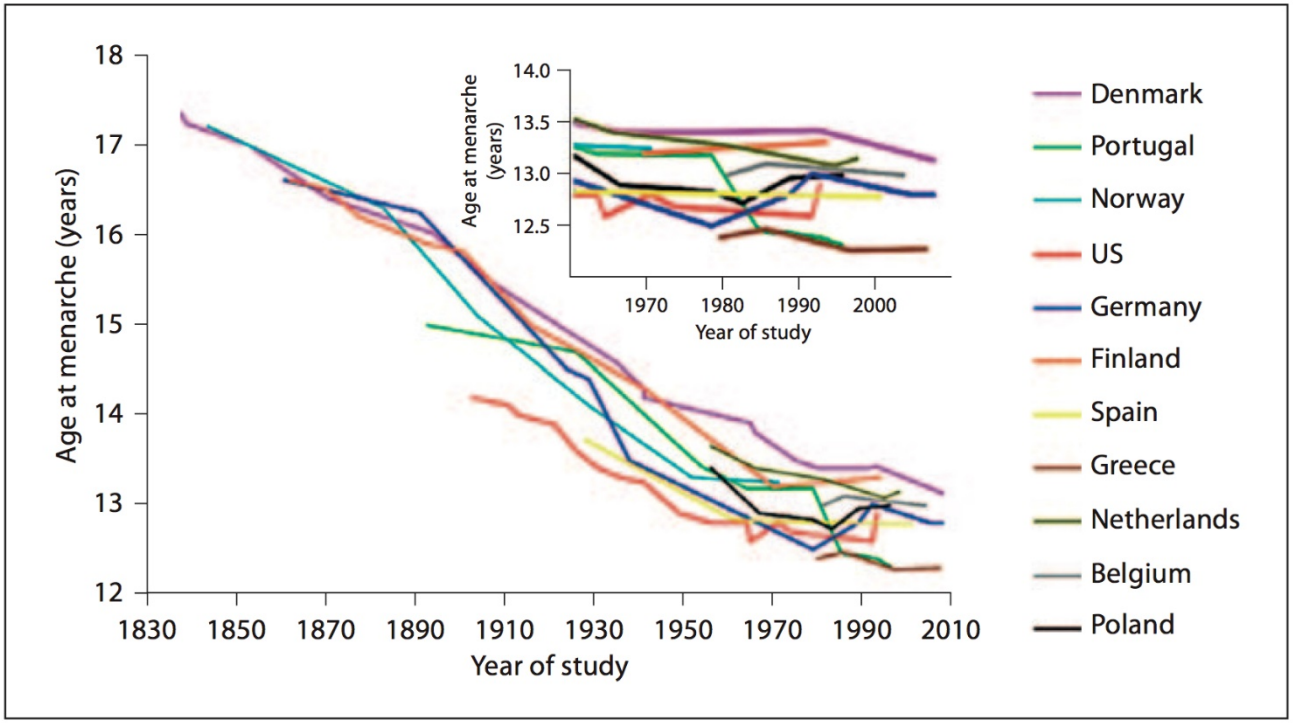


Mutlu, Schneider, Debbané, Badoud, Eliez & Schaer, *Neuroimage*, 2013

Keep in mind: secular trends and the social brain

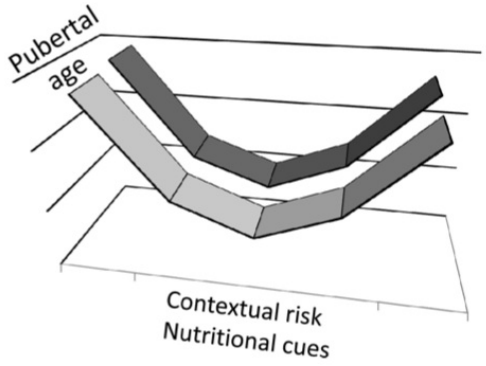
- **Maturation** is ubiquitous and inevitable… but its timing follows interesting secular trends

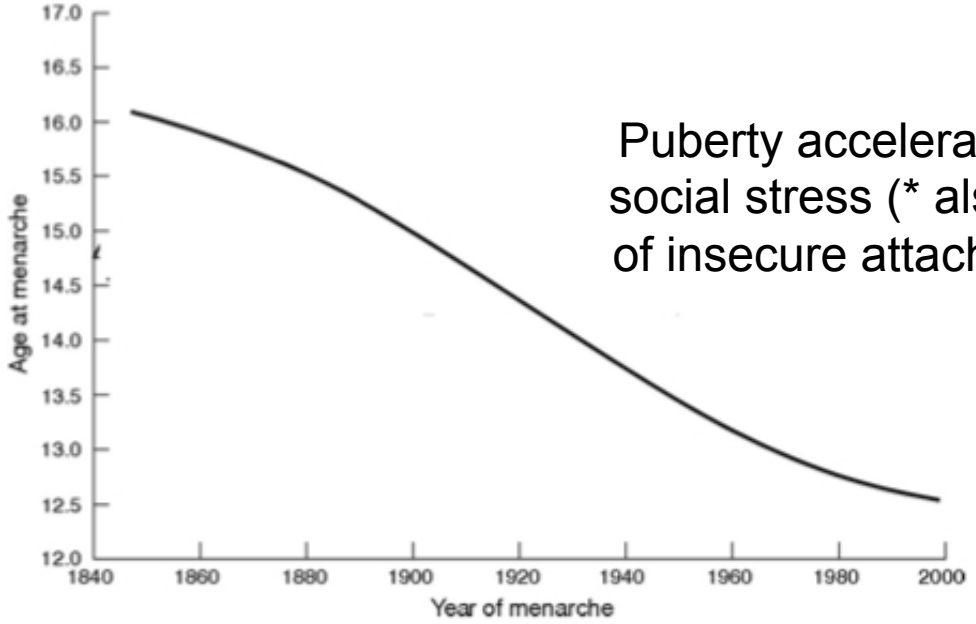


Sørensen et al., *Horm Res Paediatr*, 2012

Variations in pubertal timing

- **Maturation** is ubiquitous and inevitable… but its timing in critically influenced by the environment.





Puberty accelerated by social stress (* also true of insecure attachment)

Figure 4 The secular trend in puberty. Declining age of menarche in Western societies from 1840 to 2000. Data from [68]. The line does not show a saturation point; the trend is expected to continue.

Hochberg & Belsky, *BMC Medicine*, 2013

Does adolescent attachment play a role in the activation of the social brain?

Self and (close) others overlap in the brain

Self mental state

Other mental state

Overlapping for Self and Other

Neuroscience and Biobehavioral Reviews 36 (2012) 1043–1059

Contents lists available at SciVerse ScienceDirect

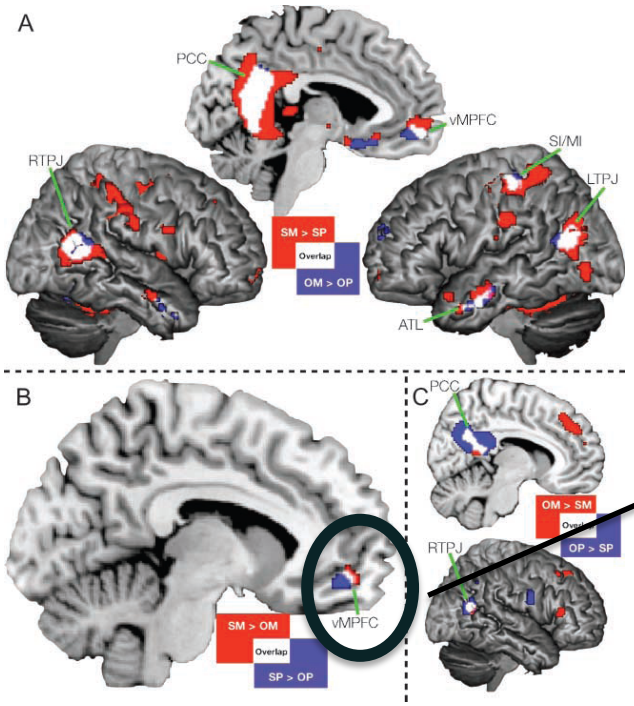
Neuroscience and Biobehavioral Reviews

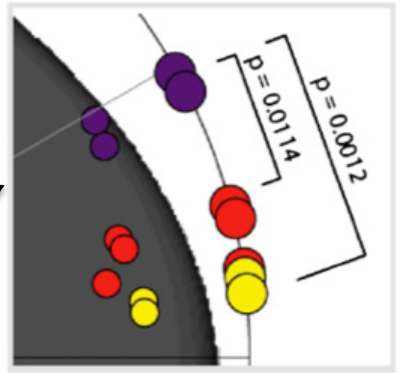
journal homepage: www.elsevier.com/locate/neubiorev

Review

Degrees of separation: A quantitative neuroimaging meta-analysis investigating self-specificity and shared neural activation between self- and other-reflection

Ryan J. Murray[a,*], Marie Schaer[b], Martin Debbané[a,b,*]





- Self Vs Control
- Close Other Vs Control
- Public Other Vs Control

Brain and Behavior

Open Access

Social feedback processing from early to late adolescence: influence of sex, age, and attachment style

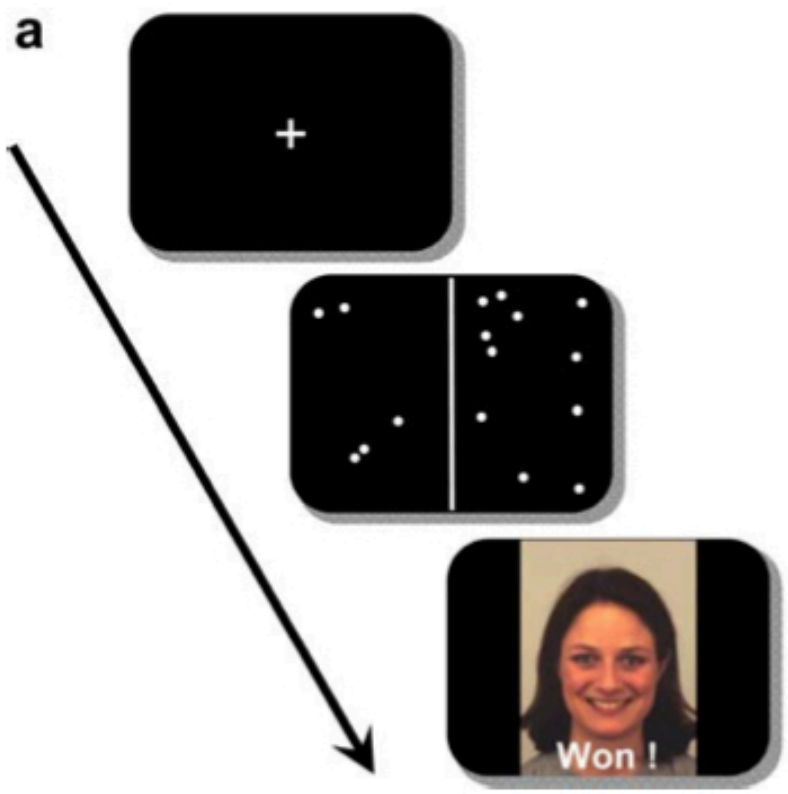
Pascal Vrtička[1,2,3,4], David Sander[3,4], Brittany Anderson[3], Deborah Badoud[5,6], Stephan Eliez[6,7] & Martin Debbané[5,6,8]

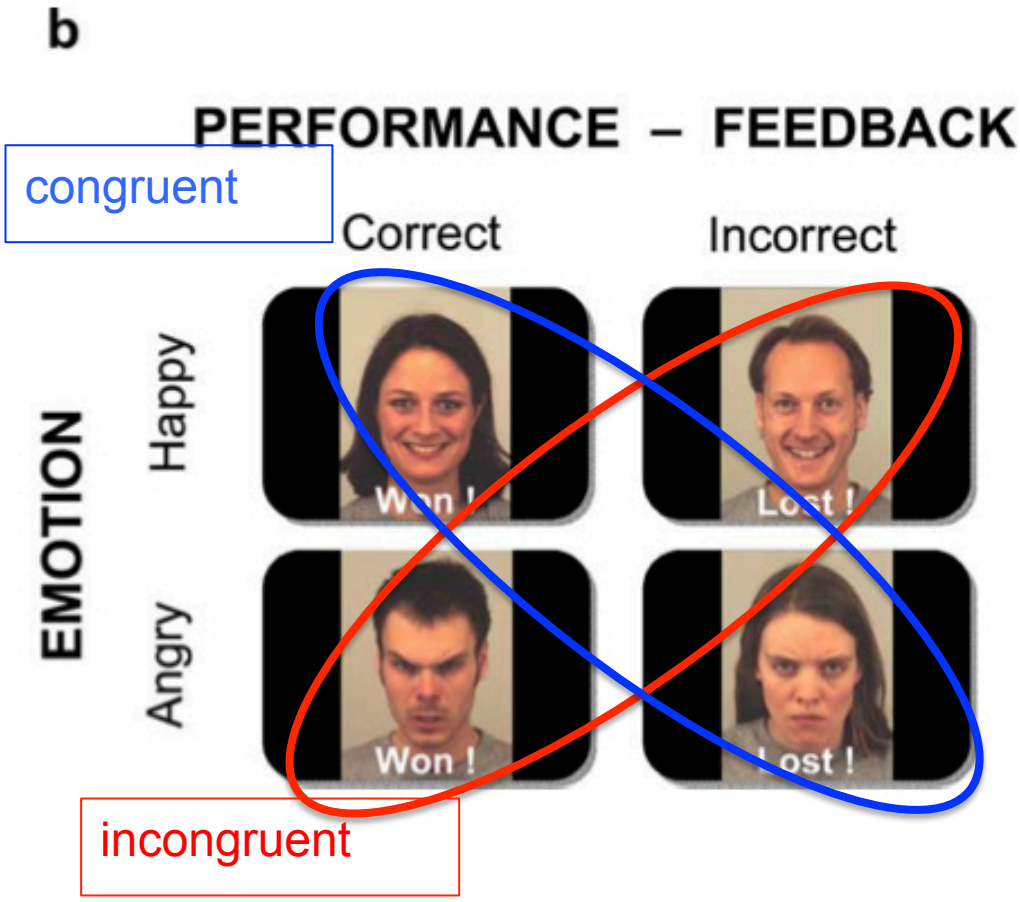
33 healthy adolescents (12–19 years old, 14 females)

Vrticka, Sander, Badoud, Eliez, Debbané, Brain & Behavior, 2014

Learning from experience

Social Feedback Processing



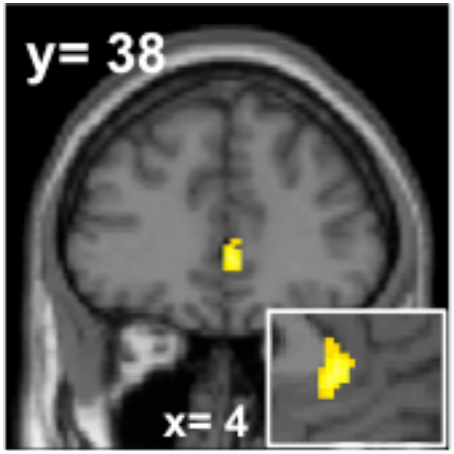


Vrticka, Sander, Badoud, Eliez, Debbané, Brain & Behavior, 2014

Learning from experience

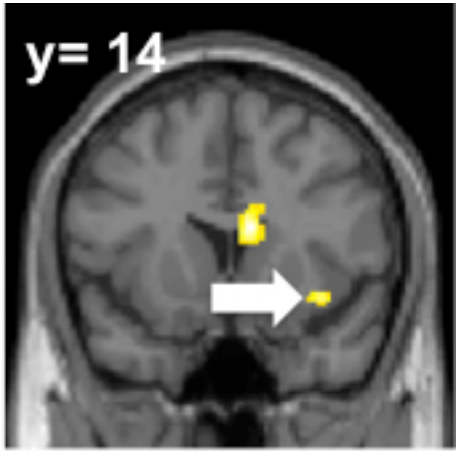
Social Feedback Processing

AGE effects on Congruence vs Incongruencce



vACC

Emotion regulation
Conflict Monitoring
Self Monitoring



Anterior Insula

Visceral
embodied
response

Vrticka, Sander, Badoud, Eliez, Debbané, Brain & Behavior, 2014

The Neural Coding of Feedback Learning across Child and Adolescent Development

Sabine Peters[1,2], Barbara R. Braams[1,2], Maartje E. J. Raijmakers[3], P. Cédric M. P. Koolschijn[1,2,3*], and Eveline A. Crone[1,2,3*]

268 participants aged 8 to 25 years

« *Sensitivity to negative feedback increases with development.* »

Peters et al., *Journal of Cognitive Neuroscience*, in press

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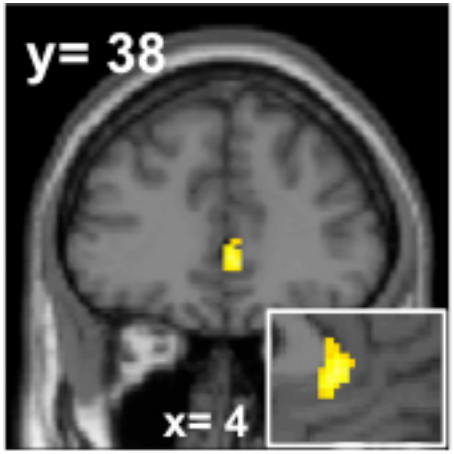
Learning from experience

Social Feedback Processing

AVOIDANCE inverse of AGE effects



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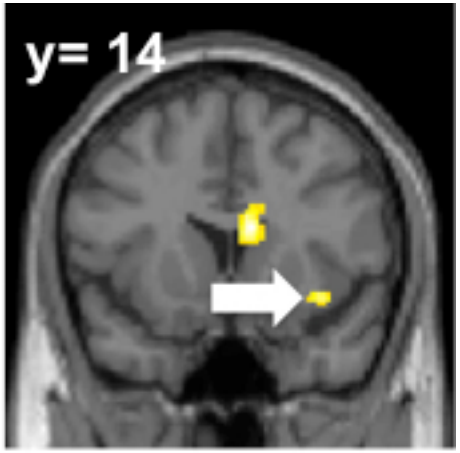

Anterior Insula

Emotion regulation
Conflict Monitoring
Self Monitoring

Visceral
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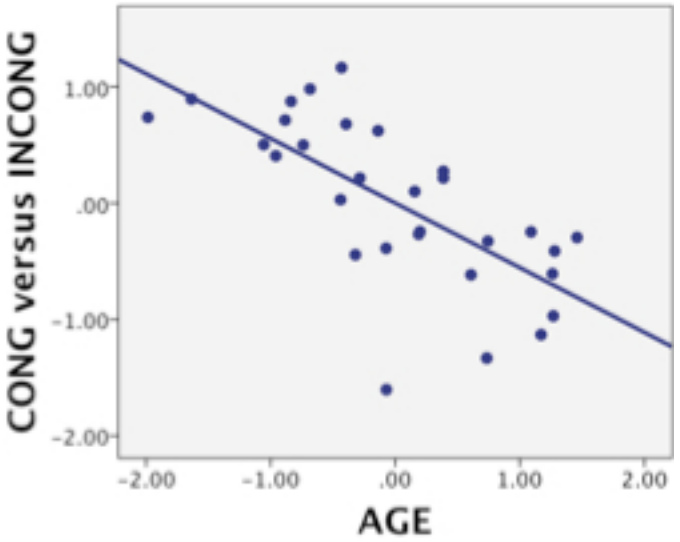

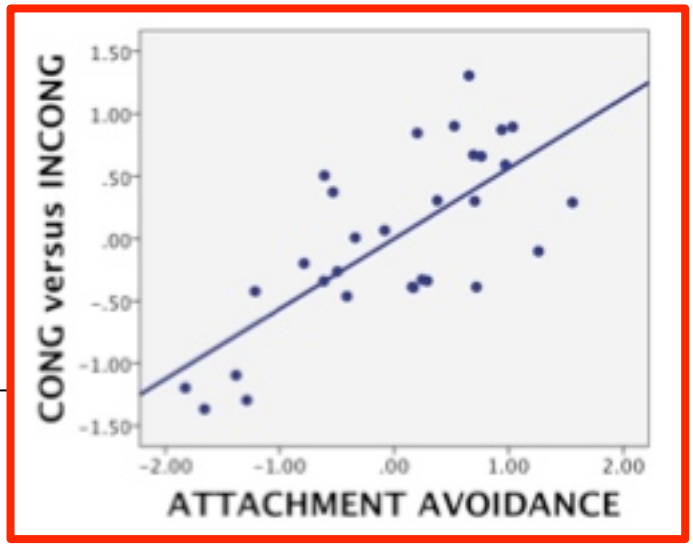

Vrticka, Sander, Badoud, Eliez, Debbané, Brain & Behavior, 2014

Further social cognitive processes contributing to (an arrest in) learning from experience

Emotion recognition and perspective taking in incarcerated male adolescent offenders

(see Poster RM-052 by Larisa Morosan on Monday 22nd)

• Previous studies **demonstrate socio-cognitive impairments** in incarcerated adolescents and adults.

• Firstly, these populations have impairments in the **recognition** of facial expression of **sadness and fear** (Blair & Coles, 2000; Dolan & Fullam, 2006; Jusyte et al., 2015).

• Secondly, some studies also demonstrate **deficits in perspective taking mechanisms** (Dolan & Fullam, 2004; Möller et al., 2014).

• However, emotion recognition was mainly studied using **static stimuli** and a limited range of emotions. In addition, emotion recognition was never studied **simultaneously** with perspective taking abilities in these populations

Sample

- 22 male incarcerated adolescents from a youth educational detention center in Geneva (M age= 16.46, SD=1.02)
- 25 male control community adolescents (Mage=16.62,SD=1.56)

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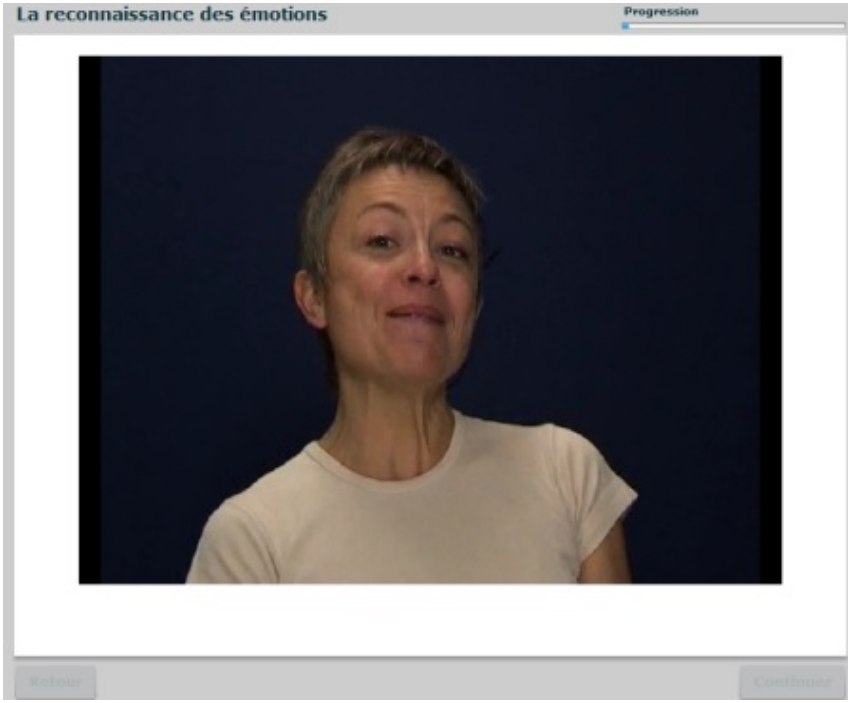
Emotion recognition and perspective taking in incarcerated male adolescent offenders

(see Poster RM-052 by Larisa Morosan on Monday 22nd)

Geneva Emotion Recognition Task (Schlegel, Grandejean, & Scherer, 2012)



Audio-video clip duration: 2-4 sec.,
(verbal content: 2 pseudo-linguistic sentences)

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Emotion recognition and perspective taking in incarcerated male adolescent offenders

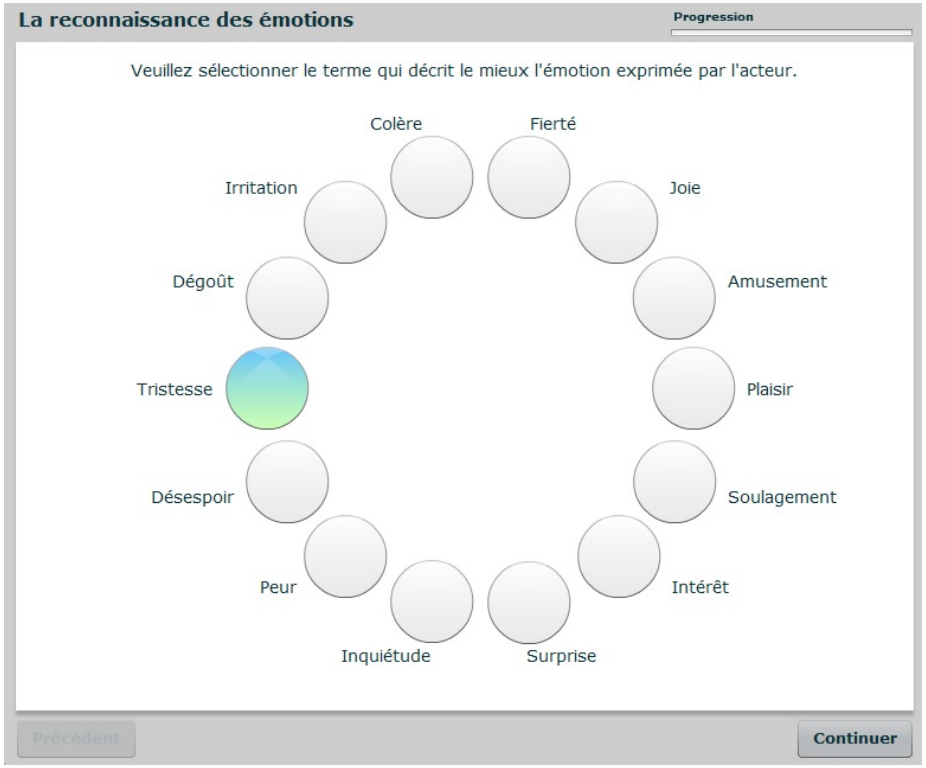
(see Poster RM-052 by Larisa Morosan on Monday 22nd)

Stimuli:

83 videos of actors: multimodal expression of 14 emotions (verbal content: 2 pseudo-linguistic sentences)

14 emotions:

- 6 positive: pride, joy, amusement, pleasure, relief, interest
- 7 negative: anger, panic, fear, despair, disgust, anxiety, irritation, sadness
- surprise



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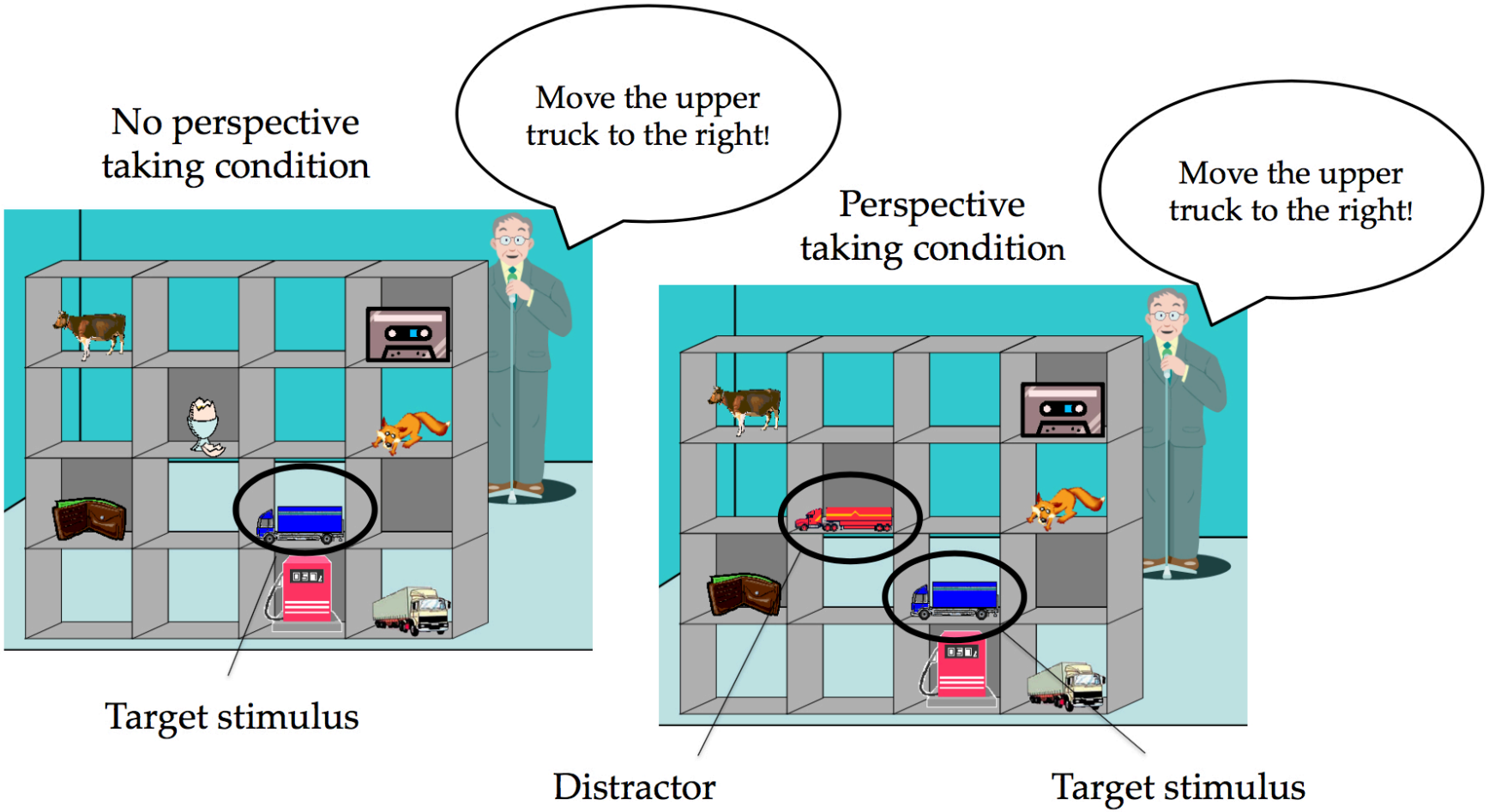

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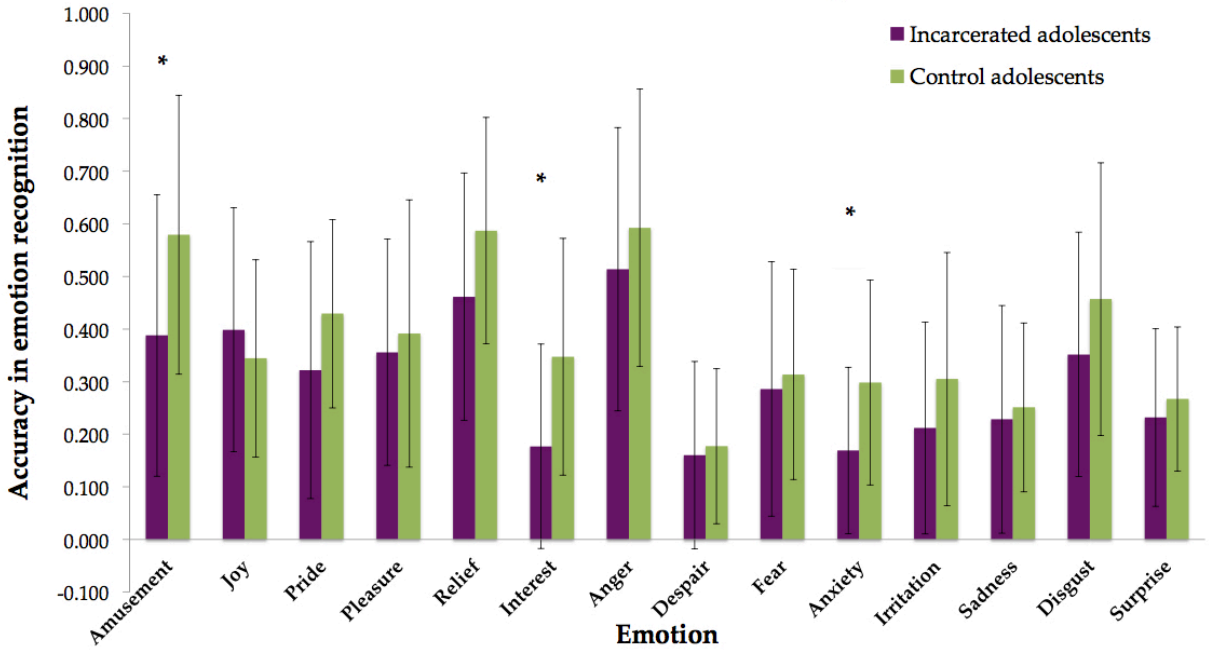
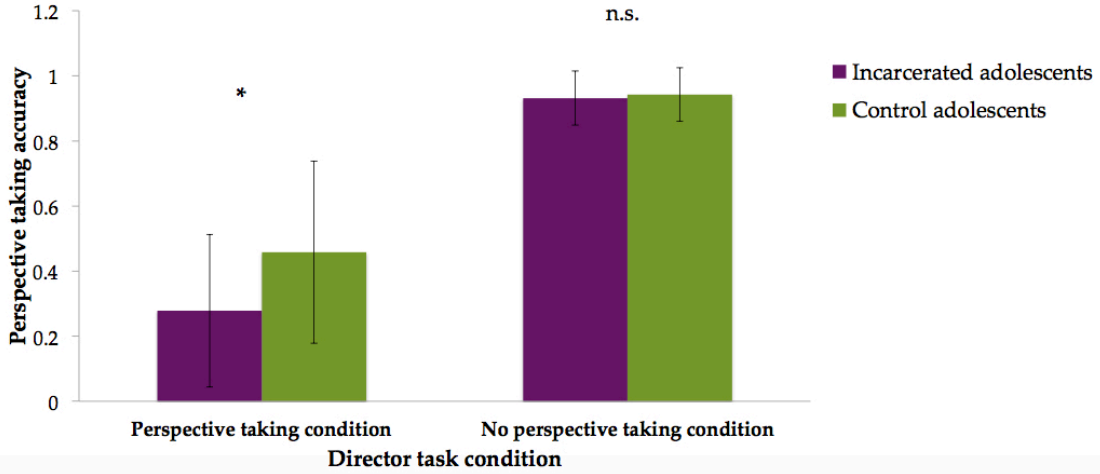
MANOVA for the emotion recognition task



Main effect of group: F(14, 32)= 2.32, p=.024;
The significance differences are: **amusement** p=.018, **interest** p=.008 and **anxiety** p=.017.

D. Badoud, Ph.D.

Mann-Whitney for the perspective taking task



Significance level for the group differences for **the perspective taking condition**: p=.024

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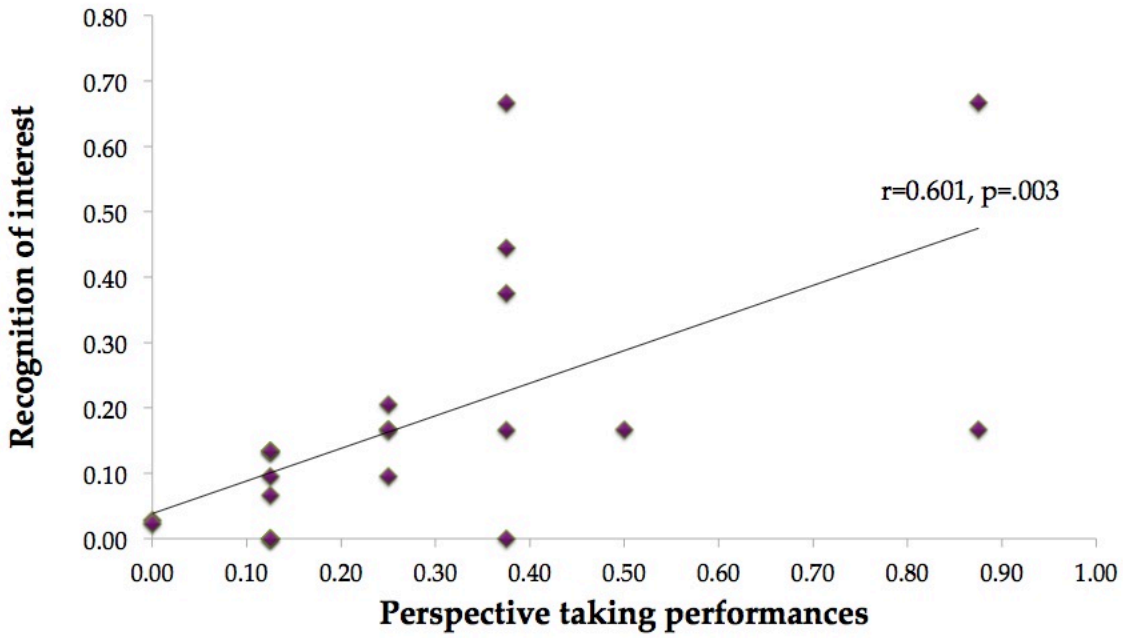
Emotion recognition and perspective taking in incarcerated male adolescent offenders

(see Poster RM-052 by Larisa Morosan on Monday 22nd)

Correlation between the recognition of interest and the perspective taking performances in the incarcerated adolescent offenders group



What is specific about *HOW* they learn?
Recapitulation

1- Importance of **feedback processing** (from positive/congruent to negative/incongruent with maturation)

2- Effects of attachment avoidance (maladaptively regulating arousal of negative affect triggered in social interaction) in **closing opportunities for learning**

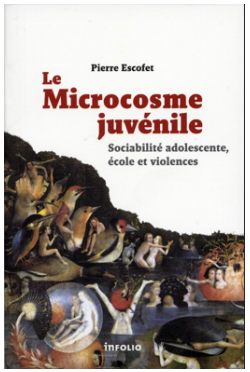
3- Interaction between social cognitive mechanisms (emotion recog. & perspective taking) **close mind to interest** in other minds

From *WHOM / WHAT* do they learn?

minding two socio-historical trends

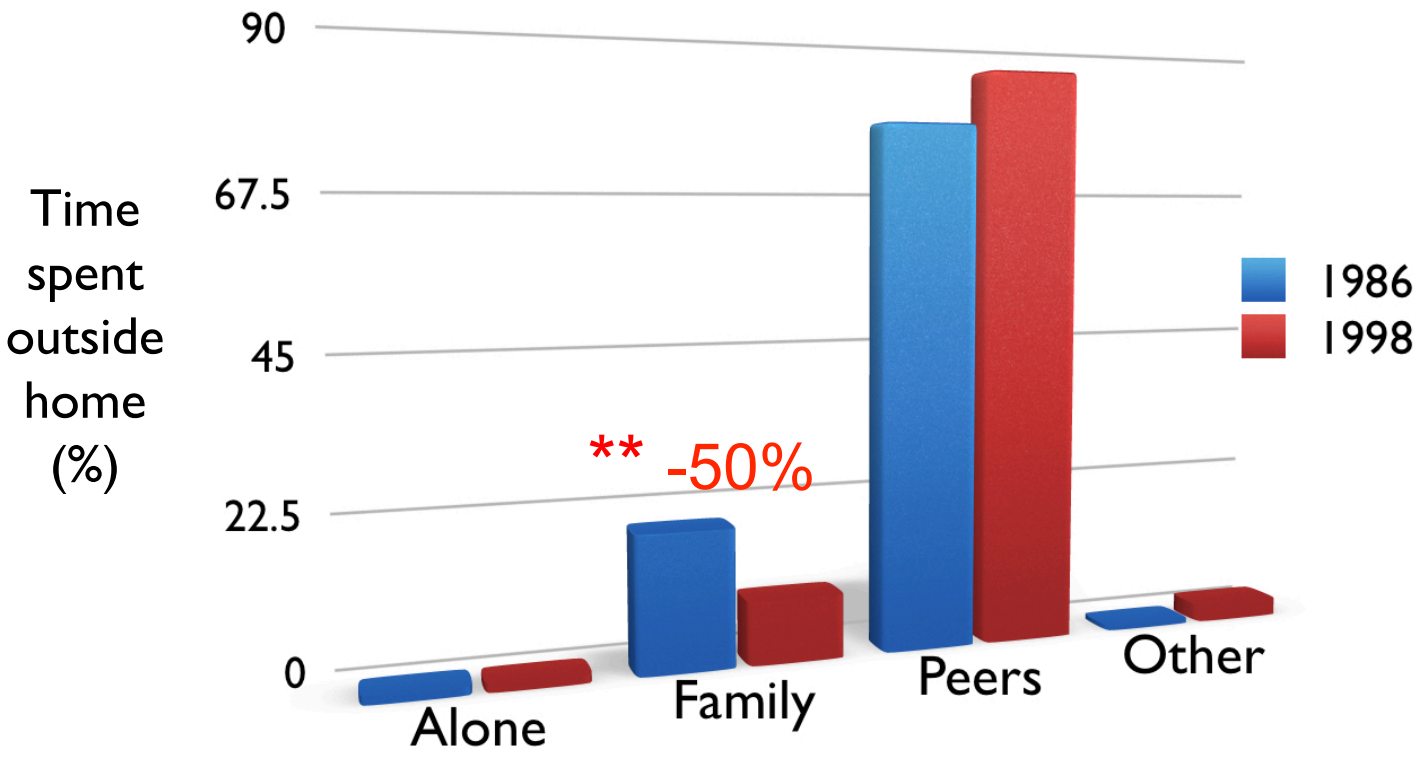
Mind Two
Socio-historical trends

Pierre Escofet, sociologist



Debbané & Escofet, Integrative approach to adolescent mental health, *submitted*

Social family time: extinction

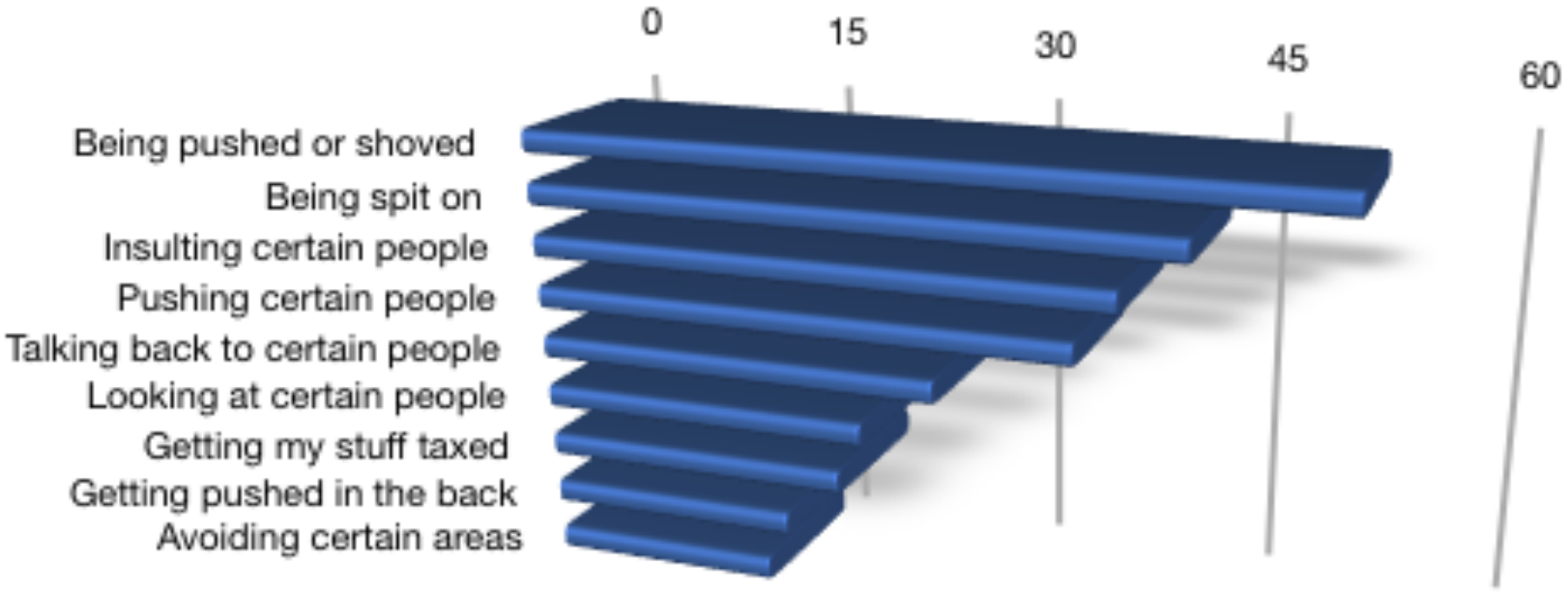


Source: INSEE; Enquête emploi du temps, in Gallant & Roudet, 2005

Growing social insecurity?

Insecurity in school settings

What kinds of things do you actively **watch out for** when you are on the premisses of your school (n=1’065; Escofet, 2009)



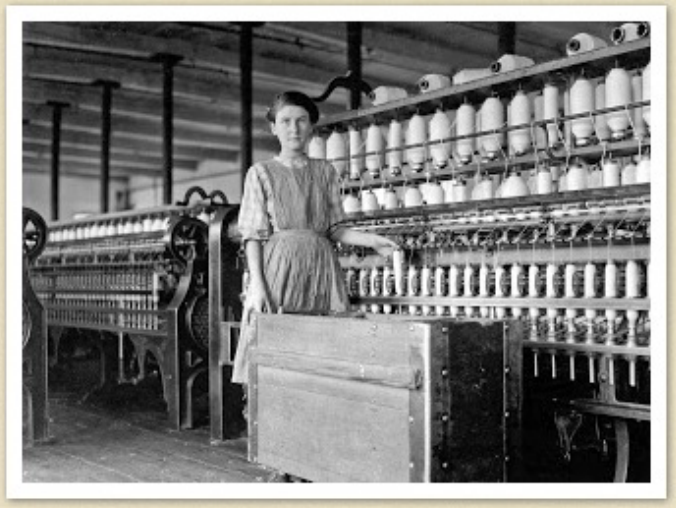
Insecurity in school settings

How many times have you seen a professor break down and cry in class (n=1’065; Escofet, 2009)

	Number of students	% of group
Yes, once	229	21.8
Yes, 2-3x	72	6.8
Yes, 4x or more	37	3.5
Never	714	67.9
No answer	13	1.2

The evolution of socialization during the 20th C. & 21st C.

1911 2015



THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY

ACAMH THE ASSOCIATION FOR CHILD AND ADOLESCENT MENTAL HEALTH

Journal of Child Psychology and Psychiatry 56:3 (2015), pp 370–393 doi:10.1111/jcpp.12372

Annual Research Review: Secular trends in child and adolescent mental health

Stephan Collishaw

Institute of Psychological Medicine and Clinical Neurosciences, MRC Centre for Neuropsychiatric Genetics and Genomics, Cardiff University, Cardiff, UK

Background: Child and adolescent mental health problems are common, associated with wide-ranging functional impairments, and show substantial continuities into adult life. It is therefore important to understand the extent to which the prevalence of mental health problems has changed over time, and to identify reasons behind any trends in mental health. **Scope and Methodology:** This review evaluates evidence on whether the population prevalence of child and adolescent mental health problems has changed. The primary focus of the review is on epidemiological cross-cohort comparisons identified by a systematic search of the literature (using the Web of Knowledge database). **Findings:** Clinical diagnosis and treatment of child and adolescent psychiatric disorders increased over recent decades. Epidemiological comparisons of unselected population cohorts using equivalent assessments of mental health have found little evidence of an increased rate of ADHD, but cross-cohort comparisons of rates of ASD are lacking at this time. Findings do suggest substantial secular change in emotional problems and antisocial behaviour in high-income countries, including periods of increase and decrease in symptom prevalence. Evidence from low- and middle-income countries is very limited. Possible explanations for trends in child and adolescent mental health are discussed. The review also addresses how cross-cohort comparisons can provide valuable complementary information on the aetiology of mental illness. **Keywords:** Time trends, secular change, depression, antisocial, psychopathology.

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Mass Education Systems

After 2nd world war, several laws across Europe aim to provide education to the majority of youths:

In France:

- Increased **length** of obligatory schooling (*1959,loi Berthoin, 1959; loi Haby*, *1975)*
- Rise in proportion of **graduates**; from 38% (born before '44) to 67% (born between '45 – '73) (P. Merle, 2012)
- Rise in eligibility for higher education (French Baccalauréat) -> 1986: 250 000… 2002: 500 000 (source Ministère de l'Education Nationale, DEP)

Mass Education Systems

Effects of massification:

- Better access to education for all
- Increased social diversity: tolerance
- Increased density in schools (students / class)
- Densification of youth groups; more time spent with peers.
- **Peers** as powerful socialization group

20th C. model of Socialization Forces

Community

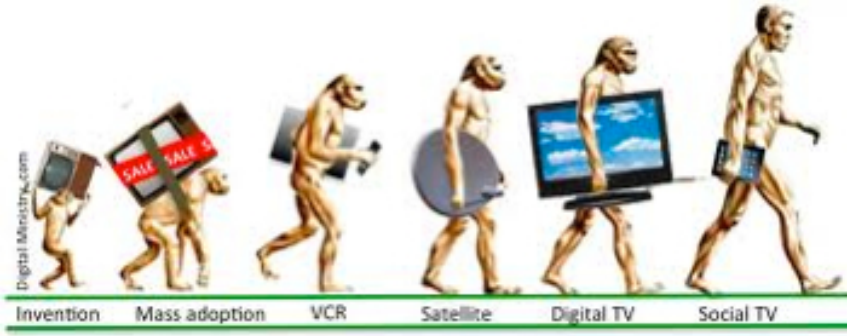
School Authority

Parental Authority

Peer Group Authority
(Mass Education)

Adolescent learning from the Social world

Where are WE going?



Media & Merchandising

Screen Culture: from the Humanist to the individualist

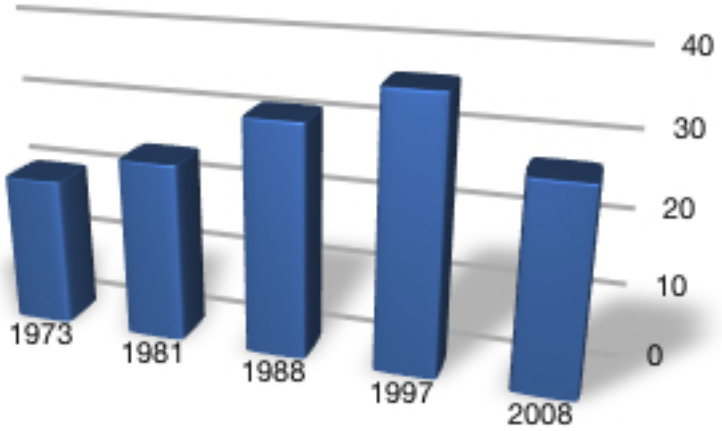
- Early stages of Television (Missika, 2006)
  - State run
  - Affordable to greater proportion of population
  - Circulate information and “legitimate culture” such as scholarly / scientific knowledge
  - Goals: inform and educate population

- Means of communications **capitalized** by merchant sphere:
  - *scholar/scientific knowledge as source of legitimate culture ridiculed*

Screen culture and inequalities

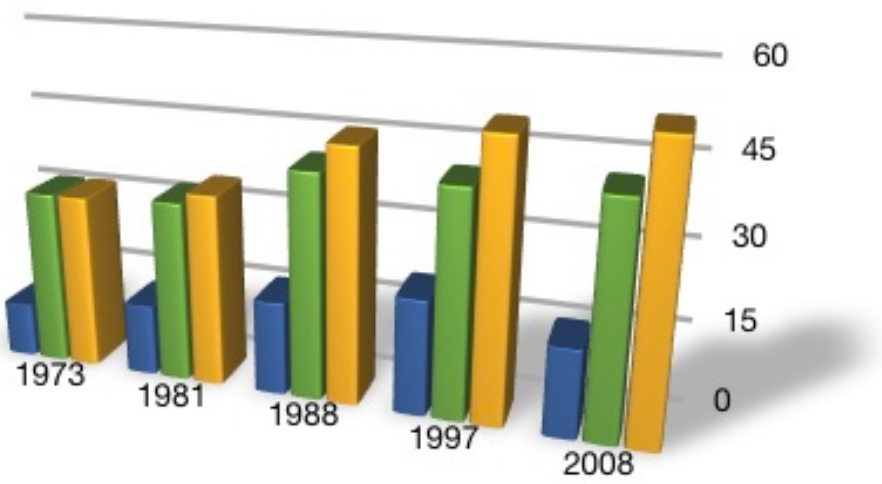
Desmurget, 2011

TV >20 hour per week



% of
15-24 y.o.

% of
adults

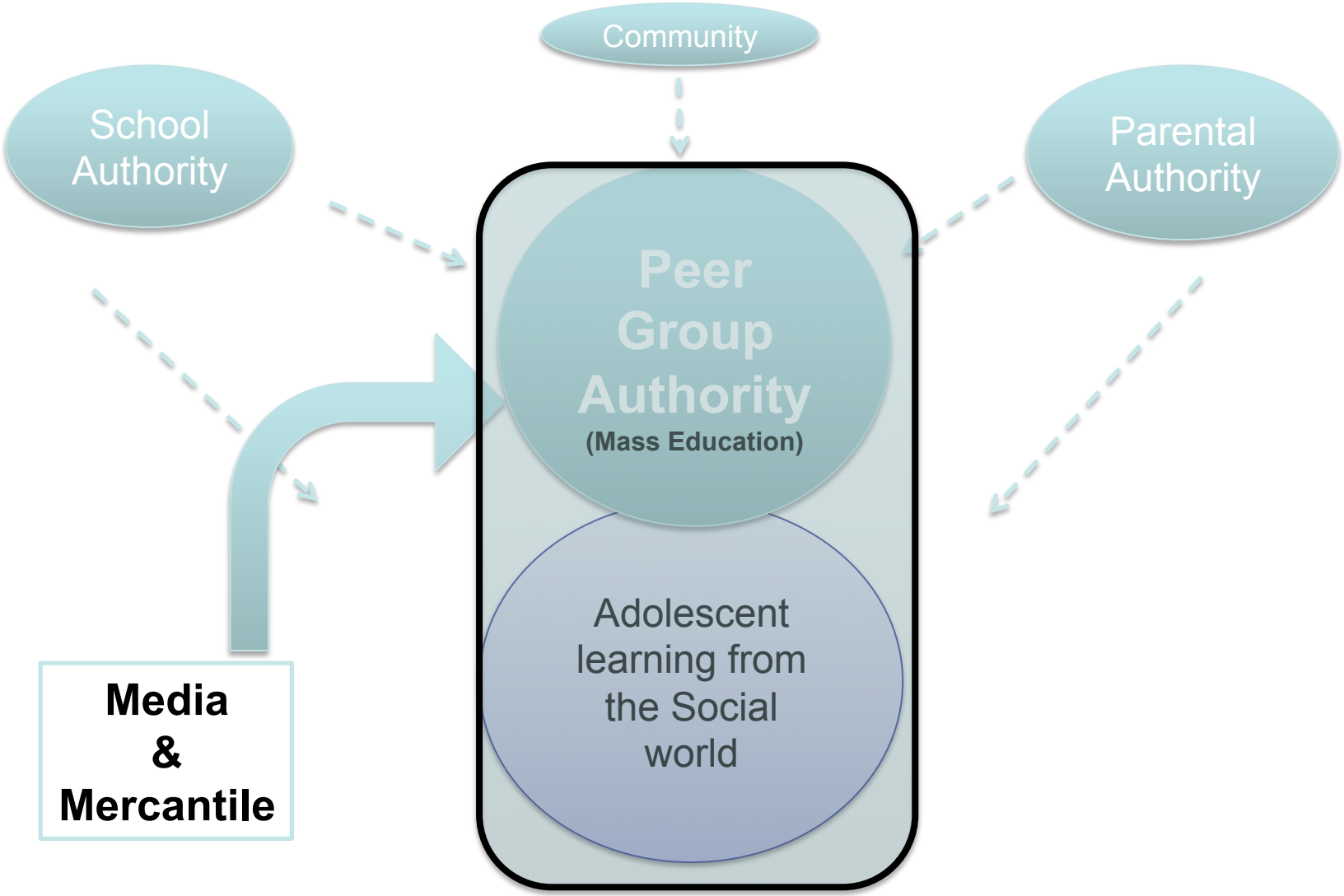


Management liberal prof.
Working class unqualified
Working class qualified

Media turning on its head

- Reinforcement through secondary socialization processes : Stylized verbal and body expressions, increased tolerance to violence (passive bystanding)
- Children and adolescents as targeted **market segments** (privatisation, individualization) (Missika, 2006).
  - Strengthens « horizontal » culture, promotes « street culture » values of virility, and conflict (survival) as core values.
  - Leads to potential creation of « adolescent microcosm », where youths' experiential world is split from and impervious to adult influence (Escofet, 2011).

21st C. model of Socialization Forces



Some implications for Mentalizing

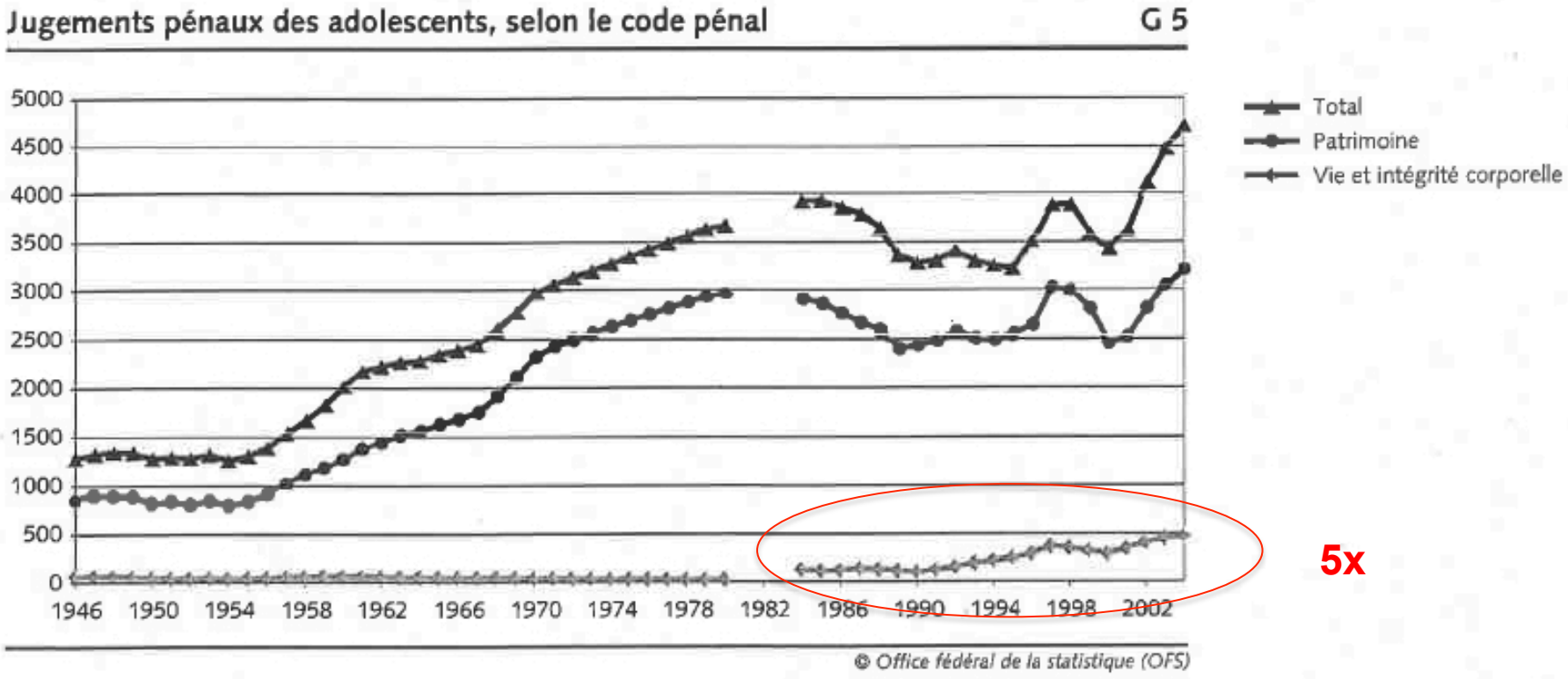
Reduction of family time in the social context deprives adolescents from an important **alternative experience** of the social world.

Insecurity in schools may enhance **arousal**, as well as **avoidance**.

Values provided by media/mecantile sphere are highly arousing, poorly filtered, and sell (successfully) **primitive representations** upon which adolescents will adapt verbal and bodily practices, and increased **tolerance to violence** (passive bystanding – Twemlow et al.).

Violent behaviour as an indicator of how youth are coping

Criminal charges against adolescents



5x

To conclude

Attachment @ the Brain/Env. Interface

From an mentalization-based attachment perspective we may postulate three types of attachment relationship in which adolescents will engage in:

1) Attachment base on intense love (as children with caretaker; as adults with romantic partner)

2) Attachment based on threat/fear

3) Secure and predictable attachment patterns

Fonagy et al., *Why we are interested in attachment*, 2014

Attachment @ the Brain/Env. Interface

The consequence of a dominating attachment style on cognition:

Reward activation through mesolimbic dopamine and oxytocin/vasopressin system, the love-system can **inhibit** the neural activations underpinning negative affect.

Threat-related activation of the attachment system (perceived threat, loss or harm) evokes **intense arousal** and overwhelming negative affect, prompting the brain to **switch to automatic modes of functioning** (fight-flight system) and **inhibiting** frontal-mediated **social cognition**.

Predictable and secure patterns of attachment contribute to **anticipating and defusing the negative impact** of threat and moderating the need for attachment activation.

Fonagy et al., *Why we are interested in attachment*, 2014

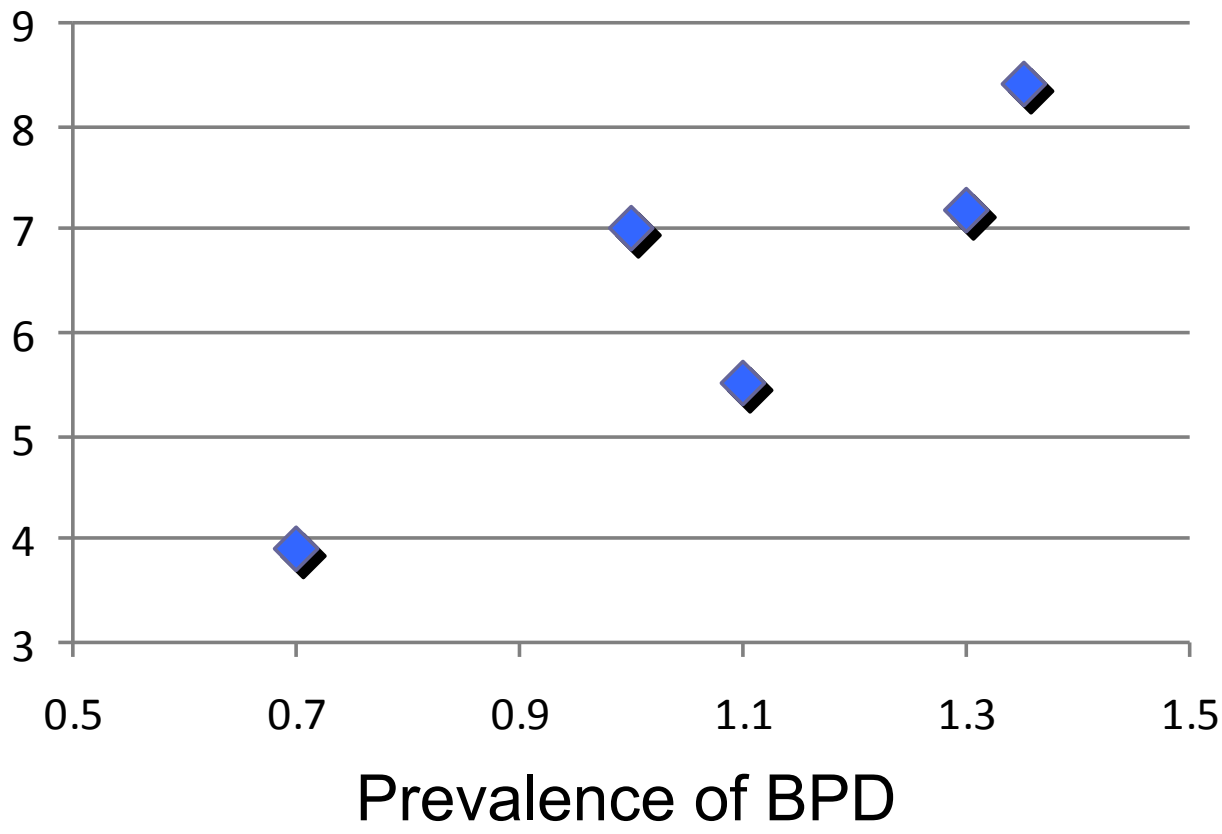
Conclusion 1
(concerning patients)

Need to seriously address peer-to-peer abuse

(including balancing media-related arousal/abuse)

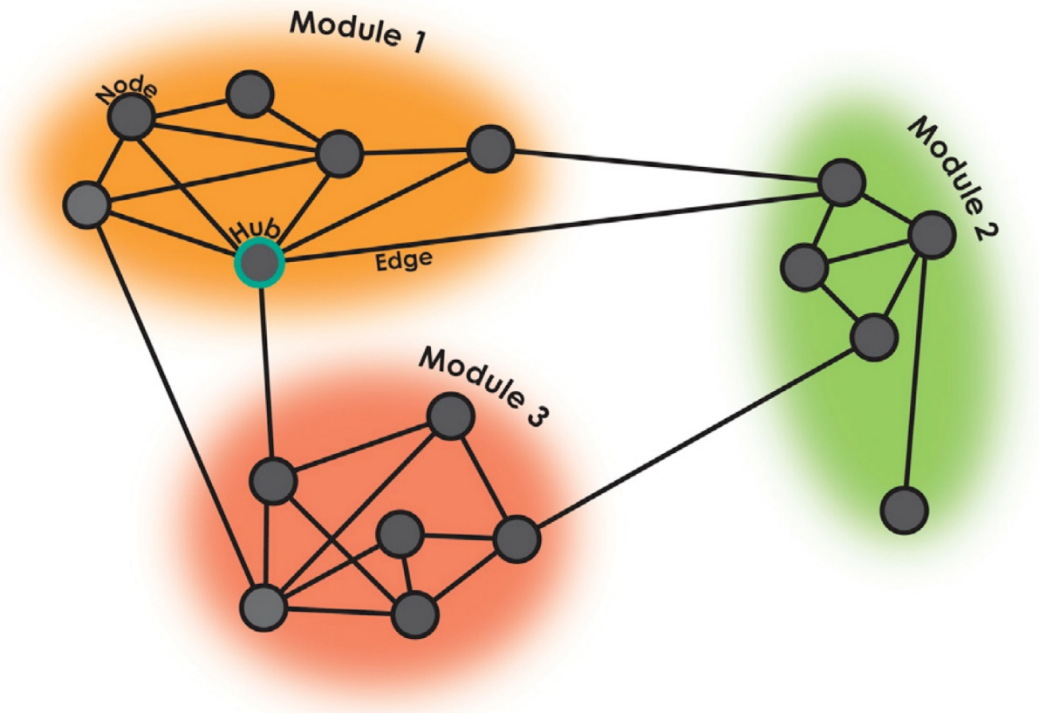
Attachment @ the Brain/Env. Interface

R/P 20% vs. BPD Prevalence



As the disparity between rich and poor increase in European countries, and as resources for mental health become scarce, we must be aware that overwhelming adversity will affect both patients, families and clinicial praticioners.

Using with the analogy of brain development:



Clinical expertise

Research Expertise

Mental Health Implementation

Di Martino et al, *Neuron*, 2014
Baker et al, *J. Neurosci.*, 2015

Conclusion 2 (concern us)

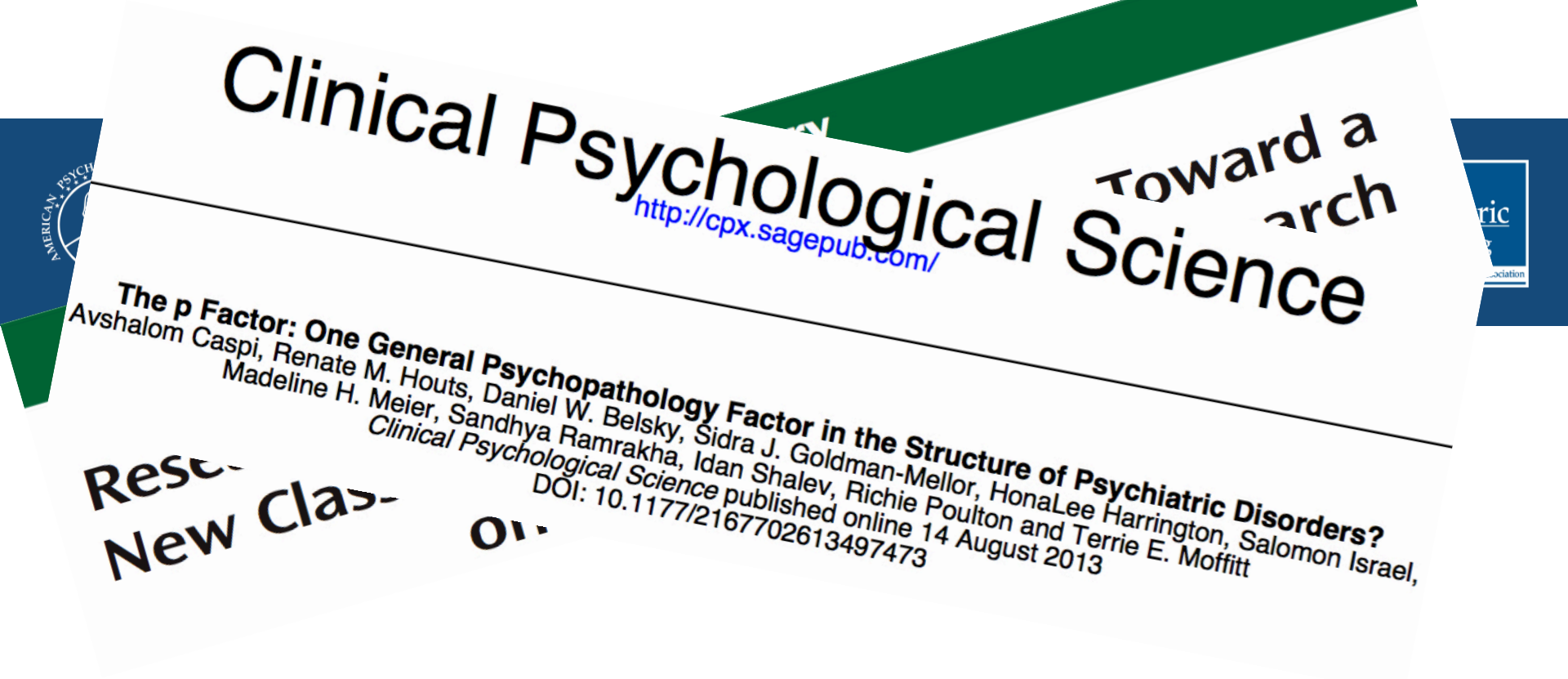
The 3 Sciences of therapeutic success (mechanism, intervention dvlp, implementation): The adolescent developing brain and effects of attachment

- Point to the limits of being "a good clinician"
- Point to the value of being in "an integrated system"
- Leads the way ahead for increased articulation for LINKING EXPERTISE (S)
- Suggests that COLLABORATION will be a highy adaptive trait for our field

Thank you for your attention

For slides: martin.debbane@unige.ch

for more information:
mentalisation.unige.ch



Why are we motivated to redefine what psychopathology really is?

Reframing Psychopathology

Psychosis
Borderline Personality Disorder
Substance Abuse
and many more...

Although treatment can achieve symptomatic remission, **functional / psychosocial outcome** is most often **UNSATISFACTORY**

"Psychopathology as an arrest in learning from experience"

P. Fonagy et al.

OPINION

Why do many psychiatric disorders emerge during adolescence?

Tomáš Paus, Matcheri Keshavan and Jay N. Giedd