Thinking differently about mental health

Transformation Seminars

#TransformationSeminars

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Development of psychopathology: How can neurocognitive research improve our understanding of environmental risk?
How can we use multiple methodologies to gain a better understanding of why psychopathology develops?
Instead of pitting ‘biology’ and ‘environment’ against each other, we need to understand their interplay.
• Antisocial behaviour as an example

• Early onset antisocial behaviour → Lasting consequences; costly to society
• Individuals with antisocial behaviour (or ‘conduct problems’ in children) form a heterogeneous population

• Do not all have identical presentation and risk factors
Individual differences: Risk of developing antisocial behaviour

- Need to understand different developmental pathways to antisocial behaviour to target prevention and interventions
• Callous-Unemotional (CU) traits one way of differentiating a subgroup of children with conduct problems (CP) who are at an increased risk of developing psychopathy/persistent antisocial behaviour
Common to many children with Conduct Problems:
Aggression, violence, stealing, truanting

Frick et al., 2014; Viding & McCrory, 2015
CP with High CU

- Capable of proactive aggression
  - Do not worry about hurting others

- Capable of manipulation

- Reduced motivation for prosocial behaviour
CP with LOW CU

- Often aggress when feel under threat or when frustrated
- Can feel bad about hurting others
Conduct Problems

Common to many children with Conduct Problems: Difficulties in processing reward and punishment information

Frick et al., 2014; Viding & McCrory, 2015
• CP with high CU:
  • Have difficulty recognising fear in others
  • Are not distracted by fearful faces
  • Lower physiological arousal to distress
  • Signals that curb proactive aggression are muted?

Hodsoll, Lavie, & Viding, 2014, FINHS;
Jones et al., 2010, JCPP
Blair et al., 2014
• Children with CP/HCU:
  • Are not distracted by happy faces
  • Report diminished desire to join in with others’ laughter
  • Signals that promote prosocial engagement are muted?

Hodsoll, Lavie, & Viding, 2014, FINHS; O’Nions/Lima, Scott, Roberts, McCrory & Viding, 2017, Current Biology
CP with LOW CU

- Hostile attribution biases?
- Attentional bias to negative emotional stimuli
- Emotional arousal to others’ distress

Viding et al., 2012; Blair et al., 2014
Aberrant functioning of the brain’s reinforcement circuitry.

Brazil et al., 2017; Blair et al., 2014; Cohn et al., 2015a&b; Viding & McCrory, 2015
• Helps explain why children with CP make poor choices and are not good at anticipating the consequences of their actions
Conduct Problems

Low CU  High CU

We also see some differences in the neural correlates between CP/LCU and CP/HCU children

Brazil et al., 2017; Blair et al., 2014; Cohn et al., 2015a&b; Viding & McCrory, 2015
Masked Fear Task

Viding, Sebastian, Dadds, Lockwood, Cecil, DeBrito, & McCrory (2012), AJP

Fear Condition

- Target
- Backward Mask

Calm Condition

- Target
- Backward Mask

17ms 183ms 300ms ISI

• Identity of target and mask always differed. Equal male and female faces.
• Based on series of papers by the Whalen group.
Groups matched for IQ, SES, handedness (N: CP(low CU) = 15; Comparison = 16; CP(High CU = 15).

Findings not explained by group differences in conduct disorder, ADHD, anxiety, depression or substance use symptoms.
• Heterogeneity of neural response to negative emotions in children with CP

• Also found using other paradigms
  – Complex emotional scenes (Sebastian et al., 2012)
  – Attention to negative emotion (Sebastian et al., 2014; Hwang et al., 2016)
  – Pain processing (Lockwood et al., 2013; Marsh et al., 2013)
• **HCU** children show attenuated neural response to distress/negative affective stimuli (e.g. in amygdala and insula)

• **LCU** either not different from TD or show an exaggerated neural response to distress/negative affective stimuli
Neural response to positive emotions?
Listening to Genuine Laughter – TD > HCU youth

N=93 (TD=31; HCU=32; LCU=30; matched for SES, IQ, handedness, ethnicity)

- Supplementary Motor Area
  [-14 -9 58]

- Anterior Insula
  [-34 3 -15]

p < .05 FWE corrected, small volume correction (anatomical ROIs)

O’Nions/Lima, Scott, Roberts, McCrory, & Viding (2017)
*Current Biology*
• Those with CP/HCU report that they do not feel like joining in with laughter as much as TD children

• Anterior insula activity differences partly explain differences in self-reported desire to join in

O’Nions/Lima, Scott, Roberts, McCrory, & Viding (2017)

Current Biology
• Reduced AI and SMA engagement could reflect:
  – decreased positive affect in response to laughter
  – decreased preparation to join in/laugh along

• Cause or consequence of atypical affiliation?
Conduct Problems

Viding et al., 2005
Conduct Problems

Viding et al., 2005
What genes?

Arousal to distressing affect?

Affiliation?

- Cumulative polygenic effects?
- Rare variants?
- Gene-environment interplay?
What environments?

Harsh and inconsistent discipline?

Warm and consistent parenting – protective?

Hyde et al. (2016) American Journal of Psychiatry;
Henry, Dionne Viding et al. (2018) JCPP
• Gene-environment correlation (Plomin et al., 1977)
  – Many parenting/family/peer variables related to CP have a genetic component
• Heritable individual differences in:

• social information processing,
• reasoning,
• affect regulation etc.
• This impacts upon:
  – how the children behave and what they respond to
  – how the caregivers behave and how they react to the child
People shape their own environments

- Parents and children in biological families share genetic vulnerabilities
  - Some ‘parenting → child behaviour ‘associations an ‘epiphenomenon’ of genetic risk in the family

e.g. Moffitt, 2005; Jaffee & Price, 2008; Viding et al., 2009
• **Illustration:** phenomenon of evocative gene-environment correlation

• Different children (with different behavioural repertoires) can evoke remarkably different reactions in the same adult
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• **Illustration:** phenomenon of evocative gene-environment correlation

• Different children (with different behavioural repertoires) can evoke remarkably different reactions in the same adult
Twin and adoption research has demonstrated that gene-environment correlation partly explains risk of developing antisocial behaviour (e.g. Moffitt 2005; TenEyck & Barnes, 2015)
• Genetic and neurocognitive vulnerabilities
  – Restrict the range of possible social inputs over development
  – Shared vulnerabilities may undermine the caregiver’s capacity to respond to needs of a child
Mothers of children with CP/HCU seek eye contact with their children.

Children with CP/HCU show lower levels of eye-contact towards their mothers and express less affection.
Families with CP/HCU children had atypical affective involvement when compared with TD ($p = 0.00; d = −1.17$) and CP/LCU ($p = 0.03; d = −0.62$) families. E.g. “We only show interest in each other when we can gain something out of it personally”; “We are too self-centered”. Qualitative analyses in line with this.
• NOT just gene-environment correlation

• Early adversity can also impact how the child learns about their environment and reacts to other people
The concept of Latent Vulnerability

McCrory & Viding, 2015

Development and Psychopathology

The theory of latent vulnerability: Reconceptualizing the link between childhood maltreatment and psychiatric disorder
Adaptation to adverse environment $\rightarrow$ Latent Vulnerability

- Multiple systems, such as those supporting detection of threat, recalibrated to ‘fit’ with adverse environment

- May not be immediately accompanied by symptoms of a disorder, but makes the child more vulnerable to future stressors
  - Direct and indirect effects

McCrory et al., 2011; McCrory & Viding, 2015
• Brain not just a ‘receiver’, but also a ‘creator’ of environments
• Brain not just a ‘receiver’, but also a ‘creator’ of environments

• Genetic and environmental factors calibrate how the brain processes information and have an impact on socialisation and social interactions
Successful socialisation!

- Making others happy is rewarding – do it!
- Others’ distress is upsetting – avoid it!
- Punishment and sanctions are not nice – avoid them!

CP/HCU
Excessive arousal to perceived threat
- G
- E

Poor ability to compute consequences of behaviour

Reduced social support

Threat reactive aggression

CP/LCU
• To make progress in mitigating environmental risk, we need to understand individuals as active creators of their own environments
• How the child and parents process information constrains what works for them and what they respond to
• Interventions for antisocial behaviour often use conditioning approaches

• Conditioning approaches that promote good behaviour are hard to implement consistently if:
  – the child is challenging
  – the adult has difficulty with planning or emotion regulation
  – If we are using the ‘wrong’ rewards and punishments
Building resilience – what should we consider?

• Expectations:
  
  – Most difficult children and most difficult families are the hardest to engage
  
  – A difficult child may respond to intervention, but may still remain in the clinical range
    
    • Longer interventions?
    
    • Interventions at multiple developmental points – ‘Inoculation and booster shots’
• Could use conditioning approaches that alter information processing biases, but work on the child’s specific difficulty

- **CP/LCU** – reduced reactivity to perceived threat (e.g. Penton-Voak et al., 2013)

- **CP/HCU** associate instrumental rewards with social rewards?
• Effortful strategies?
  – Emotion regulation training
  – Learning to look after ‘number 1’ in a prosocial way (what is in it for me?)
Parents, educators and clinicians need support to:

– better understand where difficult behaviour stems from
– to implement alternative socialisation strategies that might not be intuitive

Can this help avoid ‘burn out’?
Summary

• We need to advocate for more research and intervention focus on CP

• Researchers need to learn from clinicians and need to communicate with clinicians to more effectively help children with CP and their families

• Huge cost savings to the society – better life for everyone
Thank you!

TEDS, schools, families and children


Collaborators
Robert Plomin, Francesca Happe, Geoff Bird, Jon Roiser, Ahmad Hariri, Alice Gregory, Cesar Lima, Fruhling Rijsdijk, Sophie Scott, Andrea Mechelli, Terrie Moffitt, Isabelle Mareschal, Niko Steinbeis

Funding
Future Seminars

Booking is now live for our next two Transformation Seminars:

11th December 2019 with Stephen Scott, KCL on Parenting Matters Online: a programme to help parents transform children's mental health and well-being - www.annafreud.org/51284

9th January 2020 with Danny Dorling, University of Oxford, on The Geography of Fitting In – www.annafreud.org/51112

Other upcoming Transformation Seminars include:

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<td>Daisy Fancourt</td>
<td>12th February 2020</td>
<td>Arts, community engagement &amp; social prescribing for mental health: from biomarkers to population data</td>
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<td>Miranda Wolpert</td>
<td>20th February 2020</td>
<td>How can mental health science ensure that no one is held back by mental health science</td>
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<td>Kathryn Pugh</td>
<td>3rd March 2020</td>
<td>Transforming Children and Young People’s Mental Health care policy and implementation</td>
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<td>Karen Mak</td>
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Sign up to our mailing list to know when future dates go live for booking here