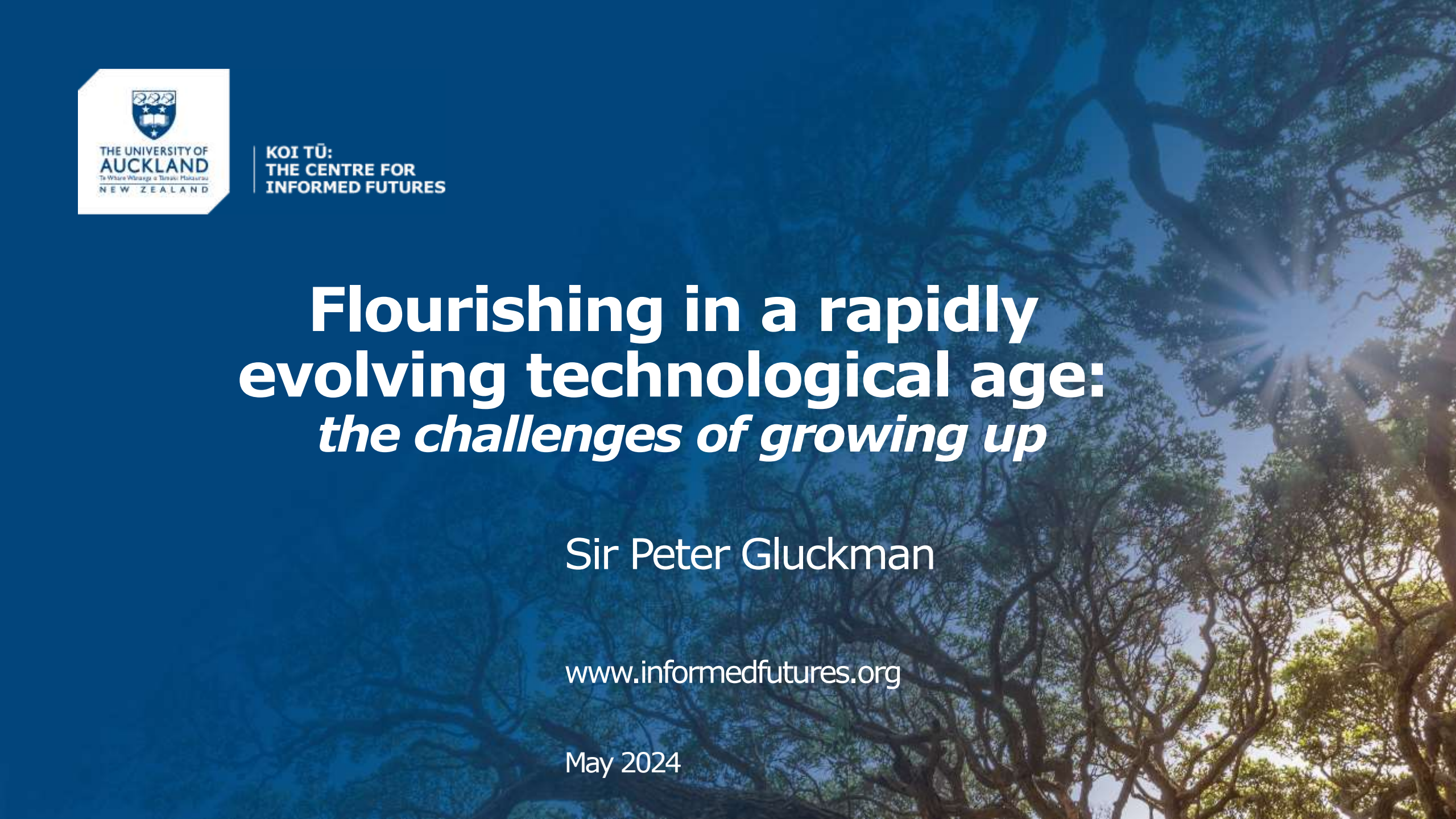


THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

KOI TŪ:
THE CENTRE FOR
INFORMED FUTURES

# Flourishing in a rapidly evolving technological age:
## *the challenges of growing up*

Sir Peter Gluckman

www.informedfutures.org

May 2024

# Koi Tū: The Centre for Informed Futures

- A non-partisan policy-oriented thinktank and research centre focused on long term issues affecting NZ
  - Transdisciplinary and stakeholder engaged
  - Based in University of Auckland with national and international members

- Major themes
  - Human flourishing: maternal and infant health, youth mental health
  - Our future society: social cohesion, future of democracy
  - Living with change: sociological, environmental , technologcial
  - Enhancing evidence to policy: risk, foresight,

# Emotions

- Emotional reactions are a normal part of our social psychological being
- But they must be displayed appropriately and in social context
- Inappropriate display is a sign of in adequacies in emotional self regulation
- Emotional self regulation depends on the development of appropriate executive function in the fronto-thalamic part of the brain
- Disturbed and inappropriate emotional self regulation can become embedded and fixed and manifests in a loss of mental wellbeing and health
- Most mental health disorders emerge in adolescence and young adults and are disturbances rooted in disturbance to emotional self-regulation.

# Youth mental health in New Zealand

- Issues of youth mental health more than doubled  in the decade *before* Covid struck.
- New Zealand
  - Highest rates of reported youth suicide
  - Mental health morbidity (national mental health survey):
    5% in 2011/12:  14.9% in 2018/19

  - Youth 2019 survey (secondary school)
    - 31% had impaired emotional wellbeing
    - Depressive symptoms:
      - Females 29%  (17% in 2012)
      - Males 17%  (9% in 2012)
      - High deprivation areas 30%, low deprivation areas 17%
      - Female Māori 38%, Pasifika 37%,Pakeha 24%
      - Male Māori 19%, Pakeha 15%
      - Rainbow youth 57%

# Executive function

- That set of cognitive skills that include flexible thinking, the ability to regulate one's attentional focus and one's emotions, and to plan and undertake future-oriented behaviour.

- We use these skills every day to learn, work, and manage daily life

- Disturbed executive function can make it hard to focus, follow directions, and regulate our emotions.
  - Language
  - Cognition
  - Attention
  - Inhibitory control and socioemotional regulation

- The foundations of these skills develop in the first 1500 days after conception

- The lifelong costs of derailing the typical development of executive functions are manifest in learning disorders, behavioural disorders, mental health disorders, and lifelong issues of poor relationships, reduced earnings, mental health disorders and interactions with the justice and welfare system

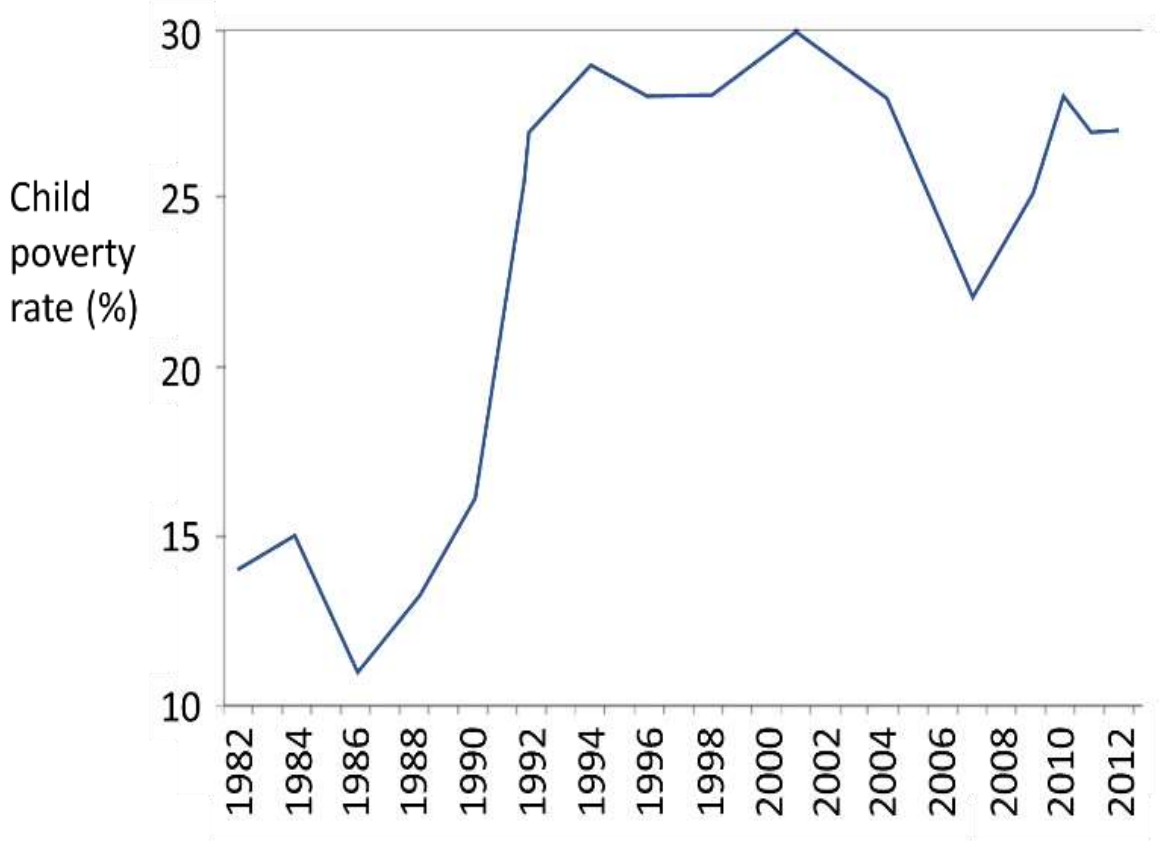
# A generalizable model

- The rise in concerns about YMH cannot be explained in classical psychiatric terms (which would imply the primary solution is psychiatric/psychological)
- Rather the primary explanation is inadequate emotional self regulation in a challenging and changing context
- The foundations of socioemotional regulation are developed between conception and 4 years of age
- They are reinforced or undermined by prepubertal experience
- Puberty brings risk taking behaviours, shifting sense of identity and autonomy, and exposures to many extrinsic pressures and the world has changed substantively in the last 2 decades
- Depending on the individual's socioemotional development these concurrent risk factors are more likely to be tipped into overt symptoms of anxiety/depression

# Developmental and contextual factors

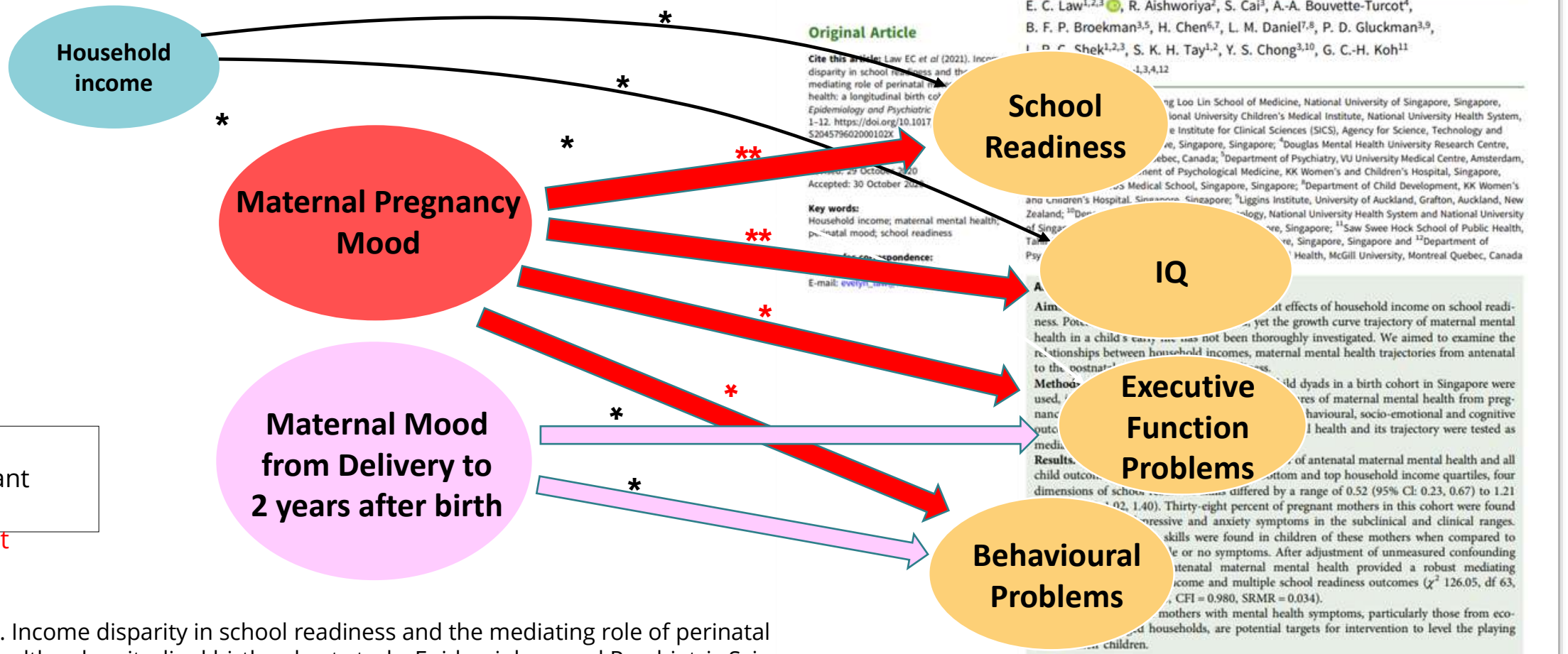
- Socioeconomic
  - The number of children born into deprivation has doubled in last 30 years
- Parental stress and intergenerational issues
- Family structure
- Parental style
- Parental and caregiver engagement
- Abuse and other adverse childhood experience
- Early childhood education
- Changed parenting
  - Loose-tight to tight-loose

# The percentage of people born into poverty doubled between 1980 and 1995




Child poverty rates in New Zealand, 1982-2012, as measured by residence in households with <60% of median income after housing costs

# Maternal mental health mediates the effect of income disparity on school readiness





Epidemiology and Psychiatric Sciences

cambridge.org/eps

Income disparity in school readiness and the mediating role of perinatal maternal mental health: a longitudinal birth cohort study

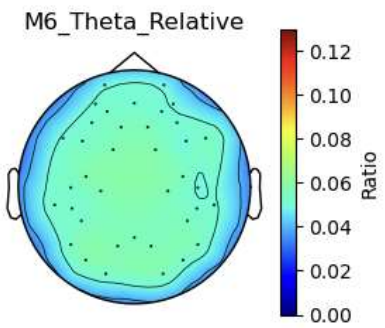
Original Article

E. C. Law, R. Aishworiya, S. Cai, A.-A. Bouvette-Turcot, B. F. P. Broekman, H. Chen, L. M. Daniel, P. D. Gluckman, S. K. H. Tay, Y. S. Chong, G. C.-H. Koh

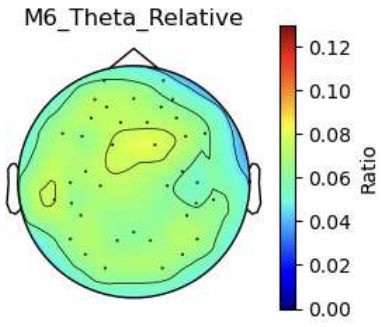
Law EC et al (2021). Income disparity in school readiness and the mediating role of perinatal maternal mental health: a longitudinal birth cohort study. Epidemiology and Psychiatric Sciences 30, e6, 1–12.

# Antenatal mental health and infant EEG (theta power)

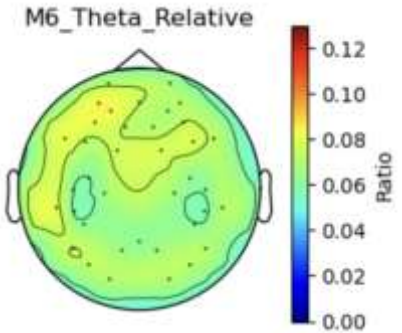
No or low depressive symptoms, EPDS <9



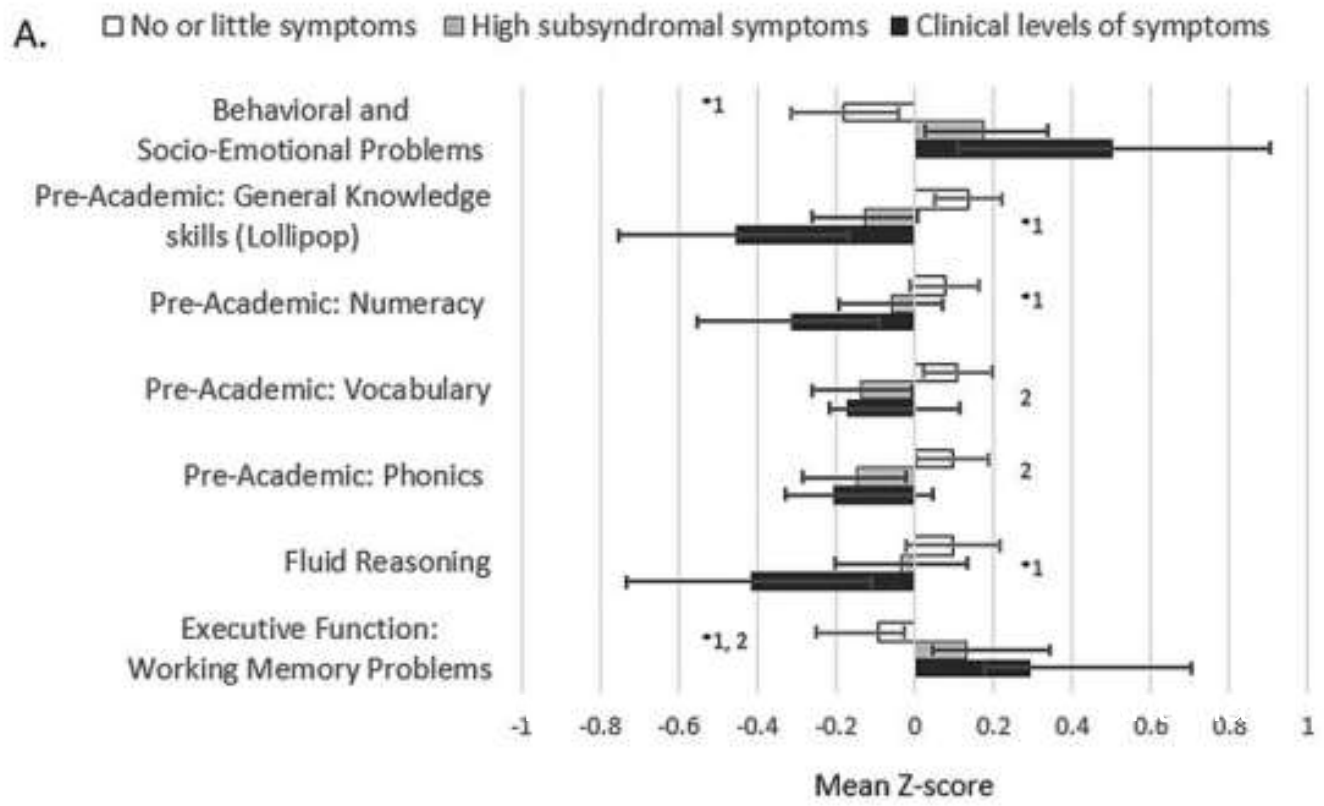

High, subsyndromal EPDS 9-12




Clinical levels, EPDS >=13

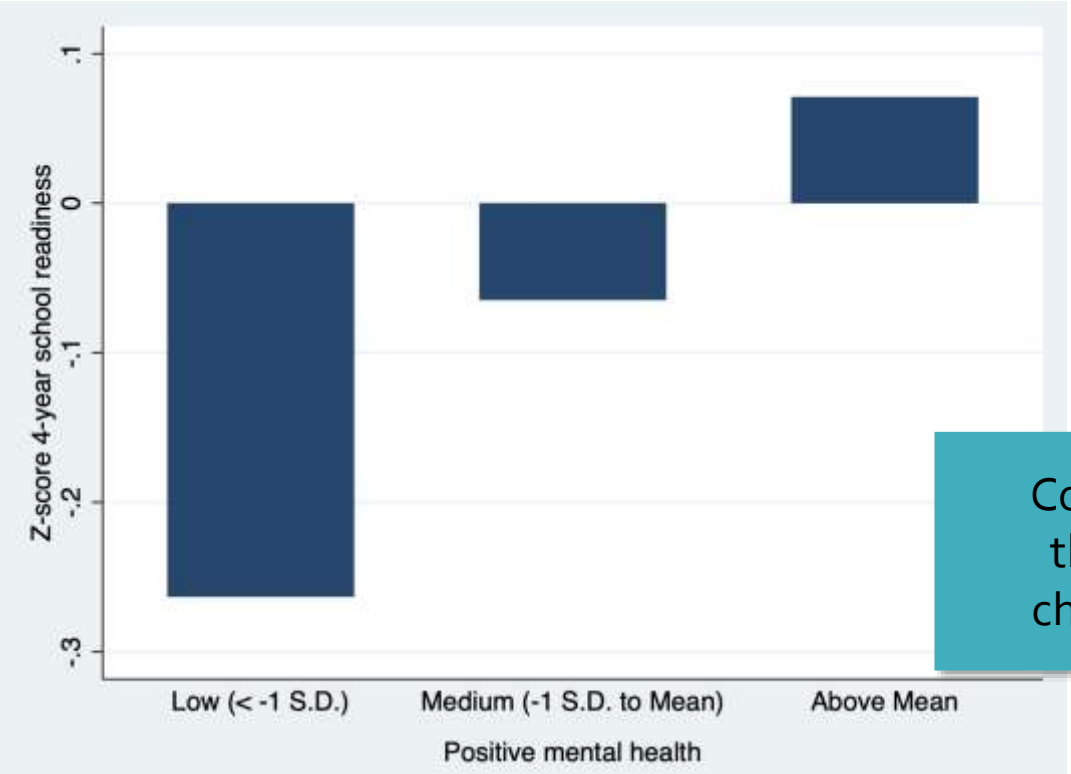


# High, sub-syndromal antenatal maternal mood symptoms are consistently associated with worse child outcomes



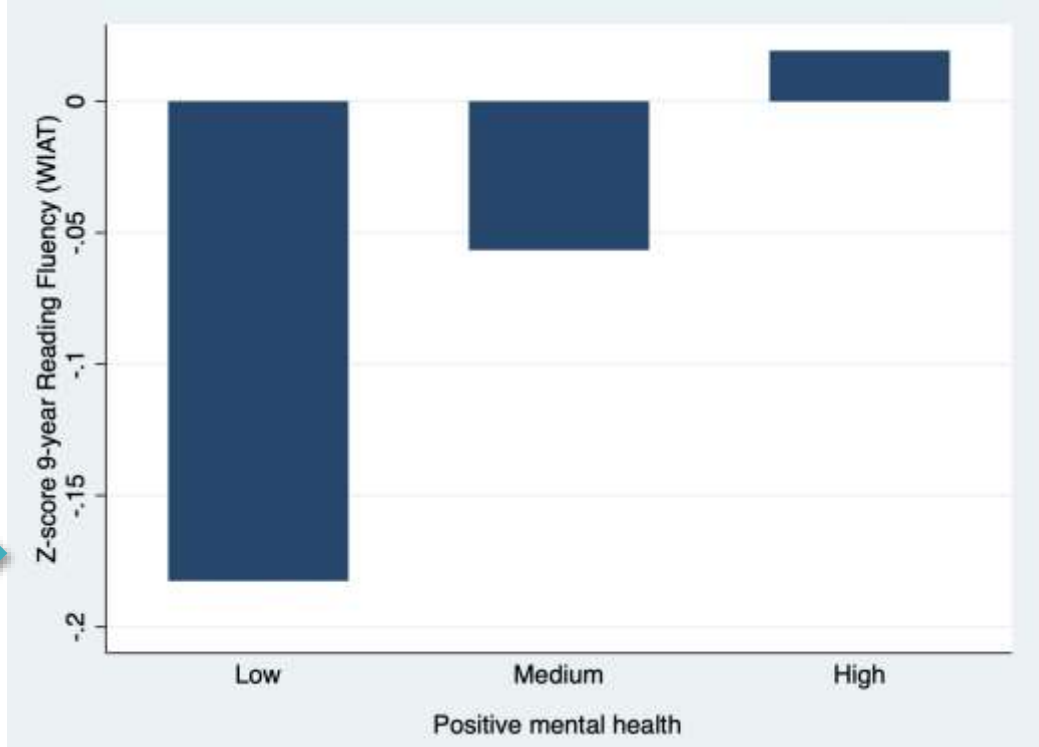
# Positive maternal mental health and child performance

## Age 4
## School Readiness



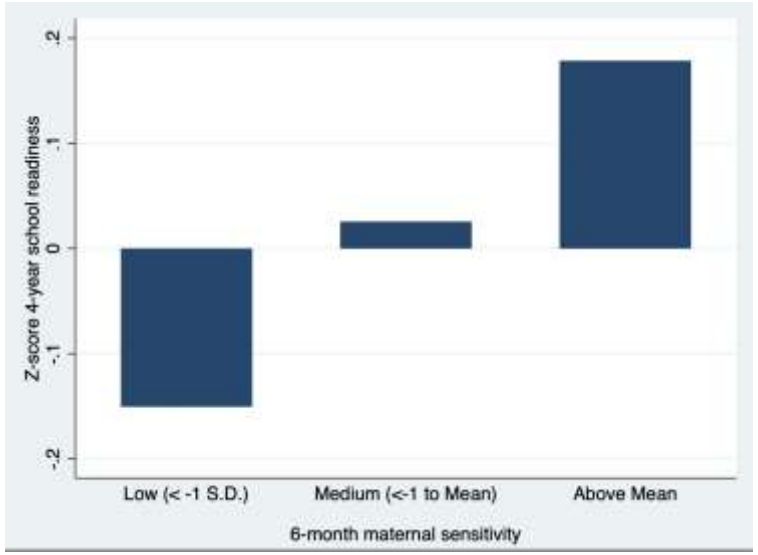

Continues through childhood

## Age 9
## Improved Reading Fluency

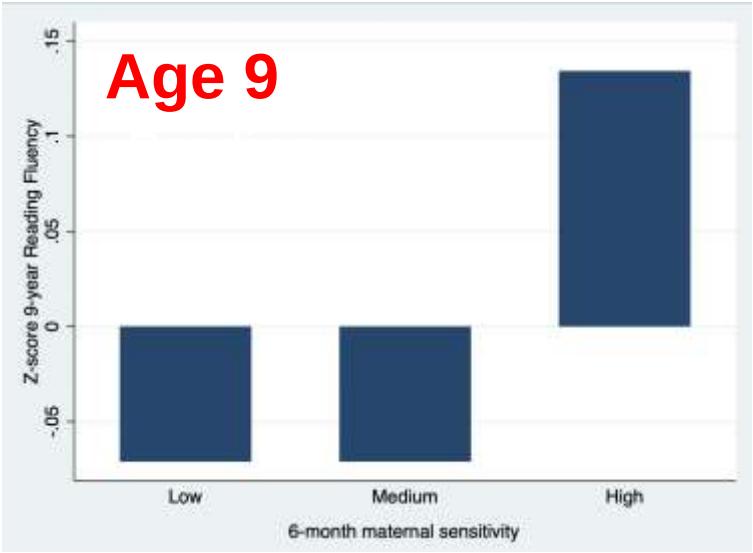


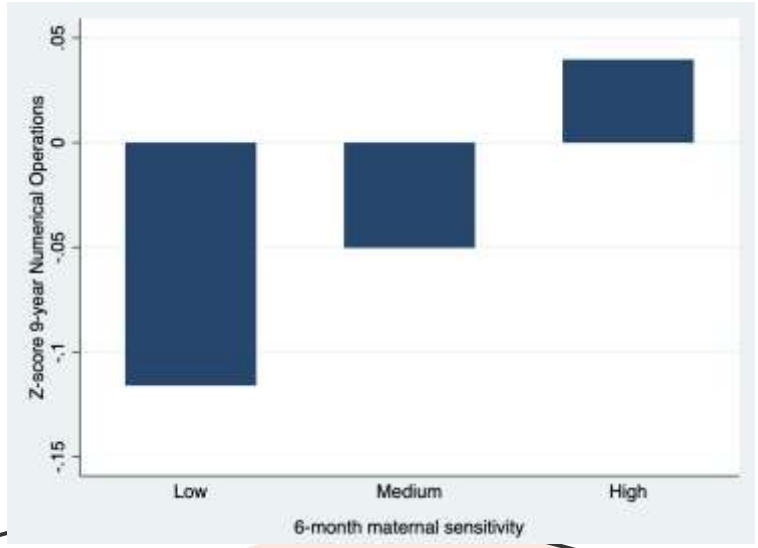
# Maternal sensitivity and achievement 9 years later

## Age 4
### School Readiness




## Age 9

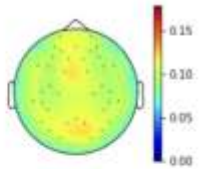
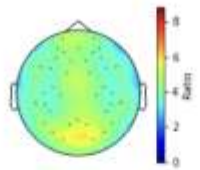
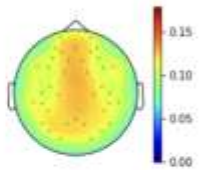
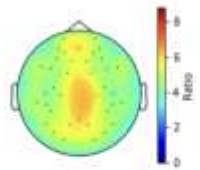
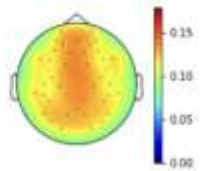
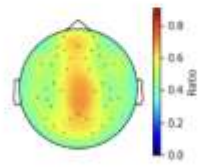
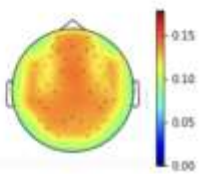
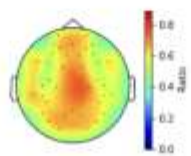



Maternal Sensitivity at 6 months

From: **Associations Between Infant Screen Use, Electroencephalography Markers, and Cognitive Outcomes**

JAMA Pediatr. Published online January 30, 2023. doi:10.1001/jamapediatrics.2022.5674

| Screen Time | Relative Theta (% Total Power) | Theta/Beta Ratio |
|---|---|---|
| <1 hour/day (n=18) |  |  |
| 1 to 2 hour/day (n=55) |  |  |
| 2 to 4 hours/day (n=41) |  |  |
| >4 hours/day (n=15) |  |  |

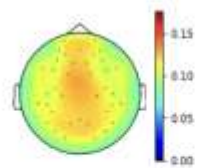
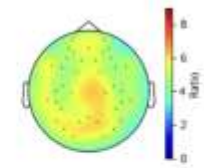
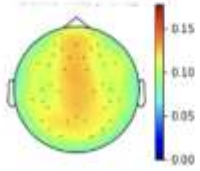
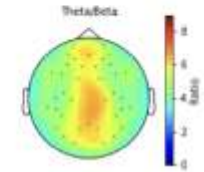
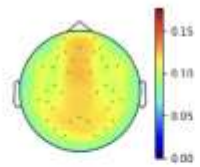
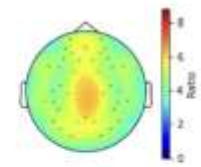
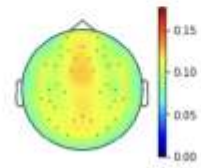
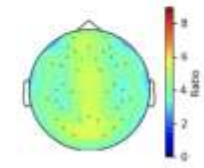
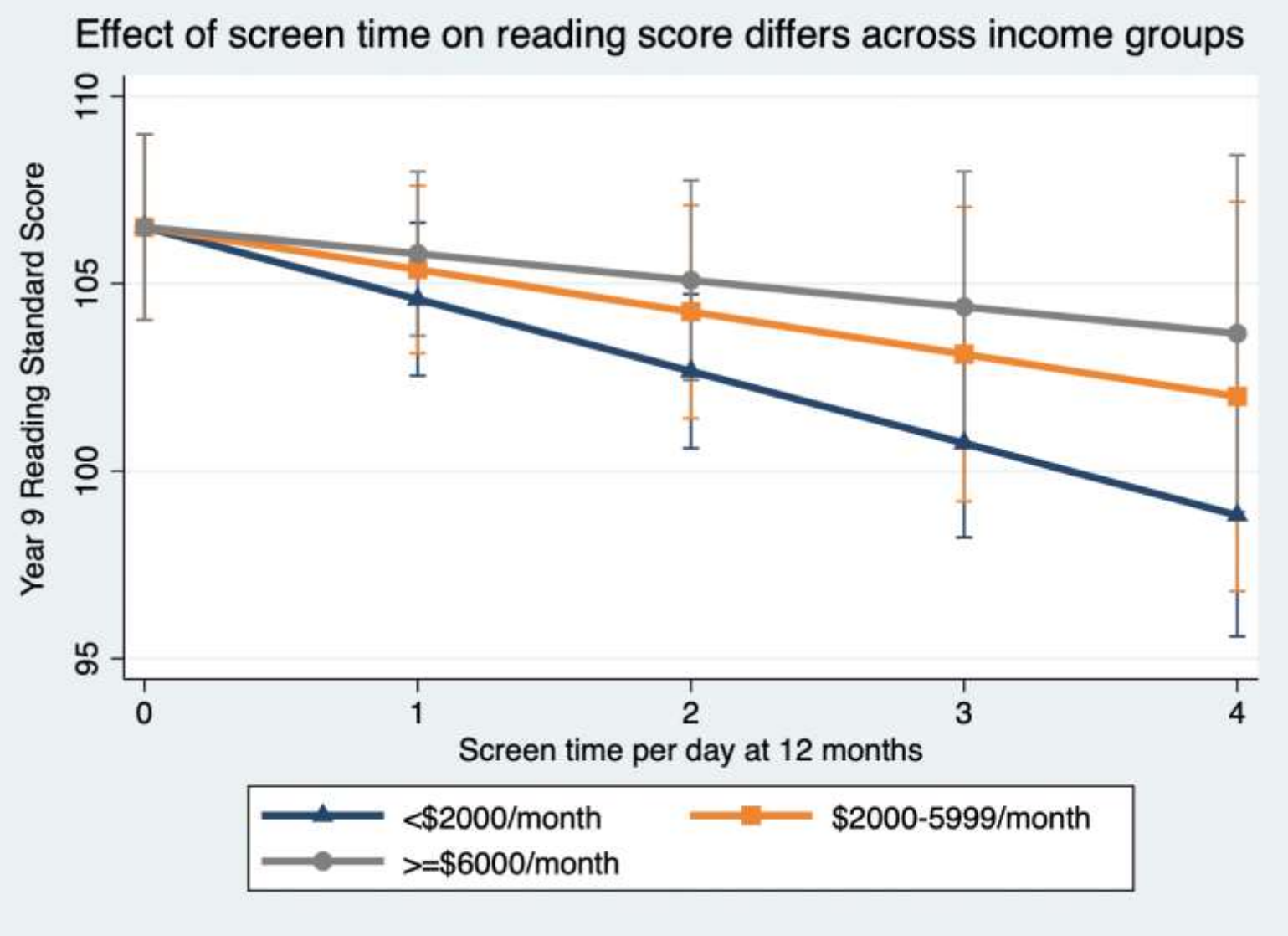
| Household Income | Relative Theta (% Total Power) | Theta/Beta Ratio |
|---|---|---|
| <SG$2000/month (n=27) |  |  |
| SG$2000-3999/month (n=54) |  |  |
| SG$3000-5999/month (n=31) |  |  |
| ≥SG$6000/month (n=37) |  |  |

Figure Legend:

Brain Topographic Maps of Postulated Neural Correlates Based on Infant Screen Time per Day

# Screen time at age 1 and oral reading fluency at age 9



# Interventions to improve executive function

- Targets: maternal mental health, sensitivity and behaviour, care-giver infant interactions
- The impact for screen-time is not direct; it is a proxy for passive care-giver attention
- Recent evidence suggests that active care-giver attention obviates the socioeconomic gradient and is the protective element.
- *Serve and return* interactions (reading, play) appear to be key
  - Explains maternal sensitivity effect
  - Passive screen exposure
  - Likely mediates the maternal mental health effect
  - Can be promoted across all socioeconomic groups

# The transition from child to adult

- In western society is prolonged and unstructured
- Has multiple components
  - Physical maturation
    - Hormonally driven
  - Psychosexual maturation
    - Hormonally and socially determined
  - Brain maturation
    - Environmentally and genetically determined
  - Psychosocial and emotional maturation
    - Temporally and socially determined
  - Acceptance as an adult
    - Culturally and legally determined

- Is a time of switching authority from parent to self (and peers)
- **Risk taking behavior on adolescence is normal** and results from changes in brain function

# Proximate factors

- The current context
  - **Digital milieu**
    - Lack of filtering
    - Changed group identity/confusion
    - Cyberbullying/ad hominem anonymous attack
    - Changed use of leisure with reduced sociality,
    - Social isolation, reduced skills for interpersonal relationships
    - Sexualisation pressures
    - Premature identity closure

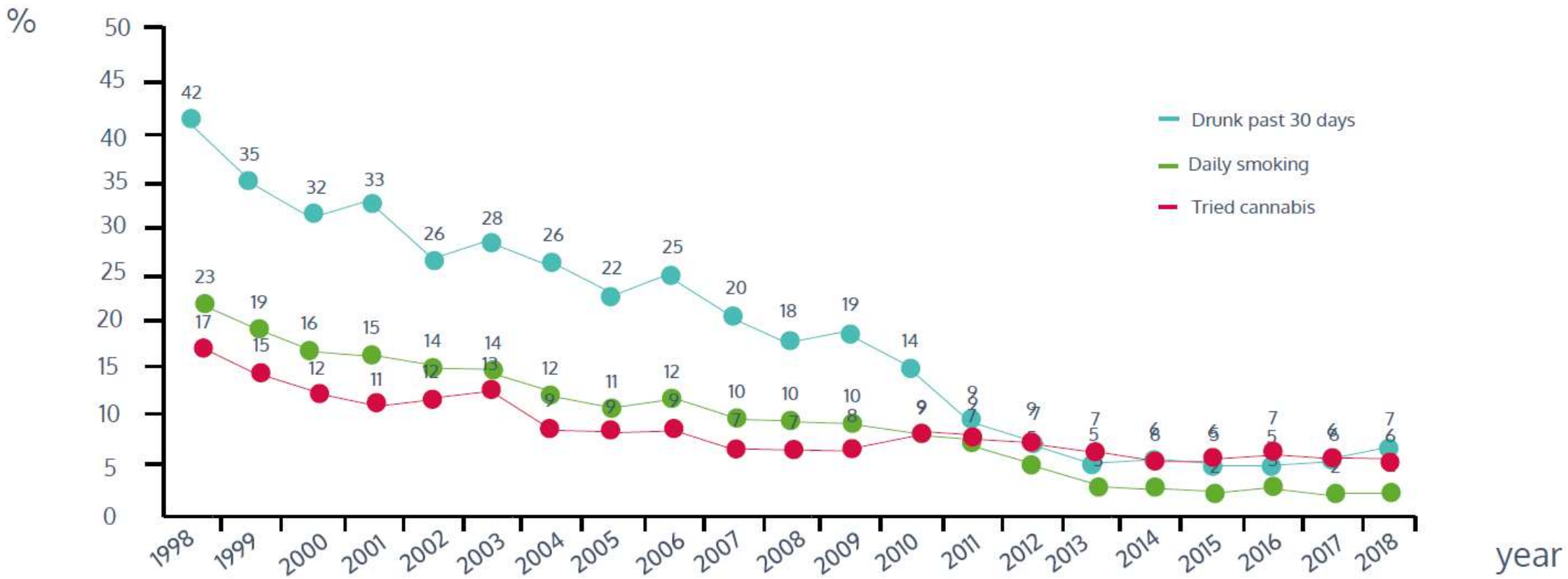
# Identity formation takes time and experience

- Individual identity and group identity both rely on
  - Inheritance (not necessarily genetic)
  - Development
  - Environment
    - Rules, boundaries, norms
    - Ritual
- Growing concern that the digital milieu is forcing premature identity closure – from later to early adolescence

# Proximate factors

- The current context
  - Digital milieu
  - **Drugs and alcohol**

# Substance use among 15-16 year old Icelandic youth




*J Sigfusson, ICSRA*

# The Iceland model

- All-stakeholder involvement
- At every scale  from macro to micro-community
- Promote parental responsibility
- Organised leisure activities
- Promote normative pressures (curfew, family dinners)

# Proximate factors

- **The current context**
  - Digital milieu
  - Drugs and alcohol
  - **Peer expectations**
  - **Narcissistic expectations**
  - **Overwhelming choice**

# Proximate factors

- **The current context**
  - Digital milieu
  - Drugs and alcohol
  - Peer expectations
  - Narcissistic expectations
  - Overwhelming choice
  - **Rapid social change, loss of boundaries**

# Proximate factors

- **The current context**
  - Digital milieu
  - Drugs and alcohol
  - Peer expectations
  - Narcissistic expectations
  - Overwhelming choice
  - Rapid social change, loss of boundaries
  - **Ecoanxiety**
  - **Lost of trust with authority**

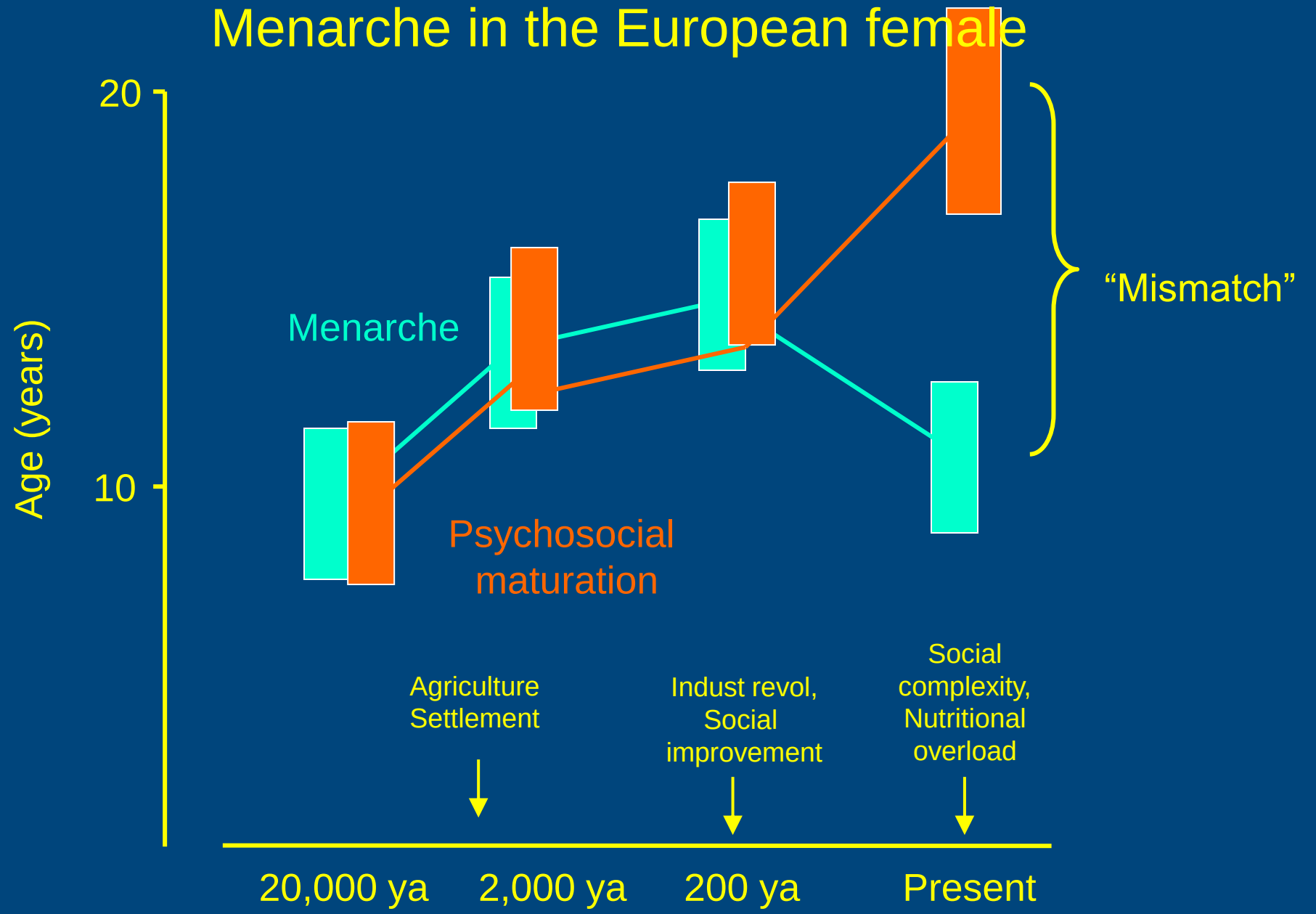
# Proximate factors

- **The current context**
  - Digital milieu
  - Drugs and alcohol
  - Peer expectations
  - Narcissistic expectations
  - Overwhelming choice
  - Rapid social change, loss of boundaries
  - Ecoanxiety
  - Lost of trust with authority
  - **Decline in social structures for youth**

# Proximate factors

- **The current context**
  - Digital milieu
  - Drugs and alcohol
  - Peer expectations
  - Narcissistic expectations
  - Overwhelming choice
  - Rapid social change, loss of boundaries
  - Ecoanxiety
  - Lost of trust with authority
  - Decline in social structures for youth
  - **Reduced age of puberty**
  - **Changing sleep patterns**

# Menarche in the European female




*Gluckman & Hanson (2006) Trends Endocrinol Metab*

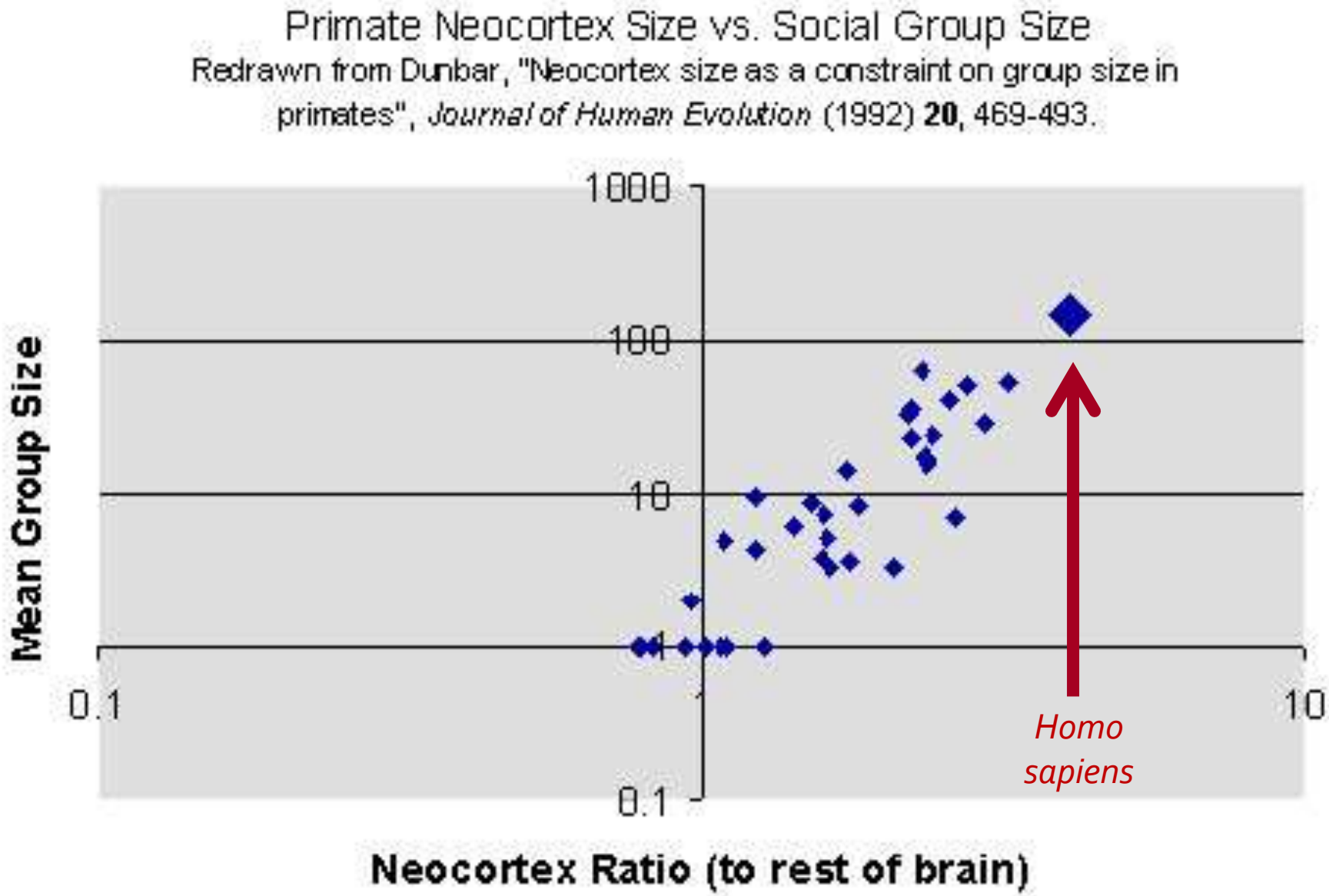
# Males – early versus average

| | |
|---|---|
| • Bad health | 1.9 times higher |
| • Functional symptoms | 2.2 times higher |
| • Victimisation | 1.7 times higher |
| • Sexually active | 1. 8 times higher |
| • Smoking | 1.8 times higher |
| • Drunk in last 6 months | 1.4 times higher |
| • Cannabis | 1.8 times higher |
| • Illegal drugs | 2 times higher |
| • Depression | 2.1 times higher |
| • **Suicide attempts** | **4.9 (3.0-8.1) times higher** |

All $p<0.001$

# Proximate factors

- **The current context**
  - Digital milieu
    - Lack of filtering
    - Changed group identity/confusion
    - Cyberbullying/ad hominem anonymous attack
    - Changed use of leisure with reduced sociality,
    - Social isolation, reduced skills for interpersonal relationships
    - Sexualisation pressures
  - Drugs and alcohol
  - Peer expectations
  - Narcissistic expectations
  - Overwhelming choice
  - Rapid social change
  - Ecoanxiety
  - Lost of trust with authority
  - Decline in social structures for youth
  - Reduced age of puberty
  - Changing sleep patterns
  - **Social group size**


Primate Neocortex Size vs. Social Group Size
Redrawn from Dunbar, "Neocortex size as a constraint on group size in primates", *Journal of Human Evolution* (1992) **20**, 469-493.
1000
100
10
1
0.1
Mean Group Size
0.1
1
10
Neocortex Ratio (to rest of brain)
*Homo sapiens*

# Suicide

- Some suicide in youth is a result of severe psychiatric disease but much is not
- Most is a result of the combination of
  - Deficient  emotional self regulation
  - Drugs and alcohol
  - An emotional  precipitant
  - Suicidality is in young people not always internalized as final
  - The challenge of contagion
- Suicide prevention in  young people
  - Role of education system
  - Role of peers
  - Counsellors/support
  - Medical care

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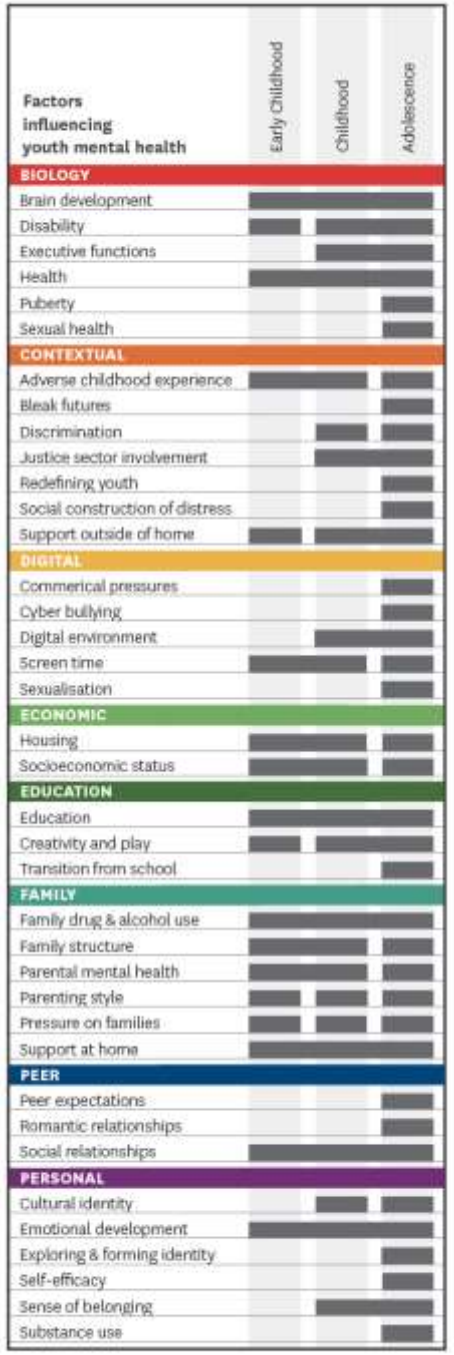
Report

# Exploring factors influencing youth mental health:

## What we know and don't know about the determinants of young people's mental health

Dr Jessica Stubbing, Teina Rihari,
Dr Anne Bardsley, Sir Peter Gluckman

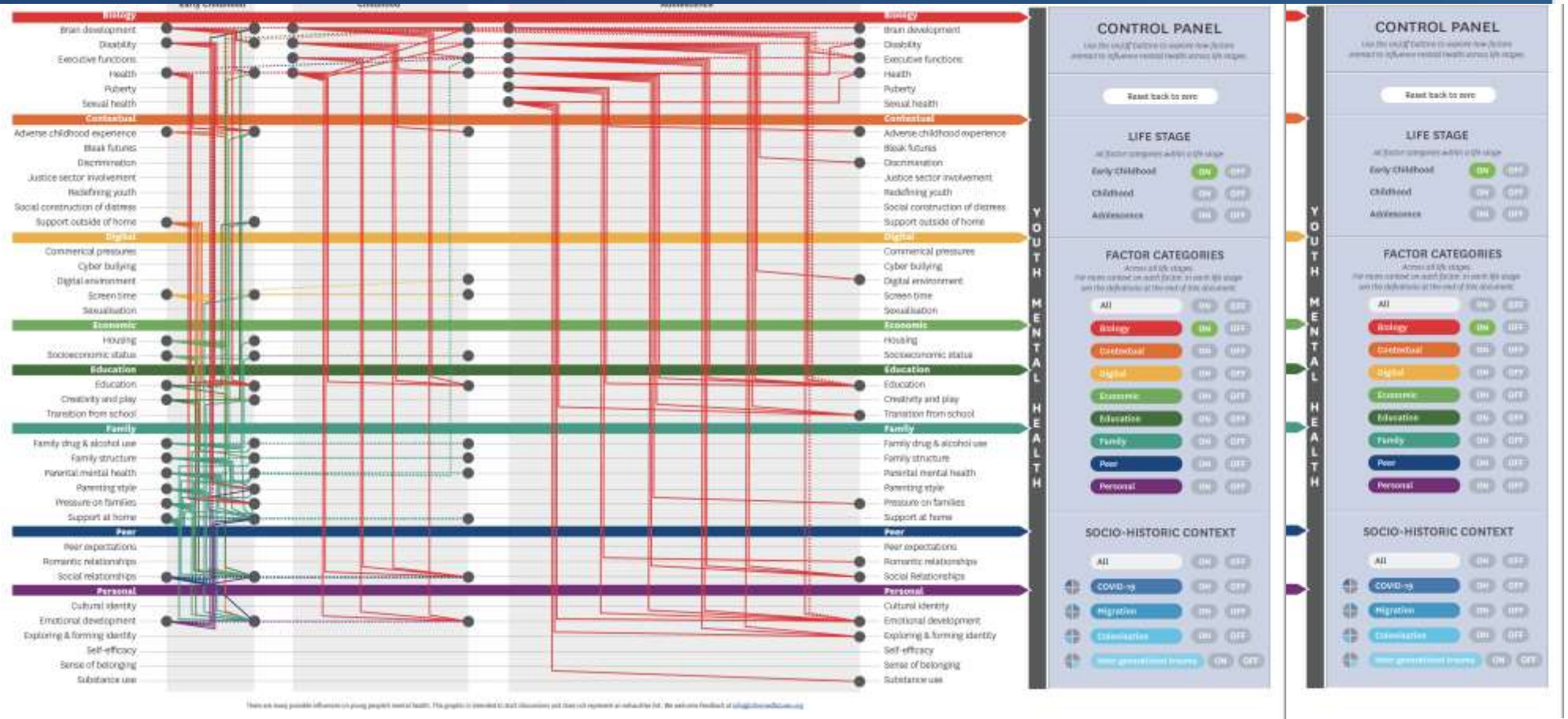
July 2023




Summary of factors influencing youth mental health over time.

# Youth Mental Health Infographic

Authors: Dr Jessica Stubbing, Teina Rihari, Dr Anne Bardsley, Sir Peter Gluckman



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Dr Evelyn Law, Singapore

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