

The developmental context of self harm – brain, mind and body

Professor Kate Steinbeck

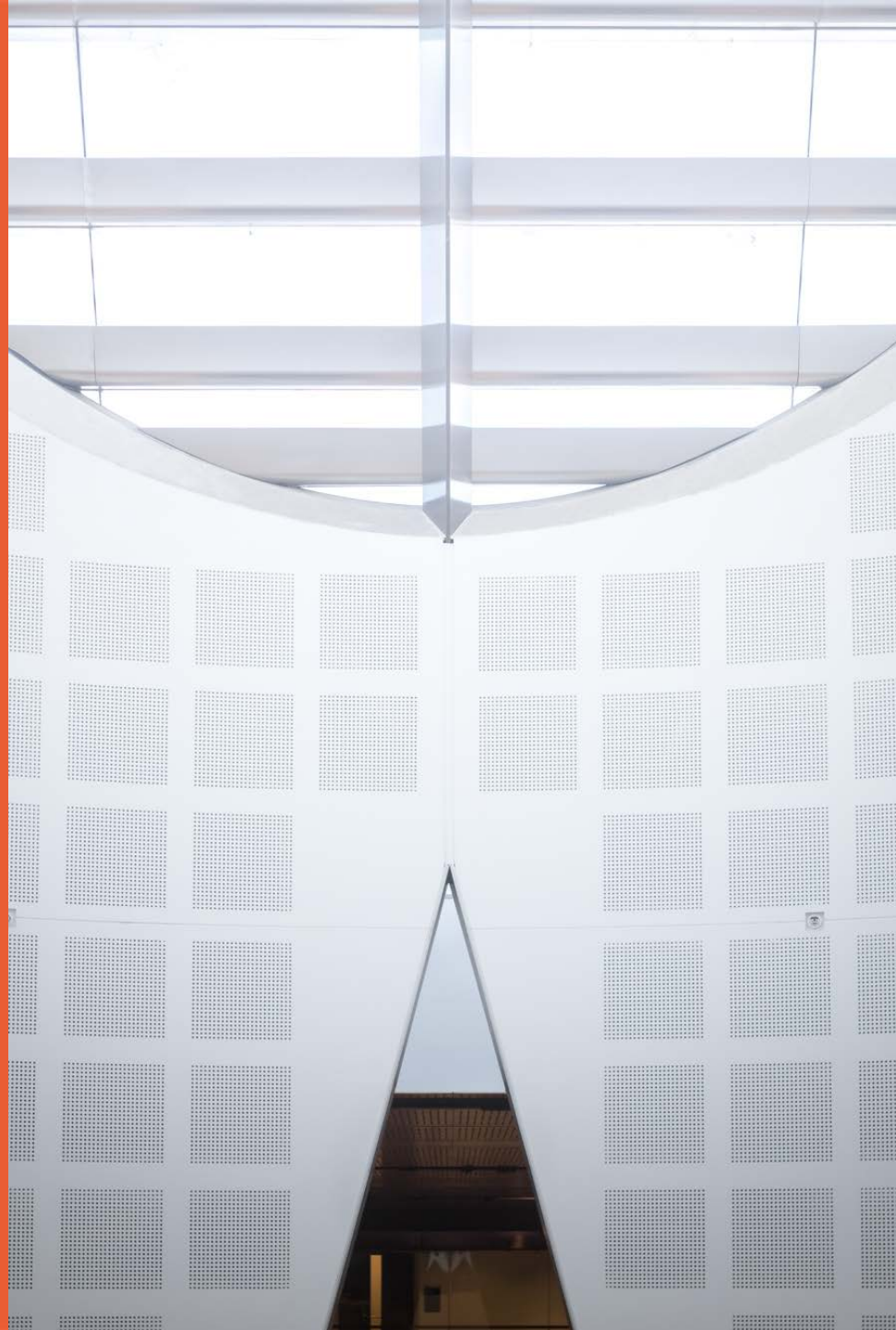
Discipline of Child and Adolescent Health

Sydney Medical School

Kate.Steinbeck @health.nsw.gov.au



THE UNIVERSITY OF
SYDNEY



Outline

- Self harm in non-mental health services
- Focus on the Emergency Department
- What is it about adolescents and young people
- Questions that need answers
- Health care provision issues

Self harm in non-mental health services

- May not screen
- Must be a frequent co-morbidity in general practice
- General risk-averseness
- Uncertainty what to do
- Young person may end up in less than optimal services

Chronic health conditions

High risk of self harm:

- Epilepsy 2.9 (2.8 to 2.9)
- Asthma 1.8 (1.8 to 1.9)
- Migraine 1.8 (1.7 to 1.8)
- Psoriasis 1.6 (1.5 to 1.7)
- Diabetes mellitus 1.6 (1.5 to 1.6)
- Eczema 1.4 (1.3 to 1.5)
- Inflammatory joint conditions 1.4 (1.3 to 1.4)

Neither a high nor low high risk of self harm:

- Cystic fibrosis 1.0 (0.9 to 1.2)
- Coeliac disease 1.0 (1.0 to 1.1)
- Crohn's disease 1.0 (1.0 to 1.1)
- Spina bifida 1.1 (0.9 to 1.2)

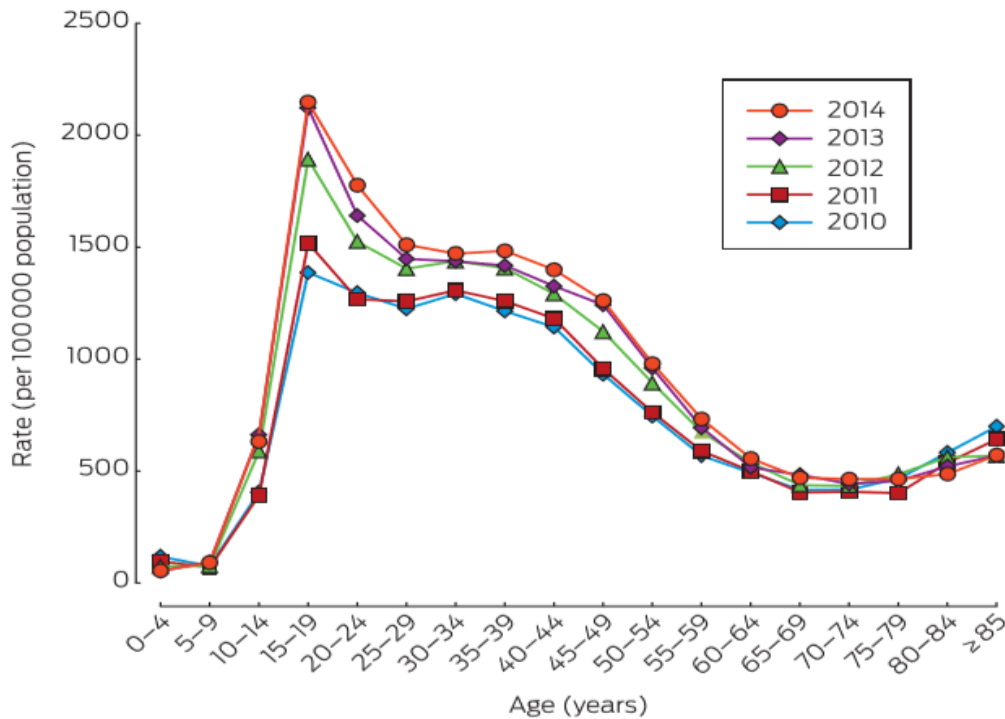
Low high risk of self harm:

- Cancers 1.0 (0.9 to 1.0)
- Congenital heart disease 0.9 (0.8 to 0.9)
- Ulcerative colitis 0.8 (0.7 to 0.8)
- Sickle cell anaemia 0.7 (0.6 to 0.8)

Focus on the Emergency Department

- Increasingly adolescents are high users of emergency departments (EDs)
- Often for conditions better seen elsewhere
- Reasons behind this are not clear
 - Open 24/7
 - Confidentiality
 - Not clear about the role of EDs

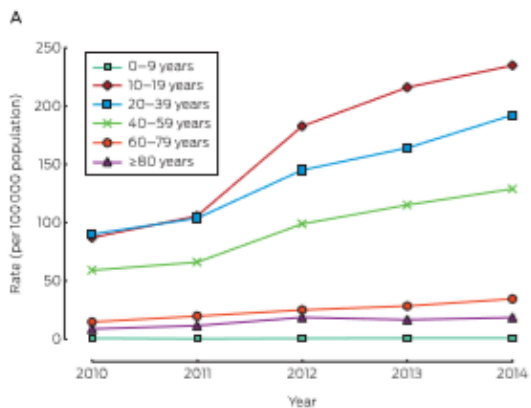
2 Age-specific rates of presentations for mental health problems to New South Wales emergency departments, 2010–2014



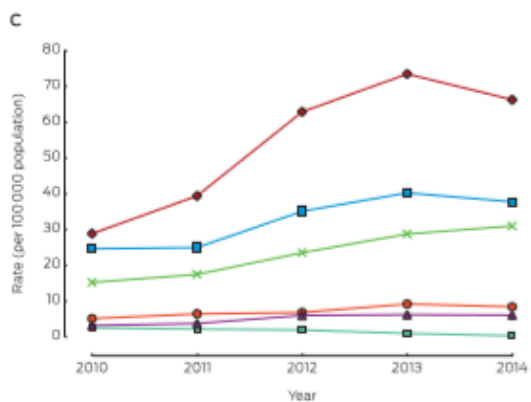
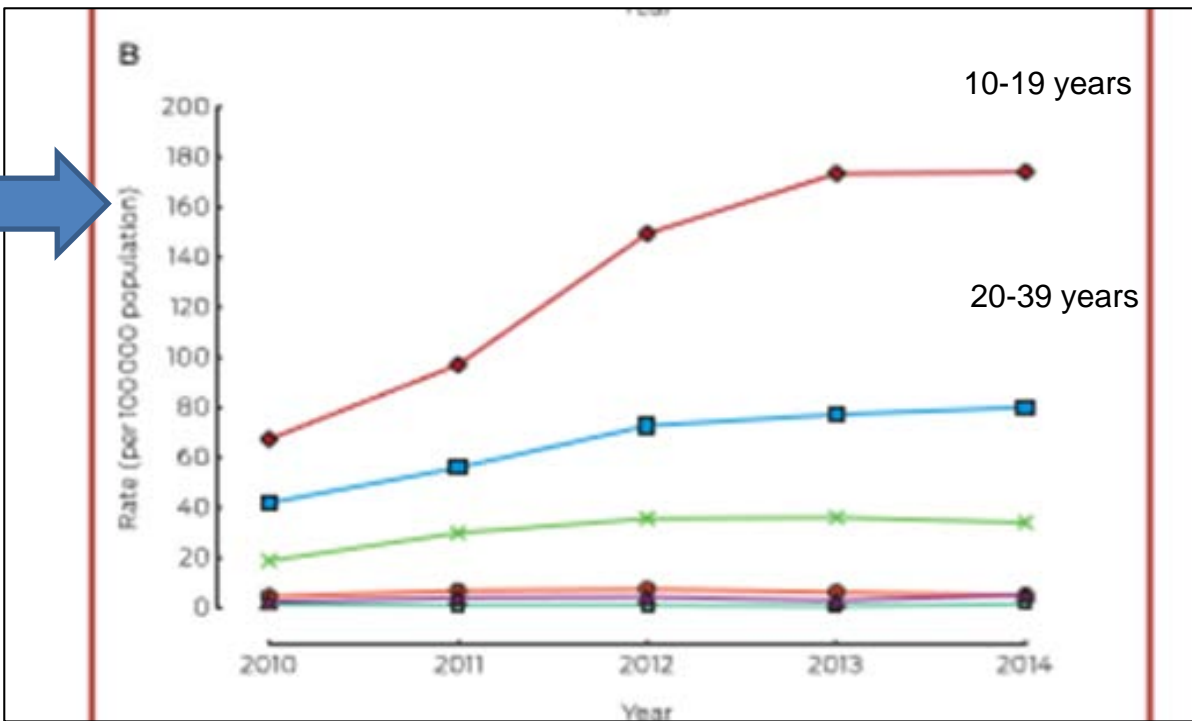
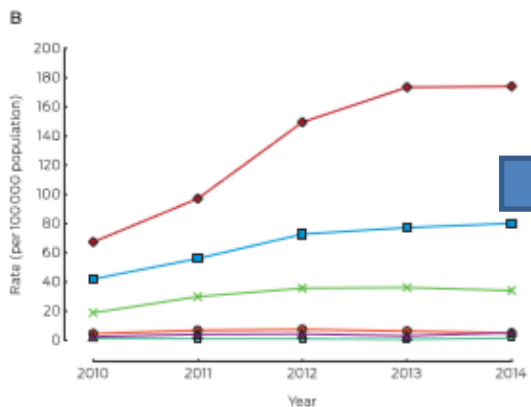
Data source: Emergency Department Data Collection Registry. ◆

Perera et al
 MJA 2018
 208 (8): 348-353.
 doi: 10.5694/mja17.00589

4 Age-specific rates of presentations to New South Wales emergency departments, 2010–2014, by age group, for A. suicidal ideation and behaviour; B. self-harm; C. intentional poisoning



B: Self harm presentations



Data source: Emergency Department Data Collection Registry. ◆

Perera J, Dinh M, Bein K, King R, Shields R, Ivers R; **Steinbeck K.** Rates of Emergency Department presentations for self-harm, suicidal ideation & intentional poisoning in NSW, Australia. A study using state-wide linked emergency data 2010-2014. 2018 MJA 208 (8): 348-353. || doi: 10.5694/mja17.00589

What is it about
adolescents and
young adults?



THE UNIVERSITY OF
SYDNEY

Self harm

- Intentional self harm is a behaviour
- What might drive an increase in this behaviour in the second decade
- There are **three** major developmental domains to consider when assessing behaviour
 - Physical growth and development – **hormones**
 - **Neurocognitive** development (internal)
 - **Psychosocial** development

Puberty

- Puberty hormones
 - Growth in body size: strength & co-ordination changes
 - Reproductive capability: increase in sexual interest & drive
- Clear sex difference emerges in affective disorders which parallels testosterone (M) and oestradiol (F)
- Sex differences in brain size & structure
- The relationships between hormones and brain function **are still being studied**

Neurocognitive change & the behaviour patterns it drives



Adolescent behaviour is not species specific

Spear Dev Cog Sci 2010

- Adolescent traits are conserved across species
- These must serve some very good evolutionary purpose
- This purpose can be summarised as
 - The drive for autonomy and achievement of independence from family of origin
 - Active drive to seek new experiences
 - Close connections with peer group

Behaviours

BJ Casey Ann Rev Dev Psychol 2015; 66:295-319

- This journal article contains a number of images that I used in my presentation
- In summary teenage behaviours can be explained by Neuroscience and are normal developmental stages, NOT aberrant or abnormal
- The limbic system which influences reward and emotion matures early, while the executive control systems of the pre-frontal cortex mature later
- Maturity is about optimising brain circuits

Neurocognitive Transitions

Events - years	10 - 14	15-19	20 - 24
Puberty hormones rise			
Synapses proliferate			
Synapses are pruned			
Myelination of nerve fibres			
The limbic system matures			
Growth of corpus callosum			
Maturation of prefrontal cortex			

Self-control

- Self control is viewed as an ability to suppress inappropriate emotions, desires and actions in favour of alternate, appropriate ones and varies between individuals at all age groups
- Lack of self control is often viewed as immaturity, but is it always dangerous?
- Intentional self harm could be viewed as a behaviour resulting from inability to suppress emotions

Reward seeking and fear circuits



THE UNIVERSITY OF
SYDNEY

Self control and rewards

- Response to rewards is **exaggerated in adolescents** compared to children or adults = a heightened sensitivity to rewards
- This peaks at about 15 years and may be influenced by learning signals – they learn that not all rewards have equal value
- Social context is important – **peers create a social reward** which motivate adolescents towards action – even if the value of the reward is doubtful

Self control when fear is perceived

'Fright and flight'

- Adolescents have difficulty suppressing fear reactions – their fear associations are harder to regulate or control
- Adolescents may also appear not to be able to assess risk initially but are capable of learning when fear is relevant or not – takes time to mature

Some questions that need answers

- How brain research, which relies on MRI scans and visualisation of glucose use in brain areas during stimuli (tasks, pictures), is translated into real life
- The true impact of puberty hormones – these stay at the same high level in adulthood but adolescent specific behaviours disappear
- What are the true impacts of social context?

Neurocognitive development and how it relates to deliberate self harm

- Strong complex emotions
- Attempt at control of these
- Obtain relief from emotions and feelings
- Fear of being invisible
- Difficulties in communication of feelings to others

Social media & other digital technologies

- No clarity on the impact of E-technologies on self harm
- Focus on social media and its self-regulation
- Limited empirical data for sound debate
- Universal acknowledgement that social media can have positive (peer support and belonging) and negative (reinforcement of negative emotions and information on techniques) impacts

“I in no way support self harm but would like to give you some ways of feeling pain without putting yourself into immediate danger. My suggestions would be to use an eraser really fast on your skin. It leaves a burning feeling but doesn't cause scars. Another option that i would suggest is to scrub your teeth until they bleed and then to swash lemon juice around your mouth. This really burns and isnt visible”.

“We're building up to more dangerous here, so do not go overboard with this one. Burning can be quite a common way of self-harming, and can get quite serious too (I'm not going to give you any examples of some of the worse cases), so make sure you stick to something small. Putting out a match with your fingers is quite a good way of self-harming with burning. It'll sting a bit and it will burn you, but stick it under cold water and it will be just fine. The same could be done with candles if they're available. Candles also provide wax which you could use, but make sure that you remove it as soon as it touches your skin. Wash it off. Repeat the process if you want, but don't leave it on your skin and try not to do it when the wax is well passed its melting point (we are trying to keep this fairly safe). The most serious burning method that I'll give you (as I said, not going into the horror stories) involves a lighter.....,

“Less dangerous again - tourniquet, or something similar, preferably with something thinner than a belt (string would be quite good, a pair of wired headphones might also do if you need something common-place, but could hurt the headphones).”

QUORA for the over 13s

Health care provision issues

- Complex presentations
- Complex legalities related to safety
- Complex navigation pathways & boundary disputes
- Under-resourced public health services
- Marginalised and vulnerable miss out on services design for mainstream
- Lack of knowledge and lack of data

The developmental context of self harm – brain, mind and body

Professor Kate Steinbeck

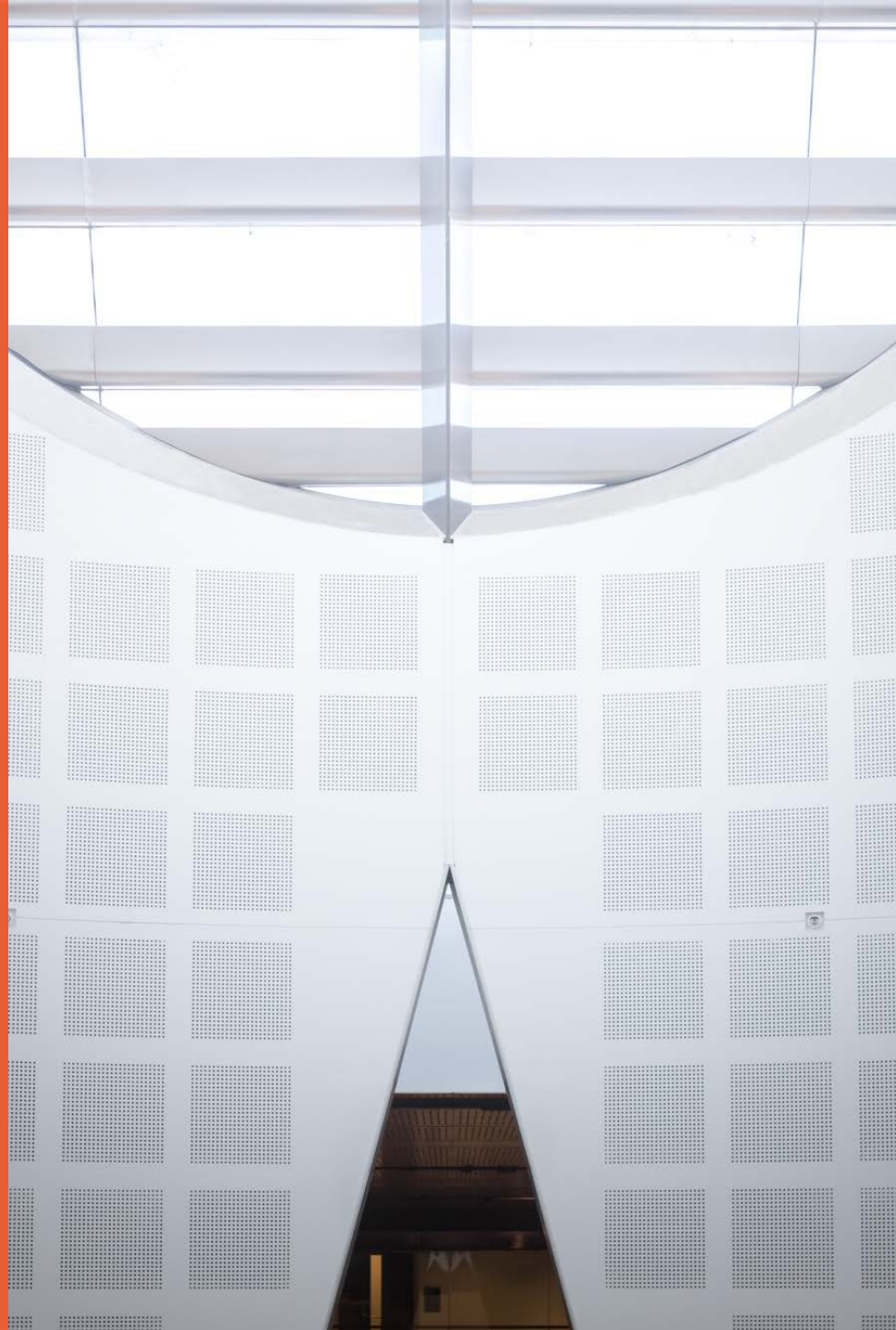
Discipline of Child and Adolescent Health

Sydney Medical School

Kate.Steinbeck @health.nsw.gov.au



THE UNIVERSITY OF
SYDNEY



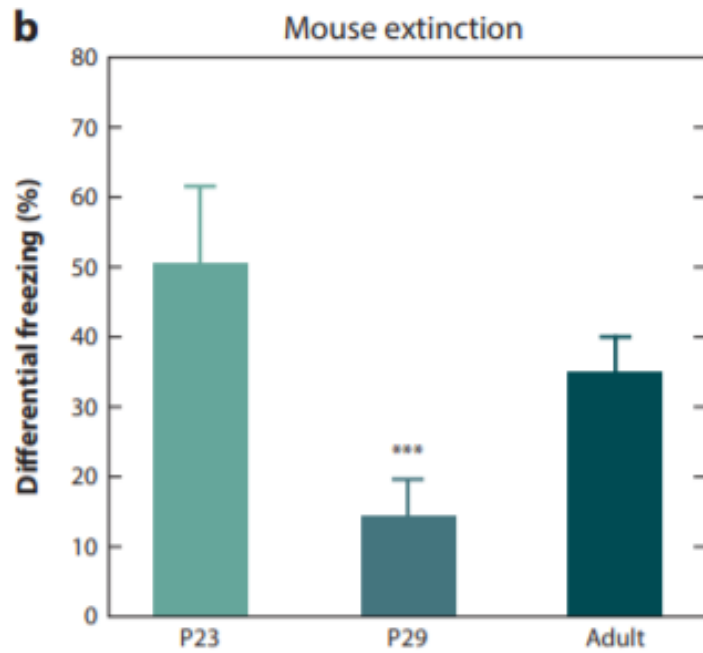
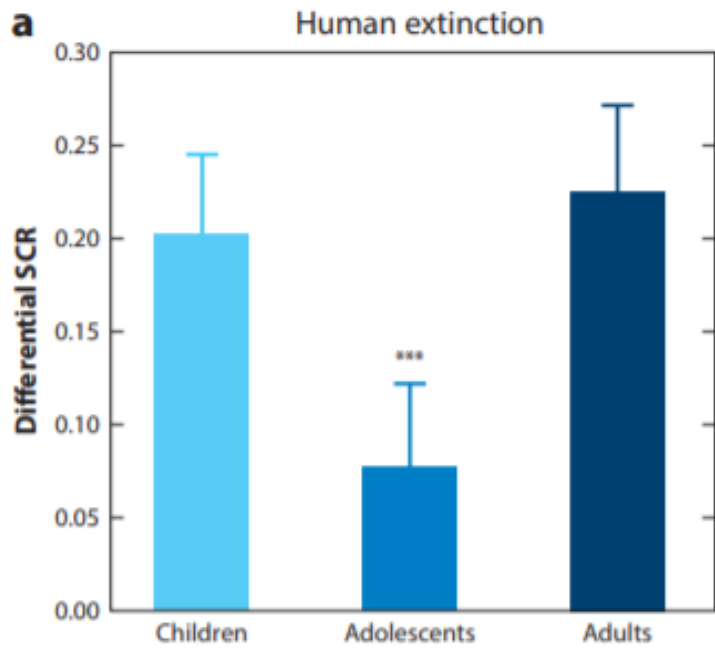


Figure 7

Systems Model of Adolescent Risk Taking

Schulman et al Dev Cog NeuroSci 2016 17:103-117

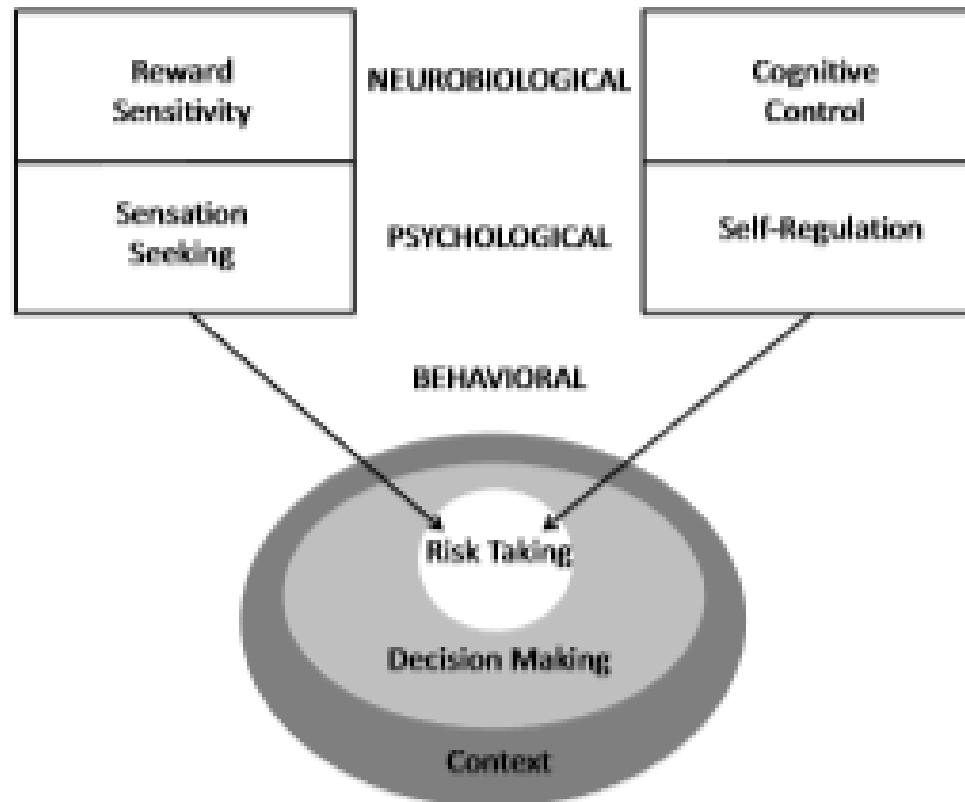


Fig. 2. Constructs implicated in the dual systems model of adolescent risk-taking arranged by level of analysis.

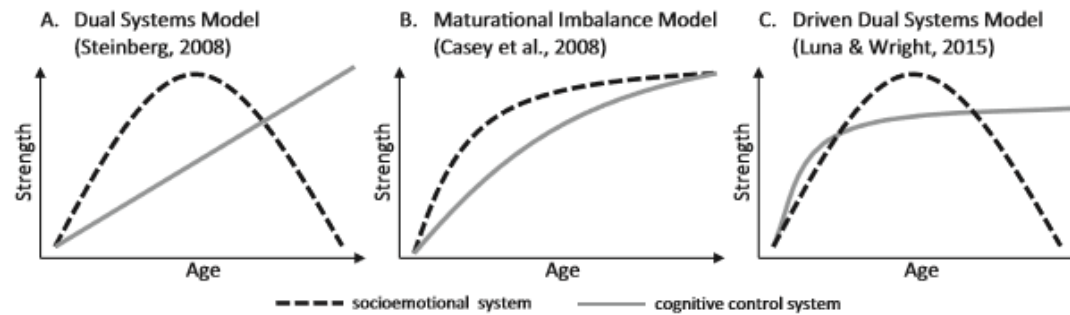


Fig. 1. Alternative theoretical models of the development of the socioemotional (reward processing) and cognitive control systems from about age 10 to age 25.