



Trouble in our Consensus About Learning: The Politics of Learning in the Contemporary Period

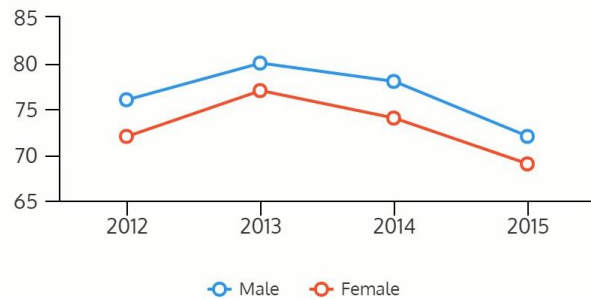
Crain Soudien | 28 May 2019

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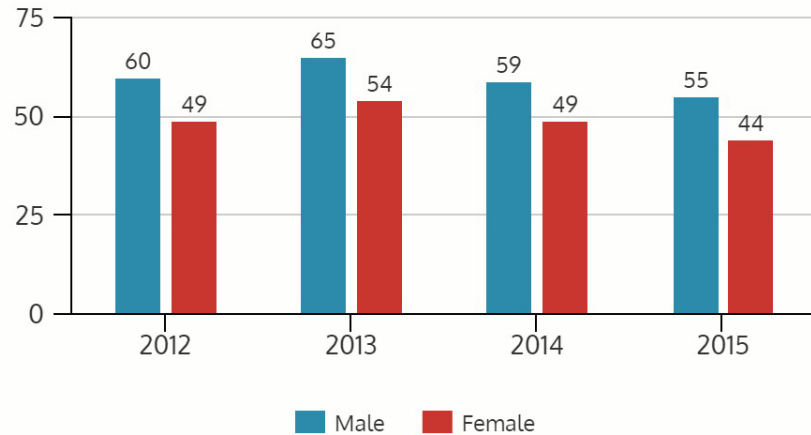
Number of learners that wrote the
2015 National Senior Certificate

Male: **46% (293 949)** Female: **54% (350 587)**

Learners that passed the NSC 2012-2015



Percentage of learners that achieved 30%
or above in Maths 2012-2015



Advancement through school (NIDS)

Learners that were in grade 10 in 2008 that
had advanced to grade 12 in 2010



< 30%



> 45%







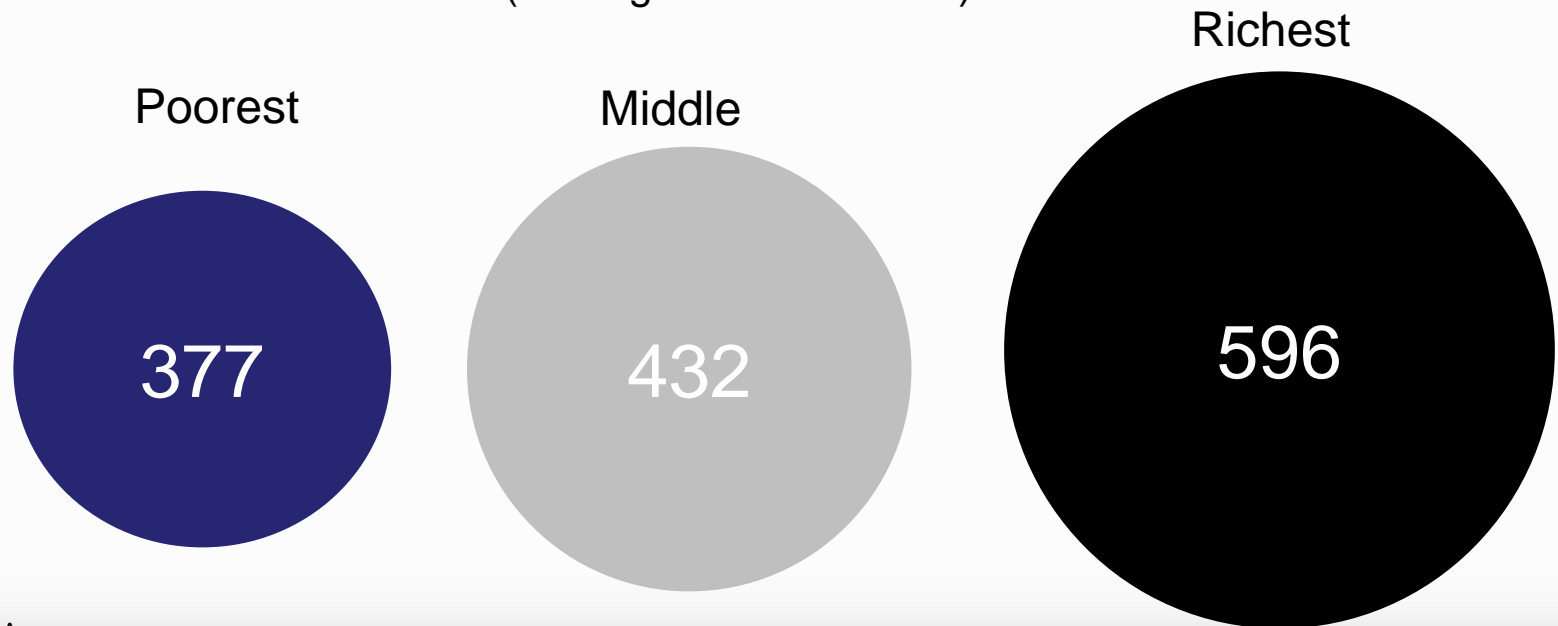
Learning from, on the one hand, psychology and social biology, on the other, we have insights about the social factors involved in learning - 'race', class, gender, place, sexuality, culture, language and disability, amongst others.

Sex



Wealth**

(Average learner scores)



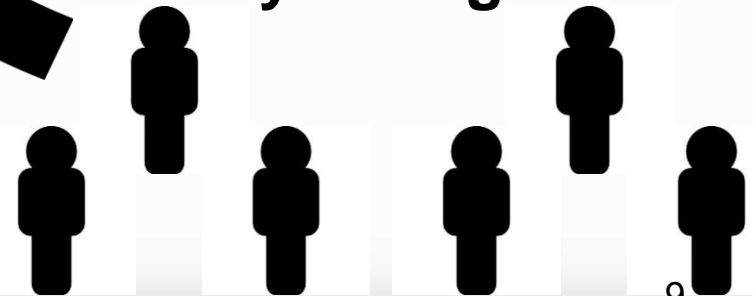
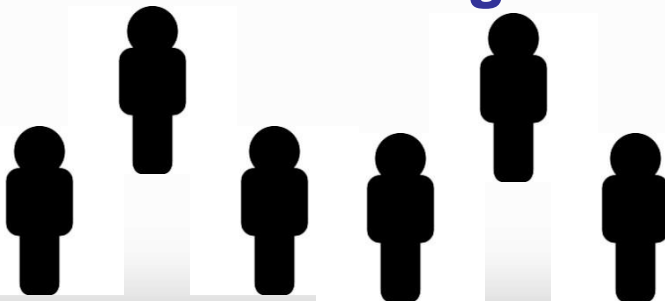


Our Consensus



Sociologists

Psychologists



This rough consensus has been both augmented and troubled by new insights in medicine. Recent developments in the neurosciences and in genetics have advanced our understanding of learning significantly. A new stage in learning theory is being signalled by this development.

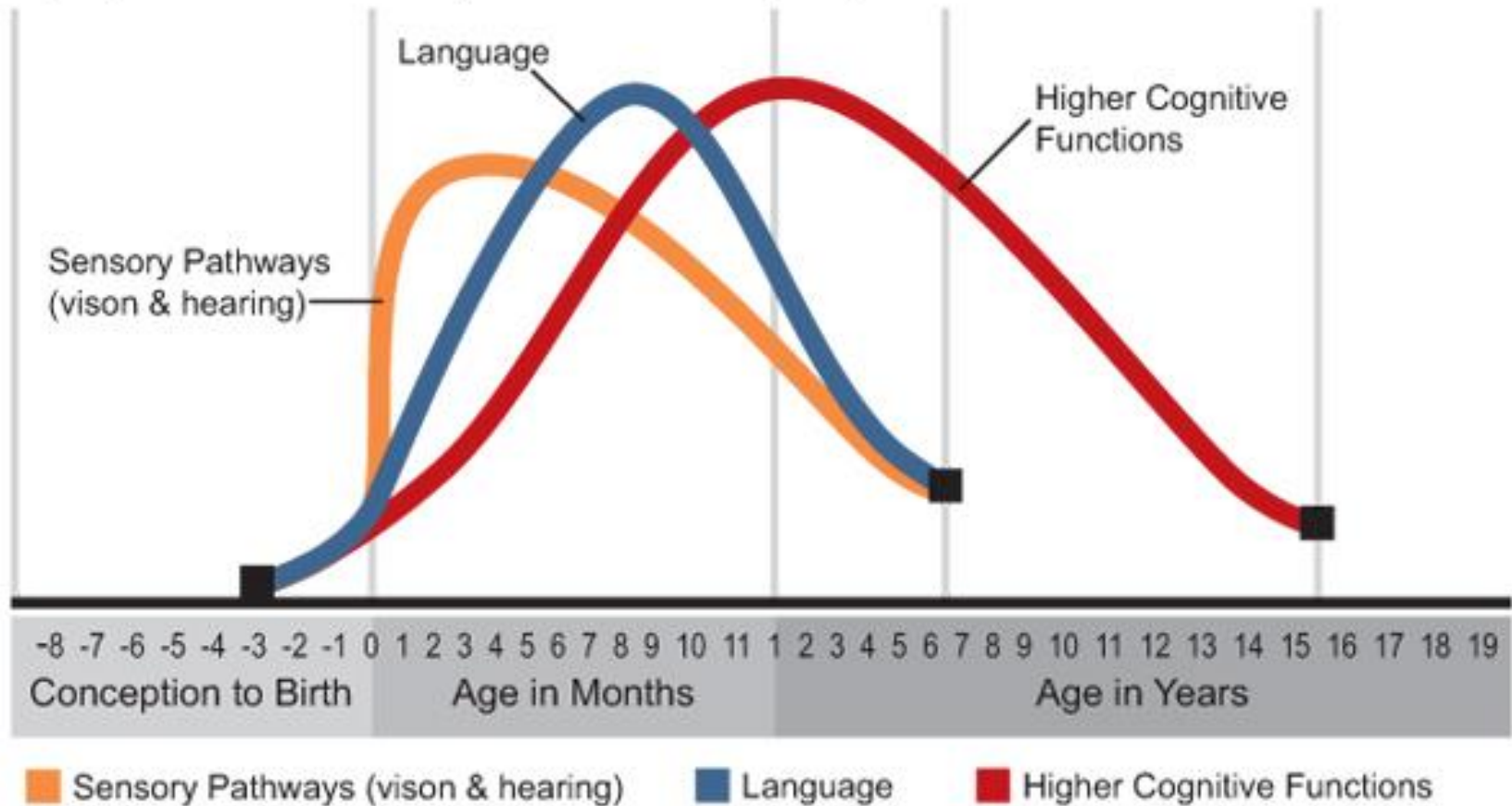
The Brain





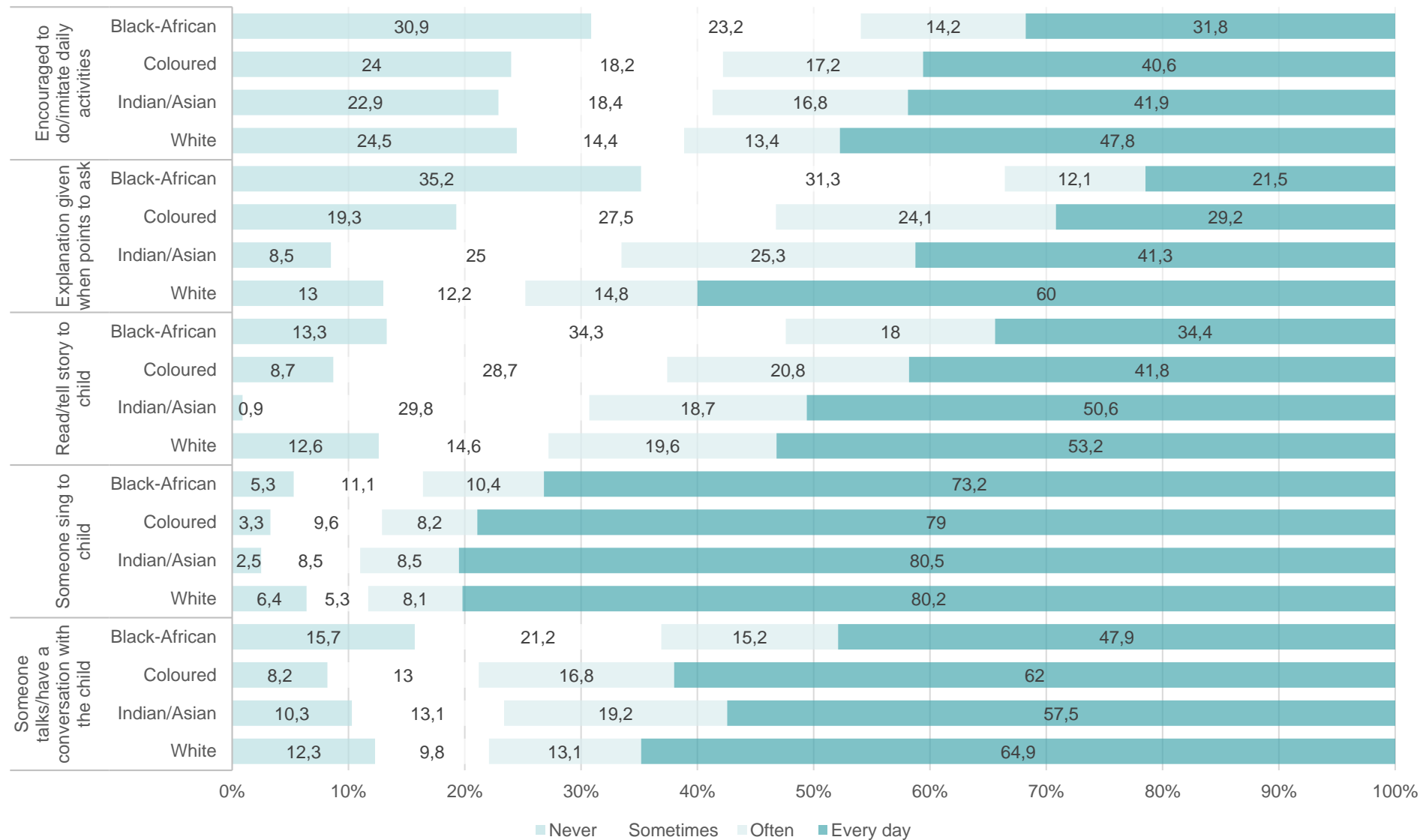
Human Brain Development

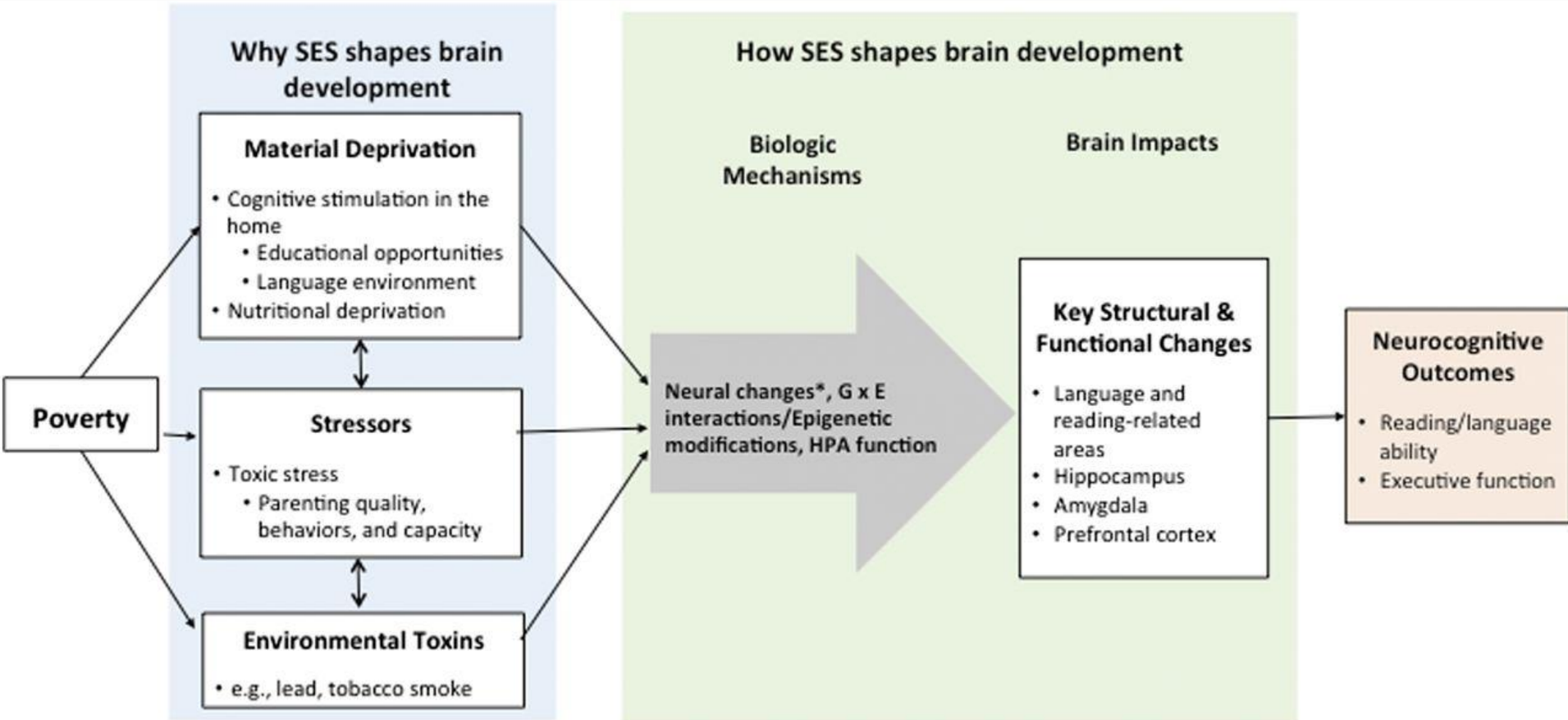
Synapse formation dependent on early experiences



“The more we know, the more we find ourselves moving away from the idea that the genome is the prime mover or the uncaused cause, towards a style of thought that sees the genome as much affected and shaped by all around it at the same time as it shaped it” (Rose, 2012: 13).

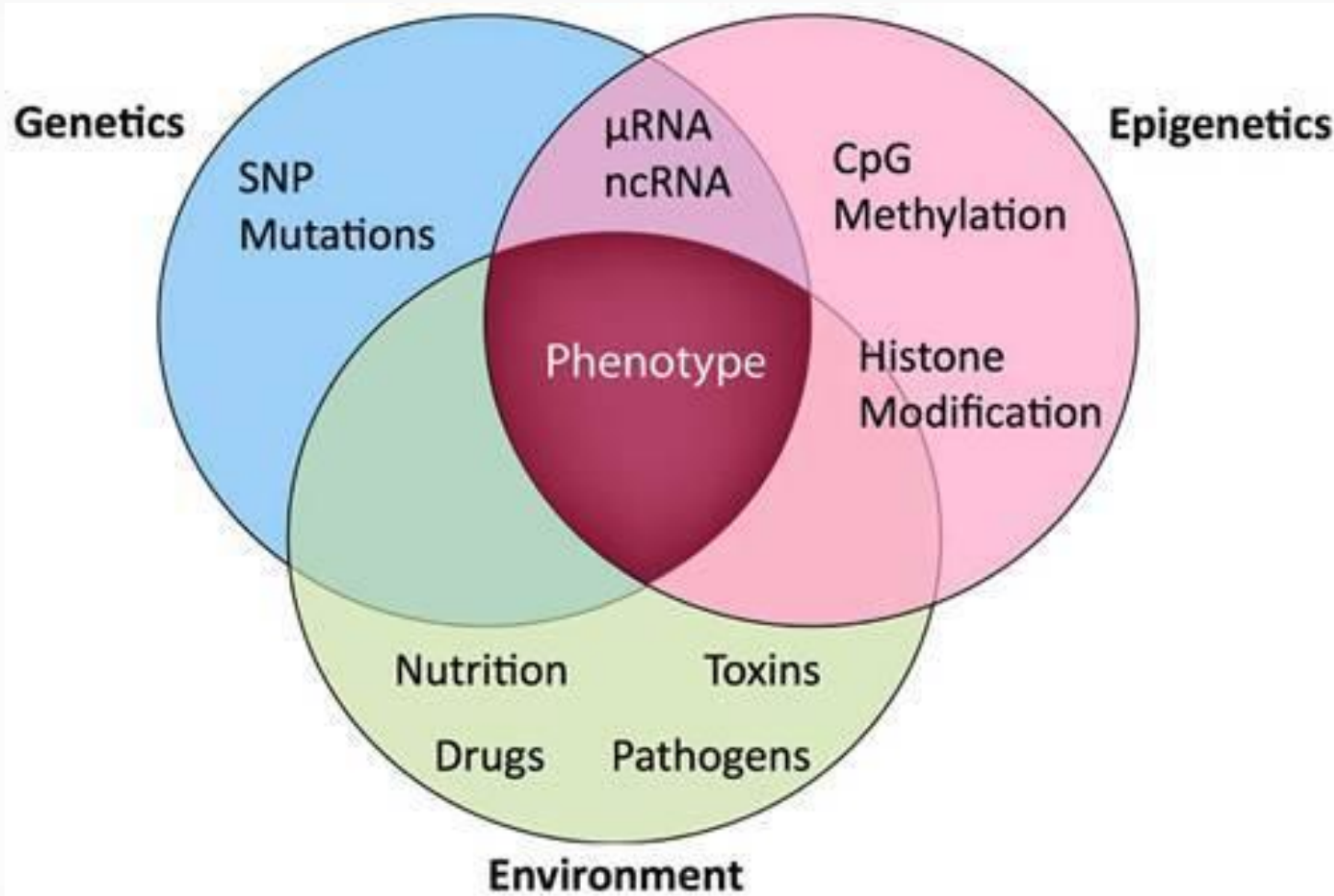
What insights can this give us
into South African learner
cognitive and literacy
development?





- Learners who speak one of nine official indigenous languages are required to switch to the medium of English (or, less often, Afrikaans).
- Learners undergoing an instructional language switch evince levels of standardized test performance distinctly poorer than their English mother-tongue counterparts.
- The switch follows an interpretation of the South African Language-in-Education Policy (LiEP) (1997).
- We hypothesise that the switch induces a moment of cognitive crisis.

- Genes determine potential
- Environment determines how much of potential is actualised
 - Nature vs nurture argument



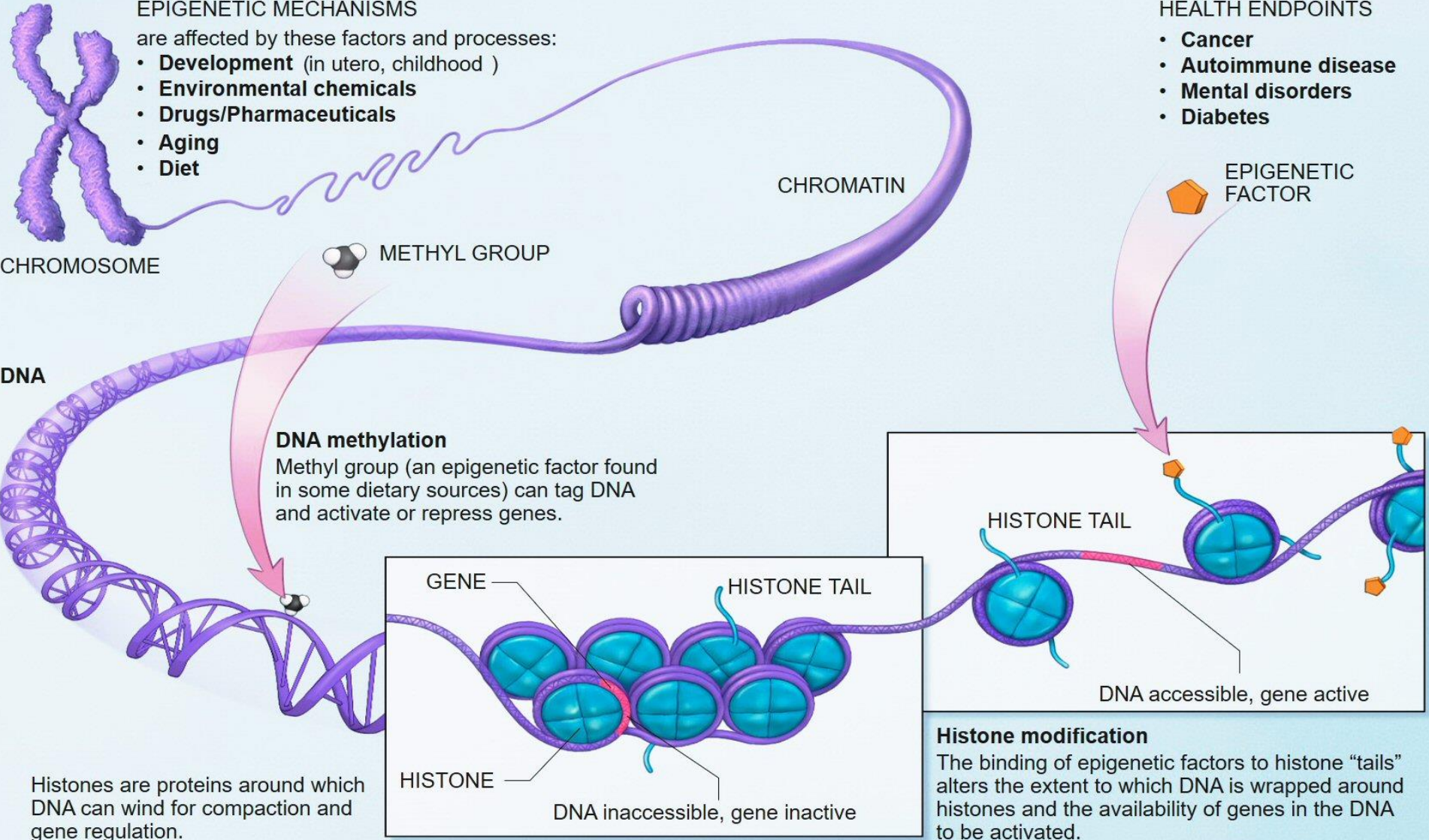
EPIGENETIC MECHANISMS

are affected by these factors and processes:

- **Development** (in utero, childhood)
- **Environmental chemicals**
- **Drugs/Pharmaceuticals**
- **Aging**
- **Diet**

HEALTH ENDPOINTS

- **Cancer**
- **Autoimmune disease**
- **Mental disorders**
- **Diabetes**



Histones are proteins around which DNA can wind for compaction and gene regulation.

Histone modification

The binding of epigenetic factors to histone “tails” alters the extent to which DNA is wrapped around histones and the availability of genes in the DNA to be activated.

Risk Factors

*Prenatal/Postnatal
Nutrition Deficiency*

Macronutrient Deficiency

- Protein (e.g. tryptophan)
- Lipids (e.g. cholesterol)
- Carbohydrates (e.g. glucose)

Micronutrient Deficiency

- Iron
- Zinc
- Folate
- Omega-3 Fatty Acids

Mechanism

*Epigenetic Regulation and Altered
Brain Structure and Function*

Changes in Epigenetic Regulation

- DNA methylation patterns
 - Hyper- and hypo- methylation
 - Expression of DNMT
- Histone modifications
- Gene expression

Impaired Brain Development

- Reduced brain volume
- Abnormal brain structures

Signaling Molecule Imbalance

- Abnormal neurotransmitter levels
 - Dopamine
 - Serotonin
- Changes in growth factors
 - BDNF

Neurotoxicity

- Heavy metals
 - Lead
 - Copper

Outcome

Psychopathology

Externalizing Behavior

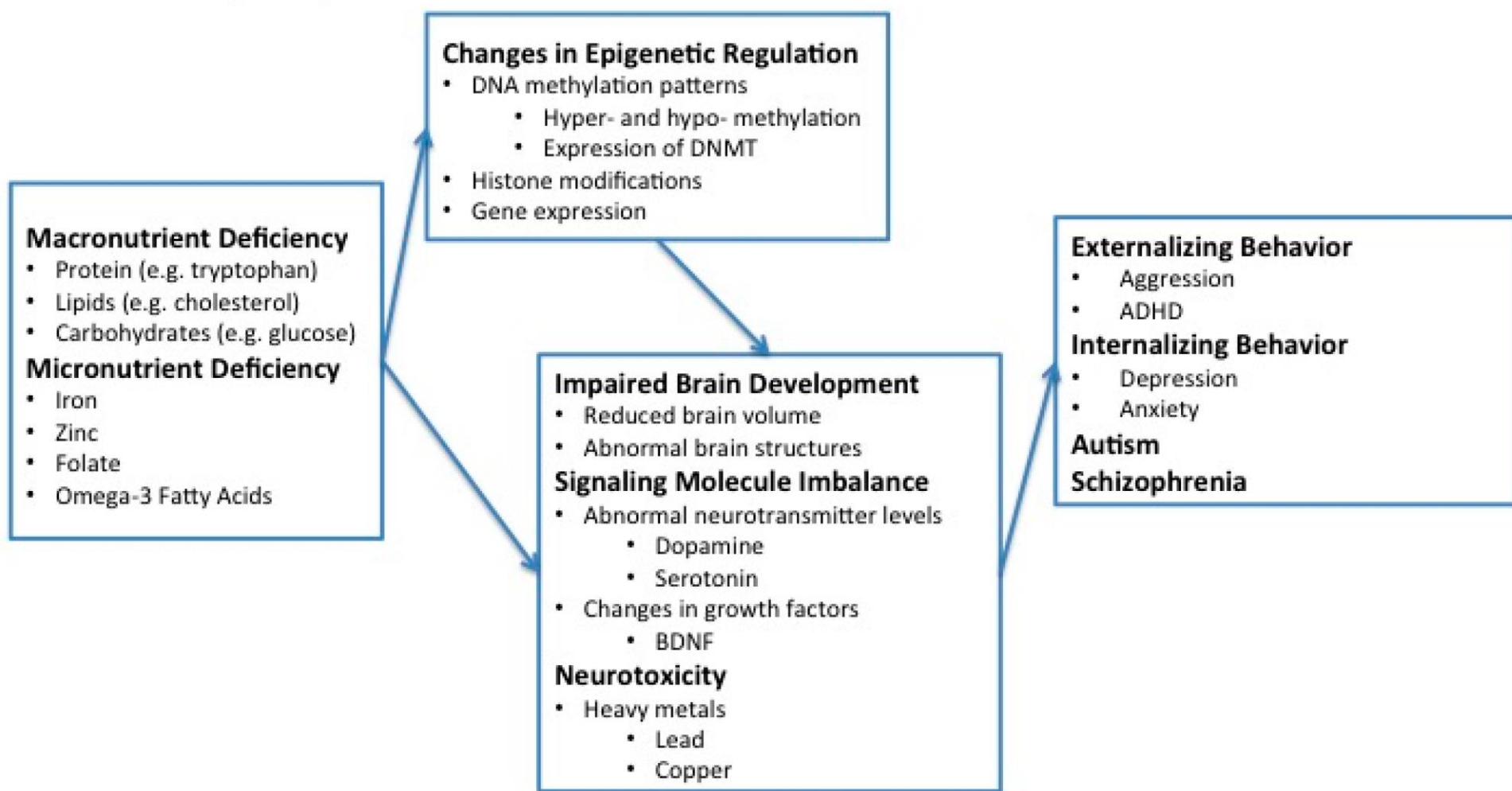
- Aggression
- ADHD

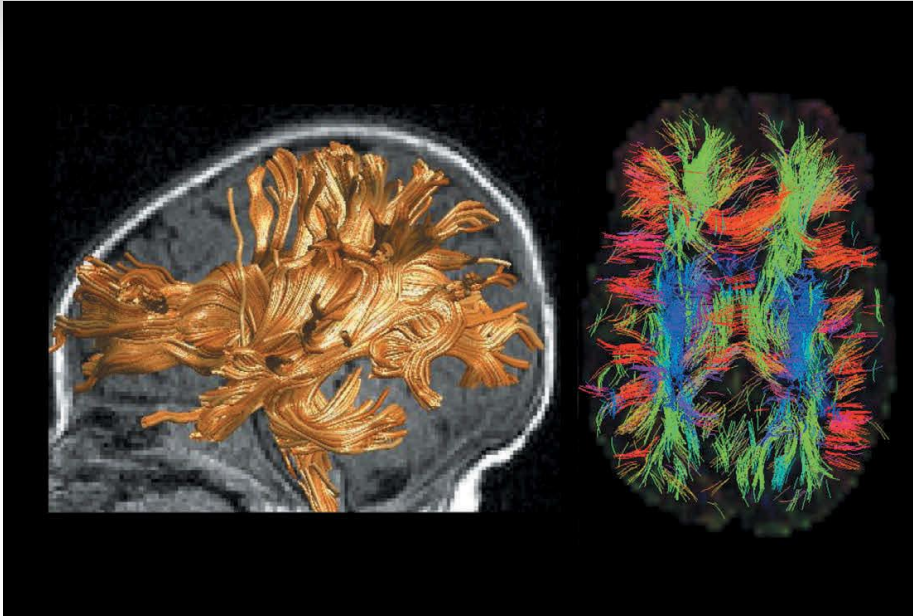
Internalizing Behavior

- Depression
- Anxiety

Autism

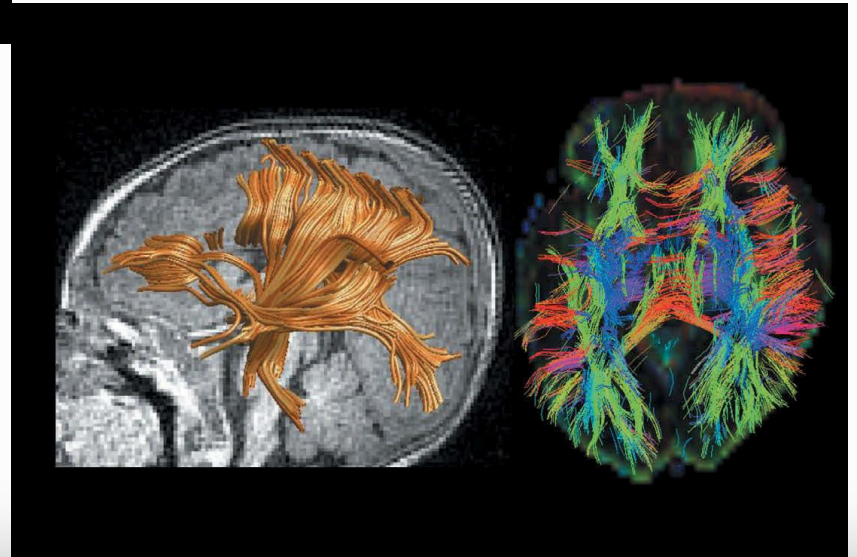
Schizophrenia





Infant representative of never-stunted growth

Infant representative of stunted growth



- Dutch famine of 1944-45
- German blockade cut off food and fuel shipments
- Children born or raised in this time were small, short in stature and had many diseases including edema, anemia, diabetes, and depression
- The Dutch Famine Birth Cohort study showed that women living during this time had children 20-30 years later with the same problems despite being conceived and born during a normal dietary state.

Earlier genetic discussions which claimed discoveries of specific genes for particular characteristics, such as a gene for homosexuality, are nonsense. There has been a “shift away from (gene) determinism towards a probabilistic way of thinking about the relationship between genetics, development, evolution, organism and life chances” (Rose, 2012: 12).

The genome is not the 'book of life'. All it does, is point to elements of our genetic make-up which are biologically significant for understanding how elements of our human and physical characteristics function.

Rose, “(we are) are realis(ing)... how much we now know that we do not know. While only 1.5% of the genome contains protein coding sequences – the classical genes – a further 6% is evolutionarily conserved, and hence biologically functional, but does not code for protein. This means that there are millions of conserved elements whose function we do not know....”

1. Learning Theory has tip-toed around biology.
2. We have become biological denialists

These ‘styles of thought’ in both the human and life sciences led us away from complexity. They depended on reductionism. At the core of that reductionism sit classificatory schemas which, as Rose says, ‘assert destiny or fatalism’ (Rose, 2012: 3). He makes the comment, to explain his point, that for many of us ‘the rationalization of race prejudice by appeal to biological principles was then plausible because human genetics was so immature’ (Rose, 2012: 6).

Thank you