

Developmental Origins of Violence In Humans

Richard E. Tremblay

Main research questions

1. When do humans start to aggress?
2. What are the different developmental trajectories of aggression?
3. What are the mechanisms that lead to these different developmental trajectories?
4. How can we prevent chronic physical aggression?

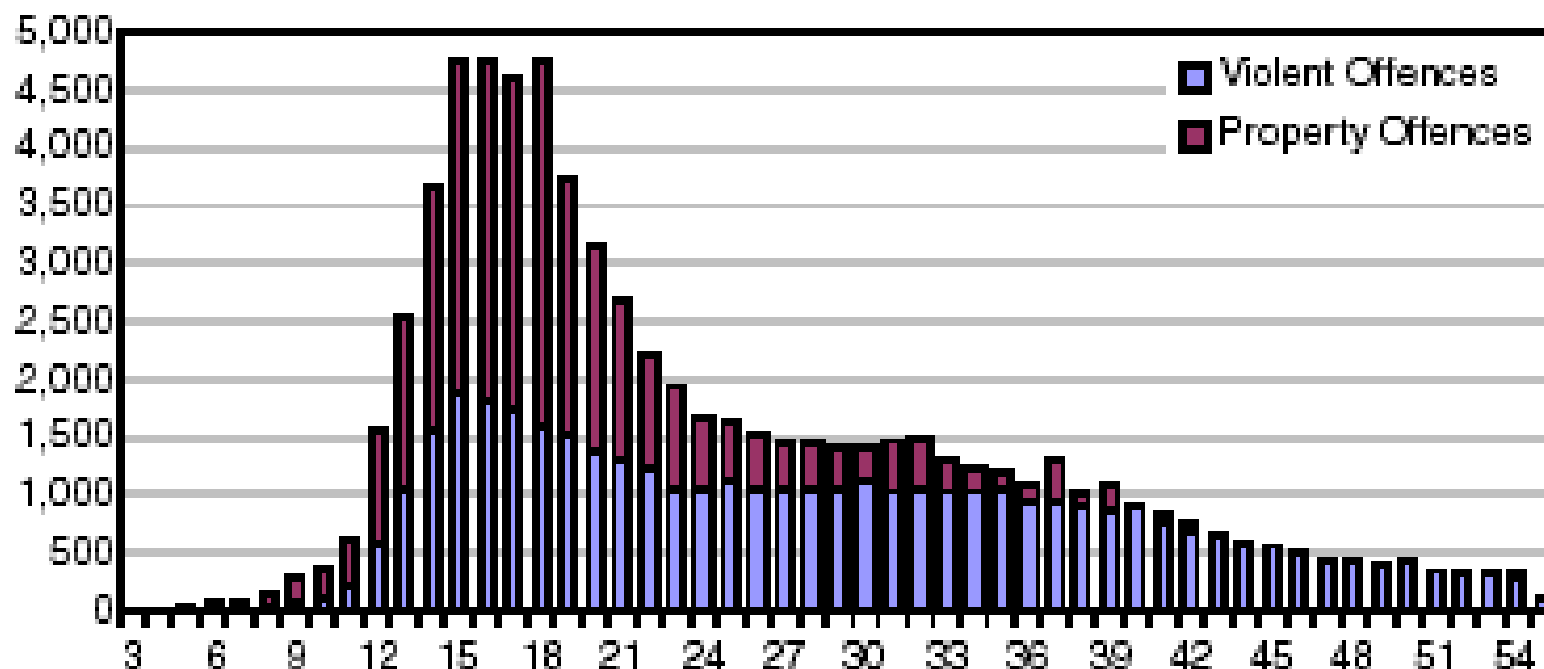
AGE and Violent Offences in Canada

(Age-Crime Curve)

Figure 6

Younger youths less frequently accused of crime than older youths¹, 1999

Rate per 100,000 population



USA National Academy of Sciences

Panel on the Understanding and Control of Violent Behavior (1993)

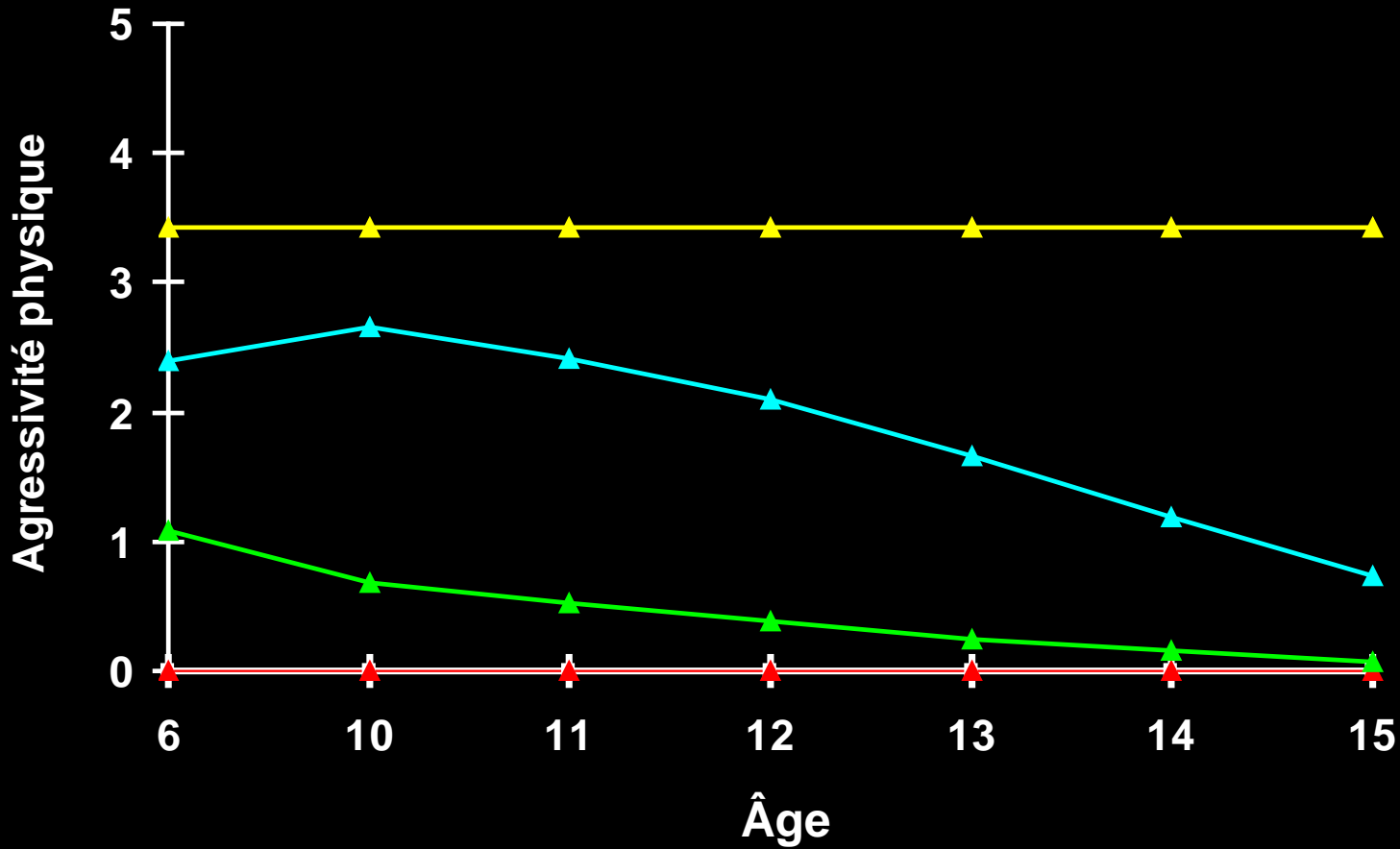
"Modern Psychological perspectives emphasize that aggressive and violent behaviors are learned responses to frustration, that they can also be learned as instruments for achieving goals, and that the learning occurs by observing models of such behavior. Such models may be observed in the family, among peers, elsewhere in the neighborhood, through the mass media ...".

The Montreal Longitudinal-Experimental Study

- Subjects** : 1,037 boys from low SES neighborhoods
- Assessment Ages** : 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 24, 26, 30,35
- Sources** : Teachers, peers, parents, self, official files.
Direct Observation in home, at school, in laboratory
- Experiment** : Parent and child training (age 7-9 years) for
aggressive boys in kindergarten (randomized)
-

PHYSICAL AGGRESSION TRAJECTORIES

(Nagin & Tremblay, 1999)



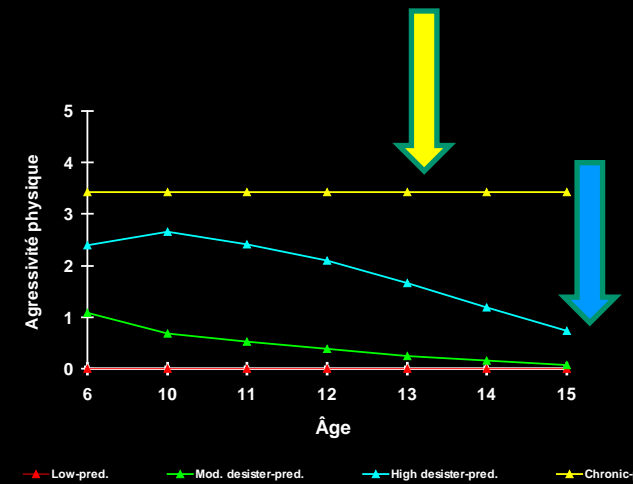
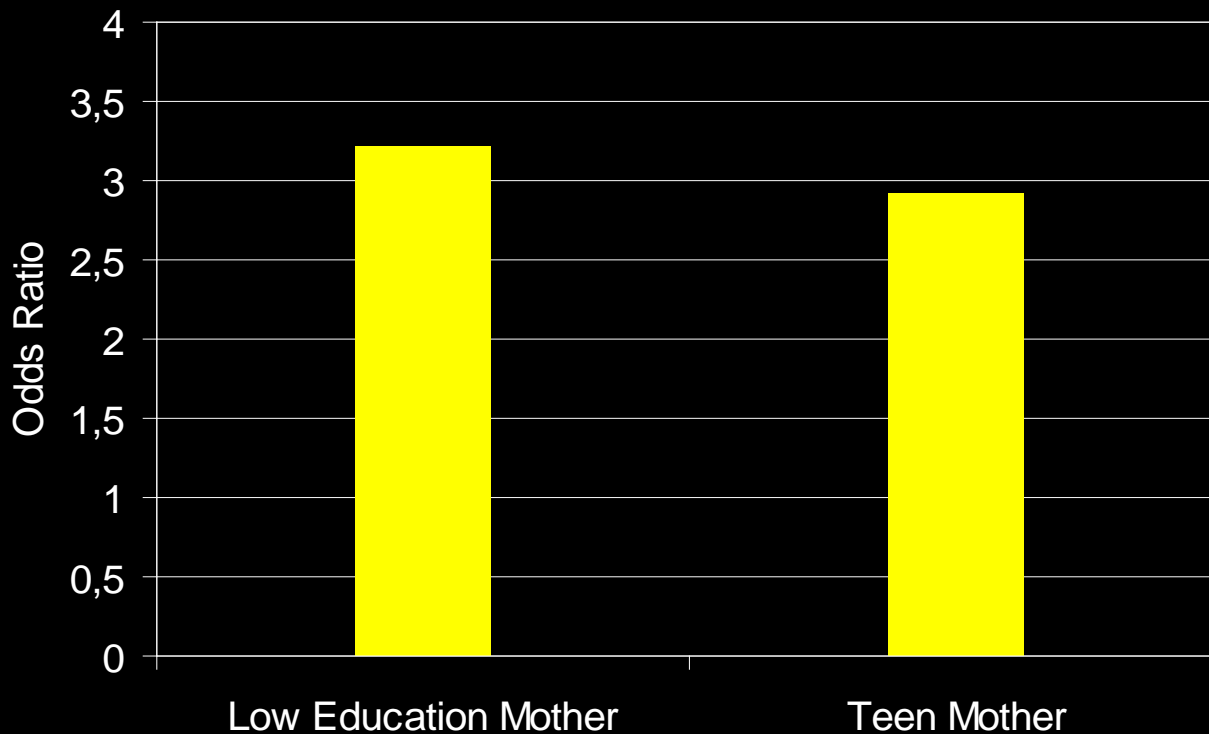
▲ Group 1 (14%)

▲ Group 2 (53%)

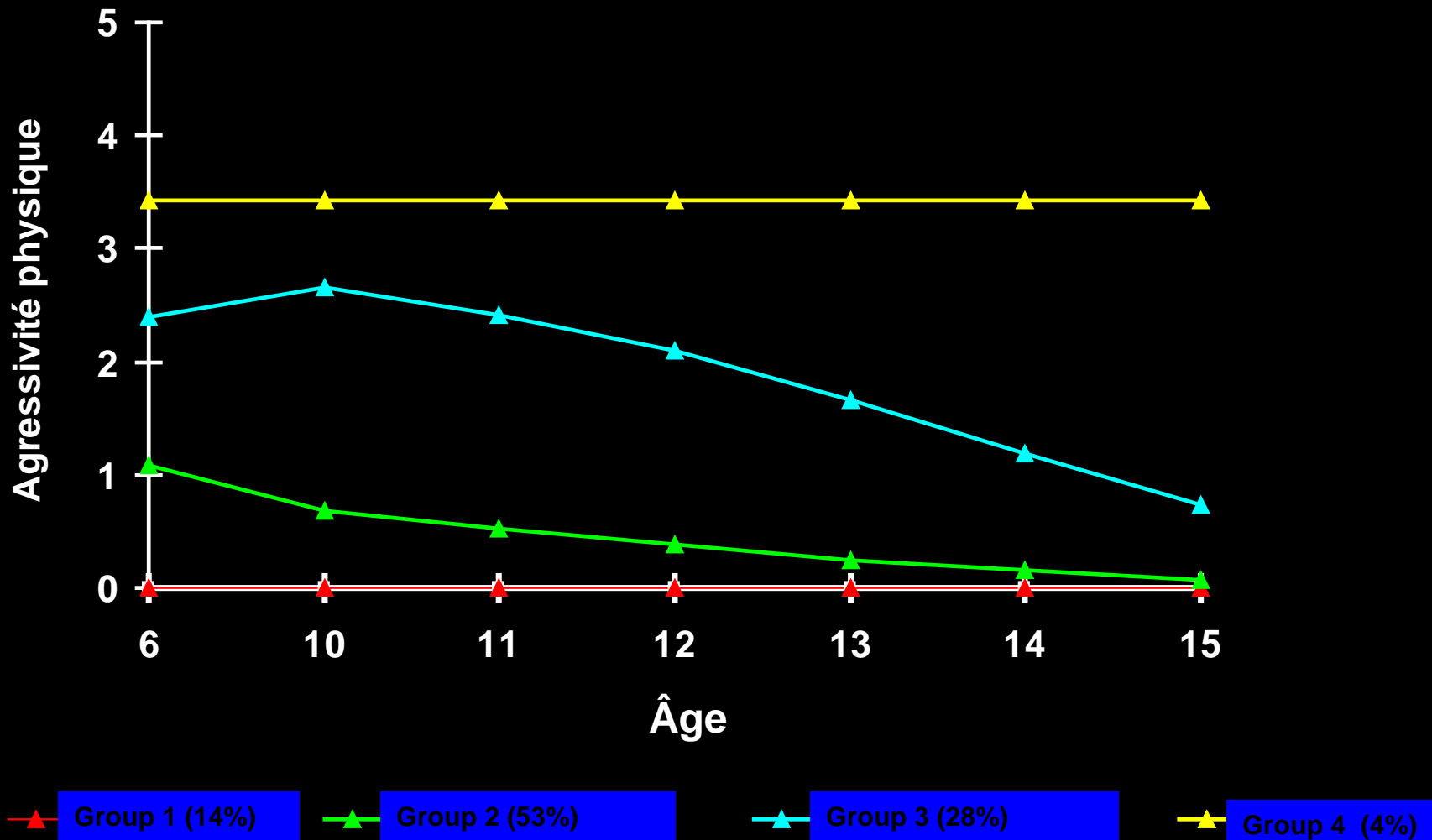
▲ Group 3 (28%)

▲ Group 4 (4%)

Significant Predictors of Chronic vs High Desistor

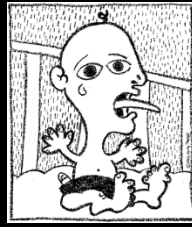


When Do Children Learn To Aggress?





Québec Longitudinal Study of Children



Subjects

: 2,223 children representing births in 1997-98
(twins: 600 pairs)

Age at evaluations

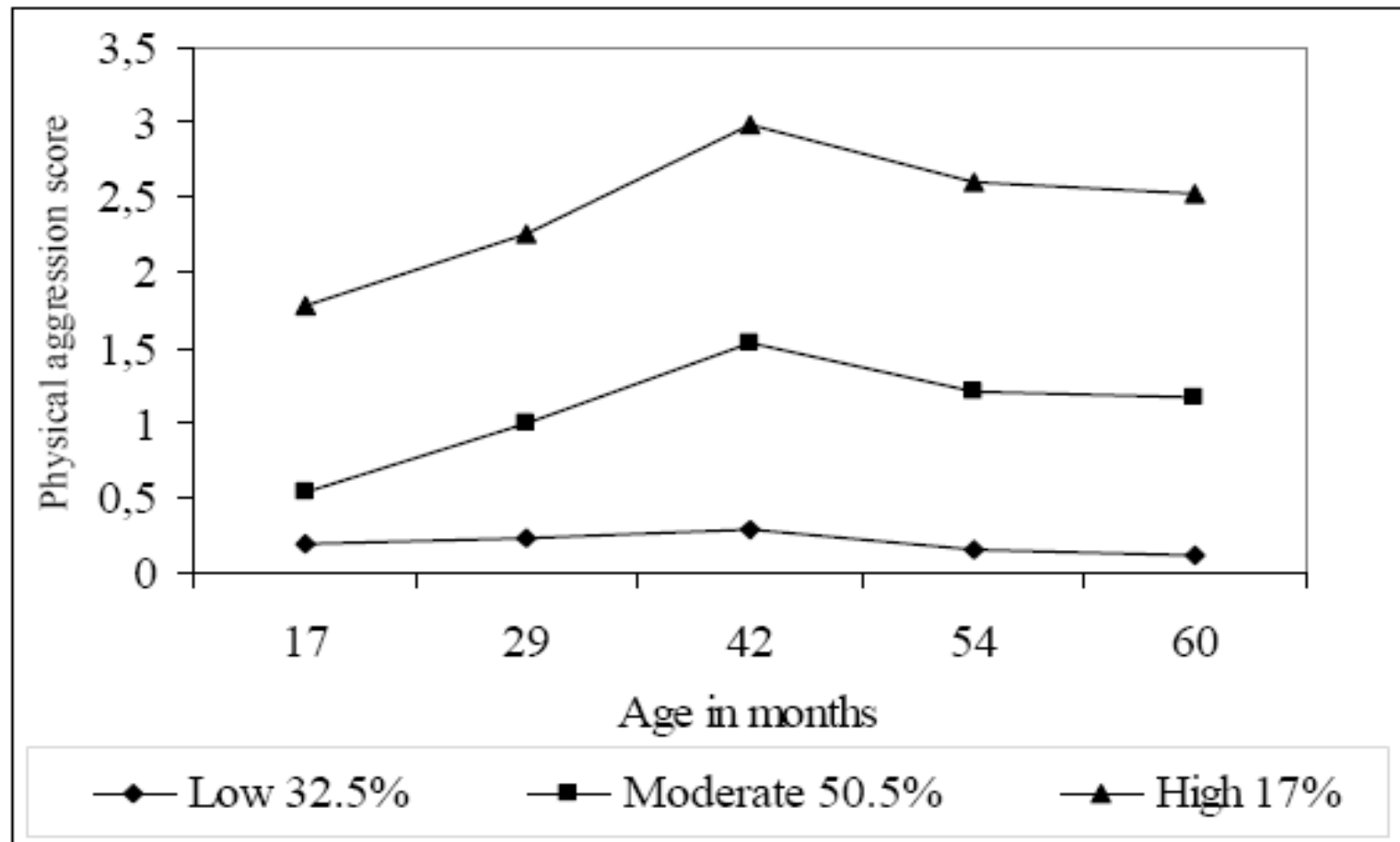
: 5, 17, 30, 42 months, 5, 6, 7, 8, 9, 10, 12, 13, 15y

Sources of info

: Parents, child care provider, teachers, peers, children,
official files. Observations at home,
in day care, at school, in the laboratory.

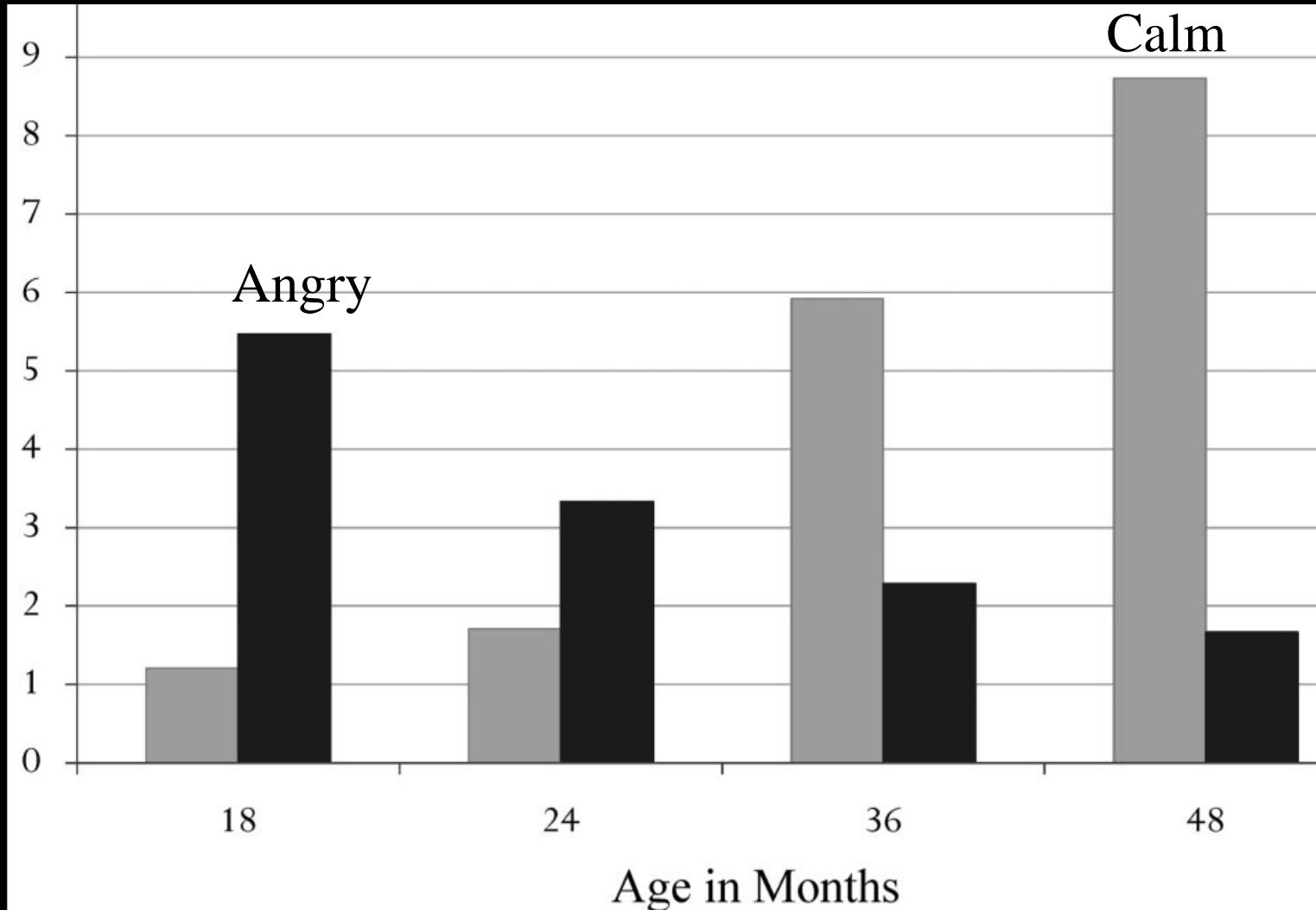
Physical Aggression Trajectories

(17 to 60 months)



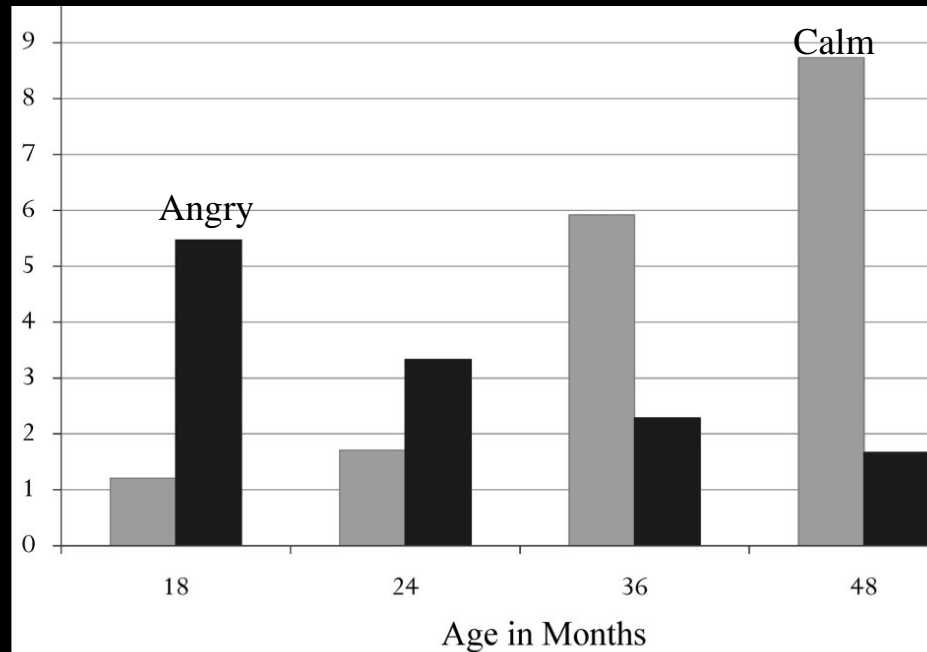
Development of Frequency of Angry and Calm Bids about Wait

Cole et al., 2011 Dev Psych

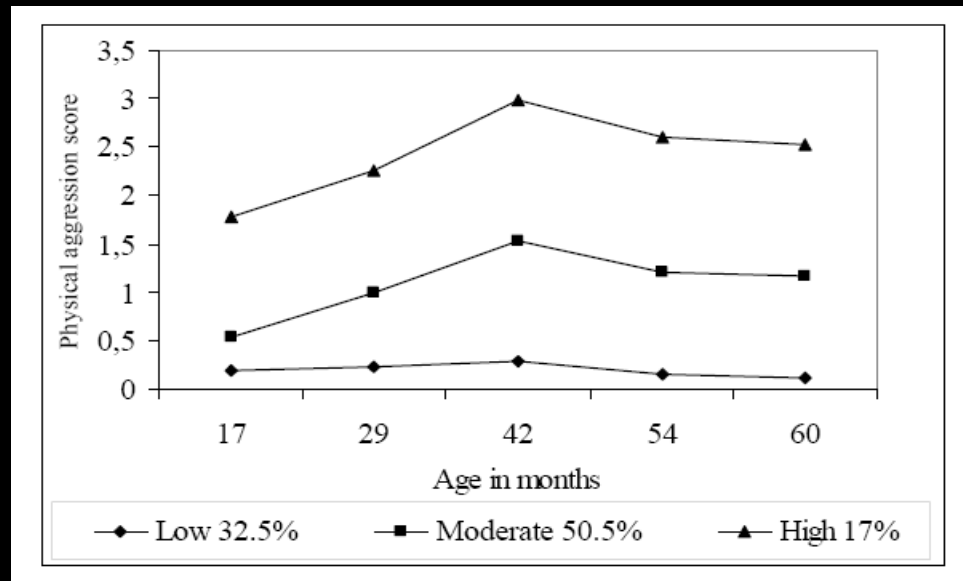


Frequency of Angry and Aggressive Behavior

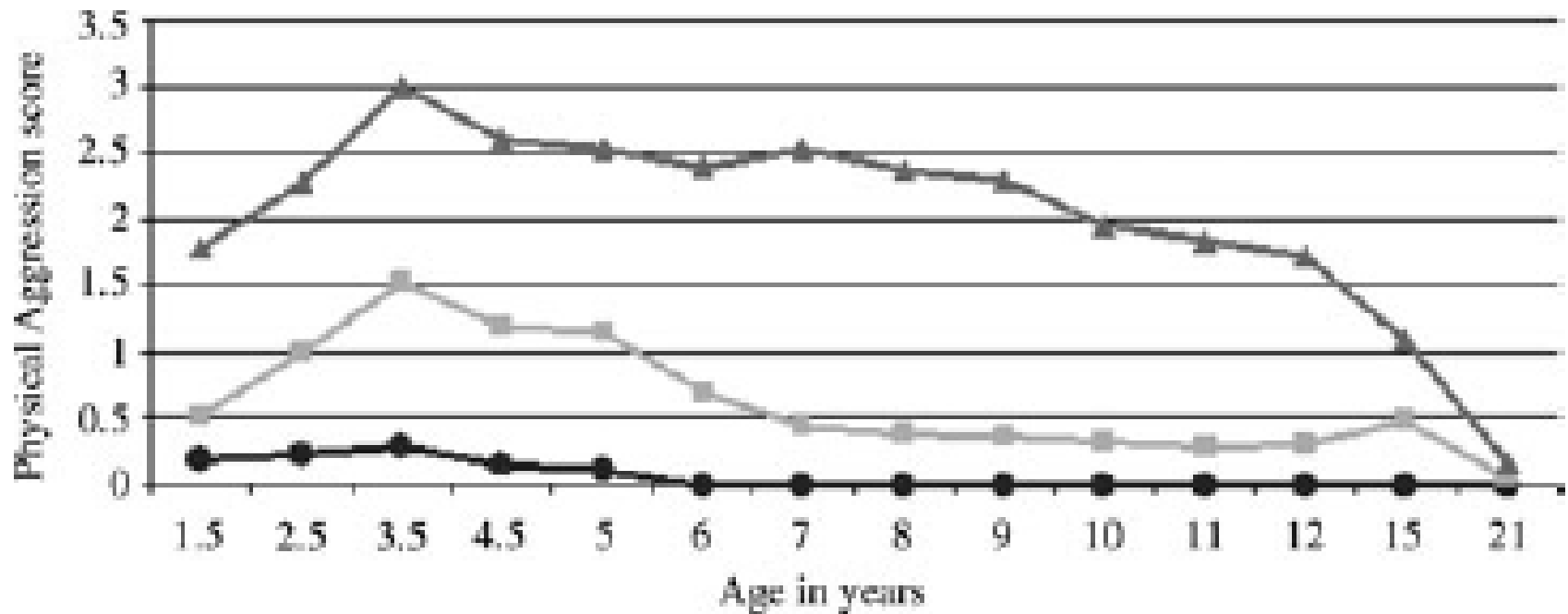
Cole et al., 2011



Côté et al. 2007



Physical Aggression Trajectories



Conclusions from Developmental Origins Studies

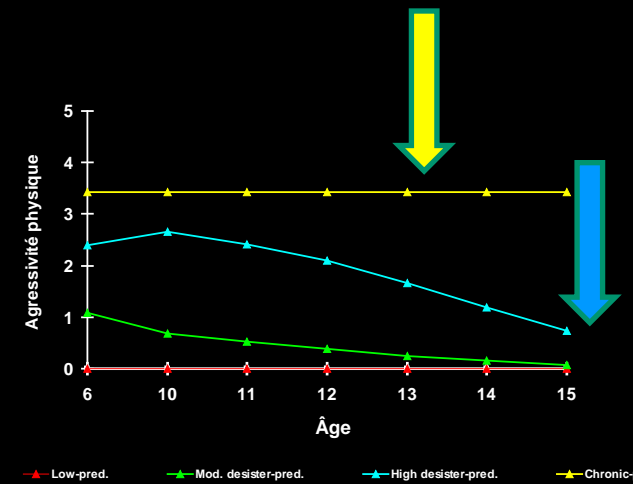
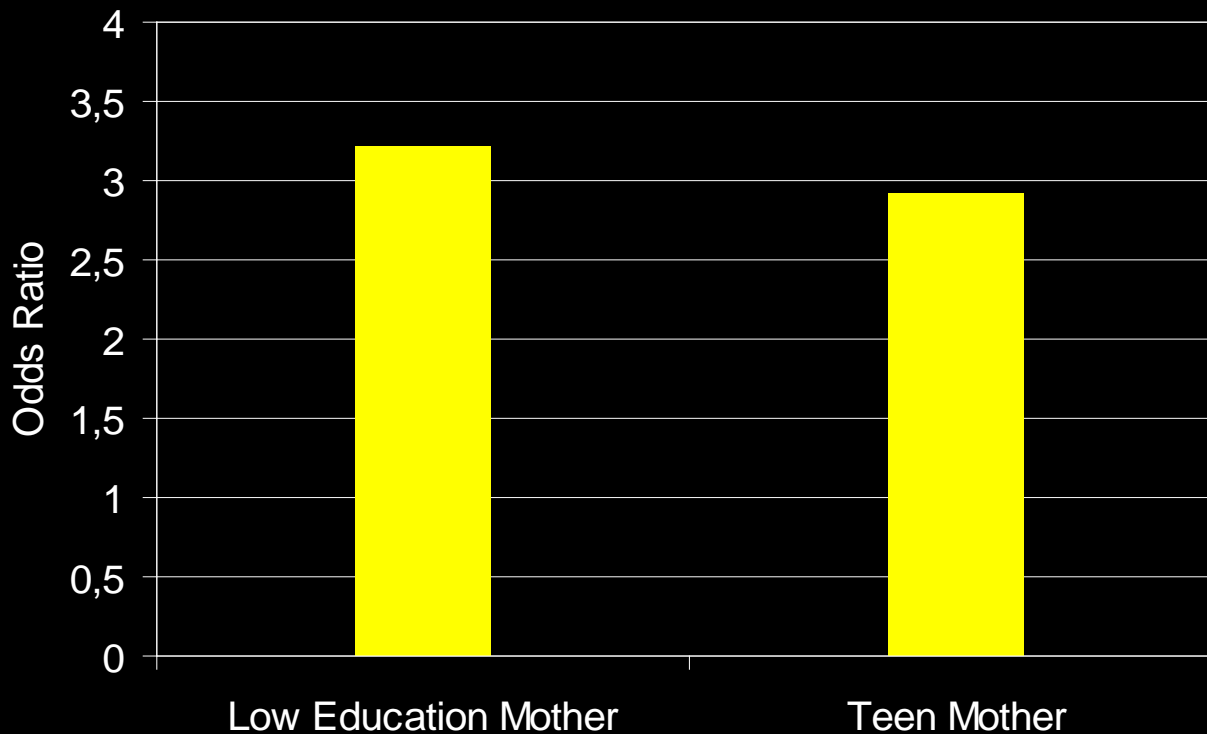
1. Humans do not learn to physically aggress, humans learn not to physically aggress.
2. Learning not to aggress starts in infancy
3. Those who do not learn early are at high risk of chronic physical aggression.

THUS, adolescents and adults with serious aggression problems had aggression problems during childhood.

The reason why **we focus more on** aggression of adolescents is that they become more threatening to adults as they grow taller and stronger.

CAUSAL MECHANISMS of
DEVELOPMENTAL TRAJECTORIES?

Significant Predictors of Chronic vs High Desistor

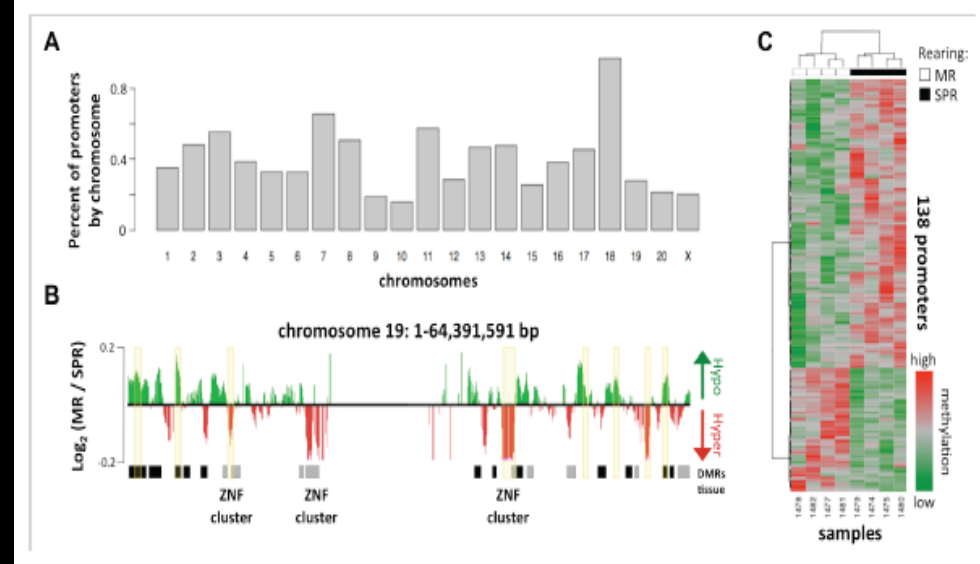
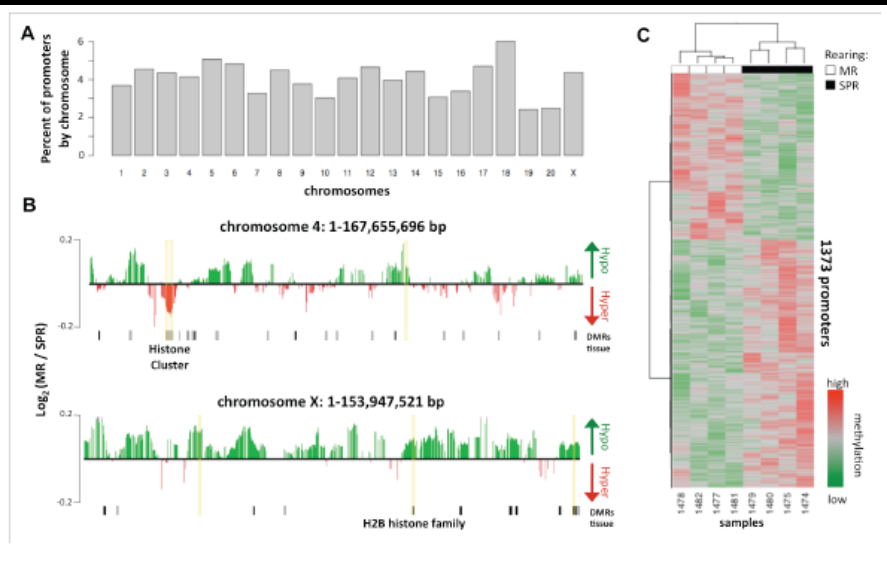


Maternal Rearing effects on DNA Methylation in Prefrontal Cortex and T cells

Provençal et al., 2012, J. Neuroscience

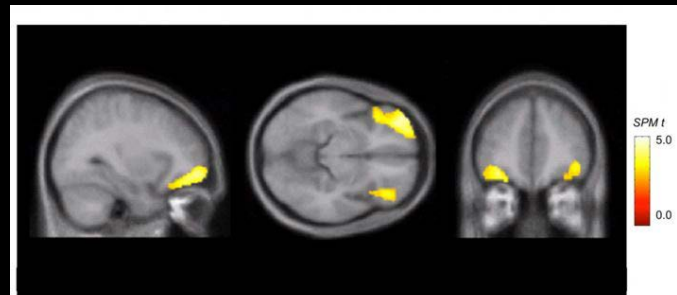
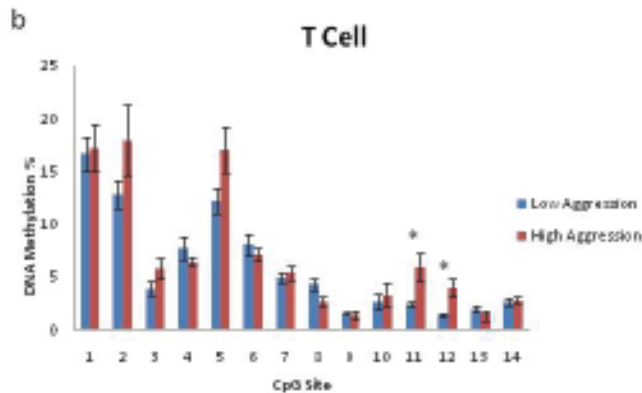
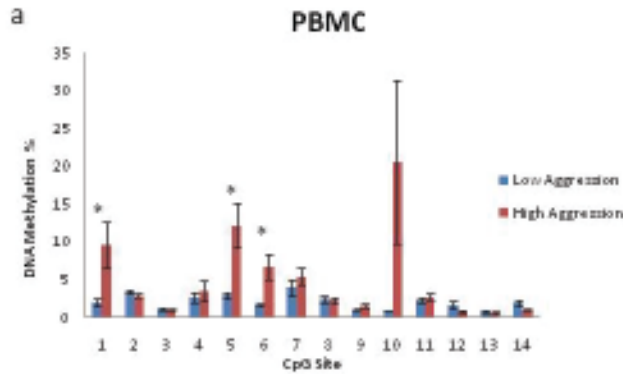
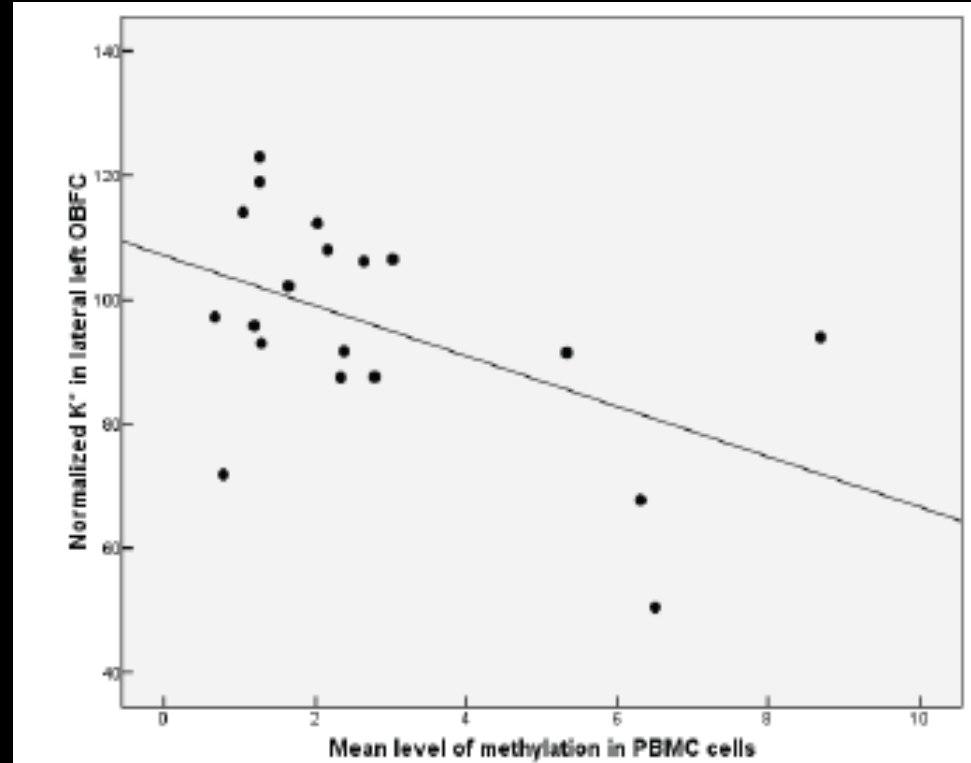
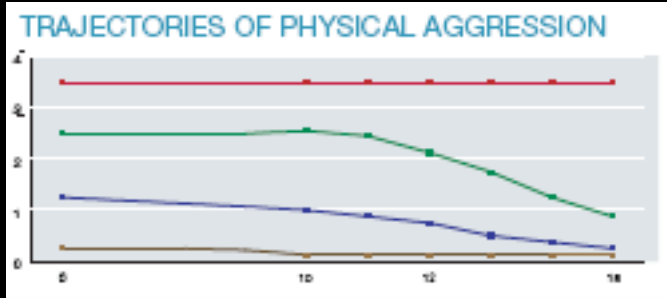
Prefrontal Cortex

T Cells



Chronic Physical Aggression, DNA Methylation of Blood Cells, and Brain Serotonin Synthesis in Human Males

Wang, et al., 2012, PLoS One



Conclusions

from DNA methylation studies

- Maternal prenatal lifestyle and postnatal care appears to impact brain development through impact on DNA methylation.
- Impact on brain development may partly explain problems with learning to regulate aggressive behavior.
- However, we need experimental studies with humans during pregnancy and early post-natal period to test these hypotheses

Conclusions

for Prevention of Chronic Aggression

- Maternal support for at risk families during pregnancy and early childhood appear most likely to prevent negative environmental impacts on DNA methylation, but also to insure quality of the post-natal learning opportunities for alternatives to aggression
- Thus the science of violence prevention needs to become a science of experimental preventive interventions (RCT) during pregnancy and infancy.

OBRIQADO