UCL

Developmental Risk and Resilience Unit

Childhood maltreatment, latent vulnerability and the shift to preventative help:

Understanding the link between childhood maltreatment and long-term mental health risk

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Anna Freud National Centre for Children and Families

Glasgow 27/28th November 2017

Poor outcomes

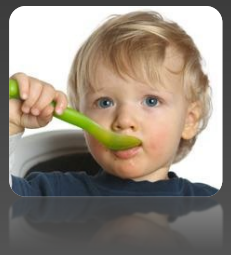
Psychiatric disorders

Attainment

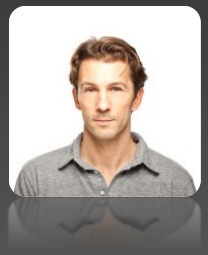
Economic productivity

Physical Health

Adversity



Healthy development

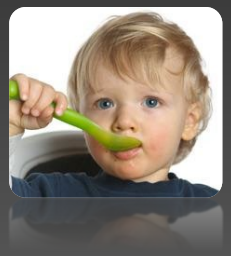


Infancy.....Childhood.....Adolescence.....Adulthood

Poor outcomes

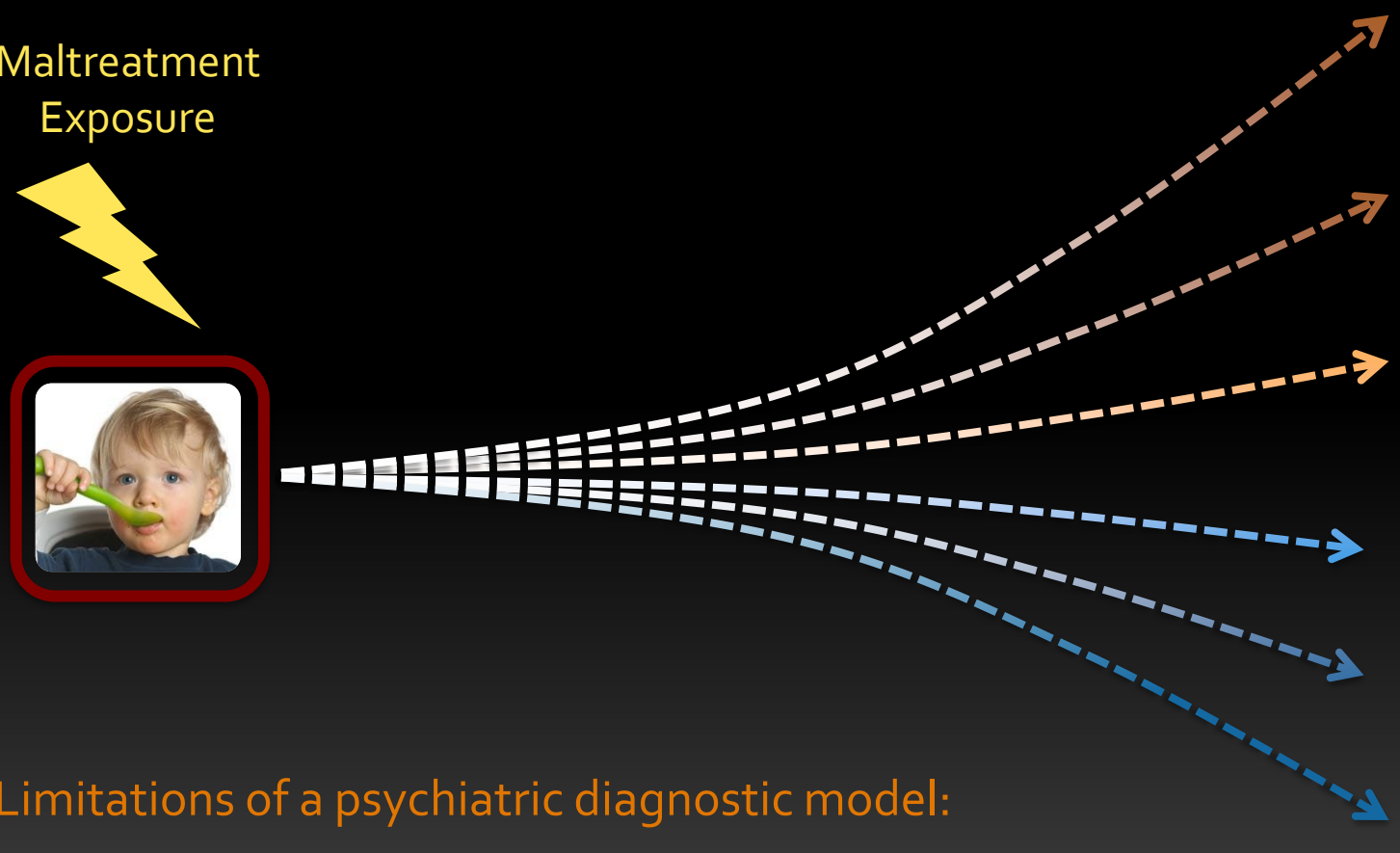
Psychiatric disorders

Adversity



- May emerge many years later
- More likely to be less responsive to traditional treatments
- Problems more likely to be comorbid
- Problems show greater severity

Infancy.....Childhood.....Adolescence.....Adulthood



Limitations of a psychiatric diagnostic model:

- Focus on trauma can obscure other mental health needs (Green et al., 2016; Woolgar et al., 2015)
- Focus on diagnostic categories can obscure causal factors and relevant situational factors.
- Mental health is viewed in terms of cut-offs rather than as a continuum. Problems often reach crisis point before they are addressed.
- Often an absence of a child-centered needs-orientated approach that seeks to understand the child's presentation in a holistic way.
- As a result children often do not get the right help in a timely way as many CAMHS professionals feel ill-equipped to deal with the complexity that the child (and system around them) presents with.

Adversity

Poor outcome

Resilient outcome

1. **Early prevention**– how can we better help and support child who have experienced maltreatment to prevent the emergence of later problems?
2. **Pinpointing mechanisms** – how does adversity get under the skin and can an understanding of this help us think about preventative approaches?

The concept of Latent Vulnerability

McCrory & Viding

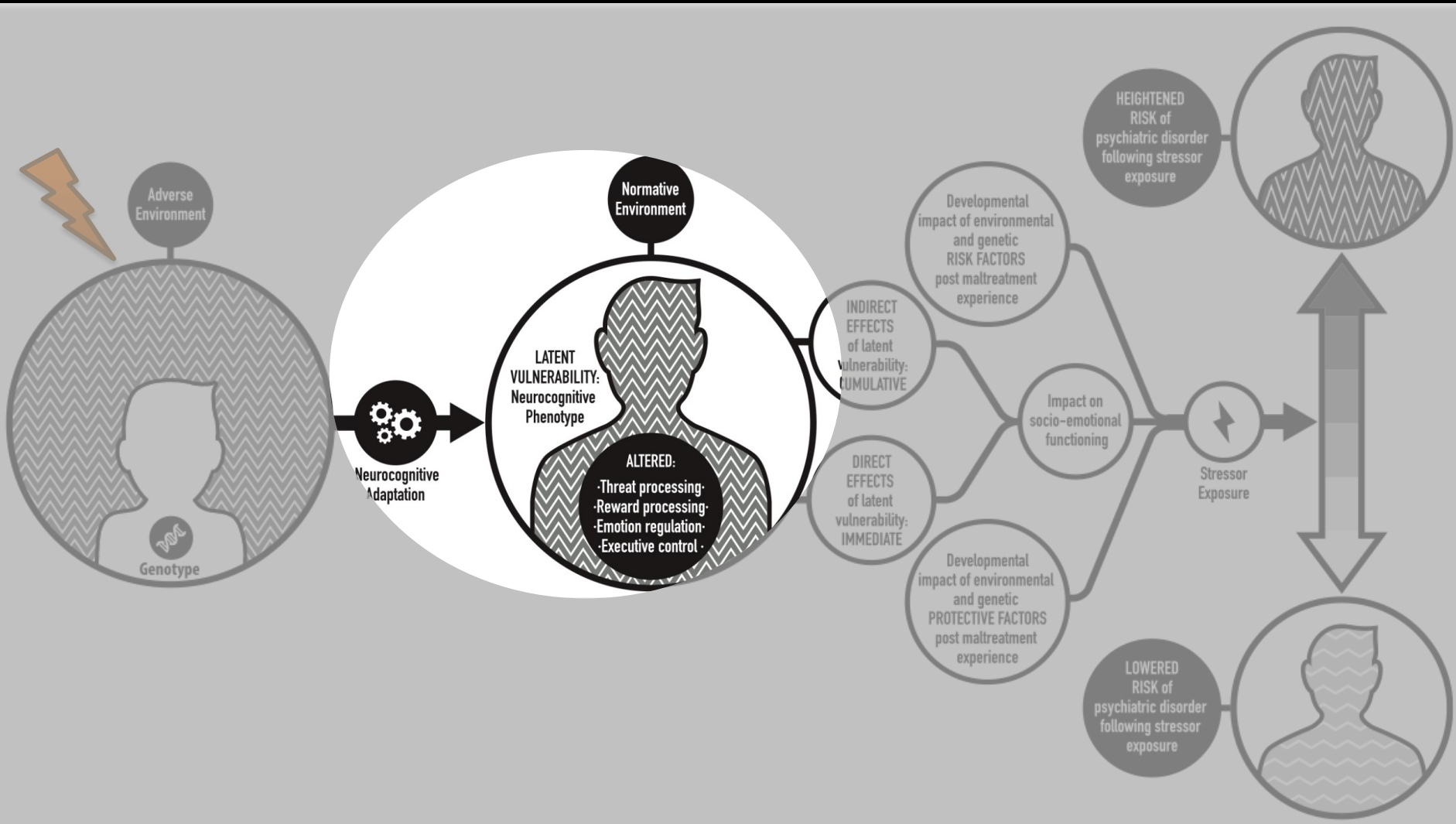
Development and Psychopathology, 2015

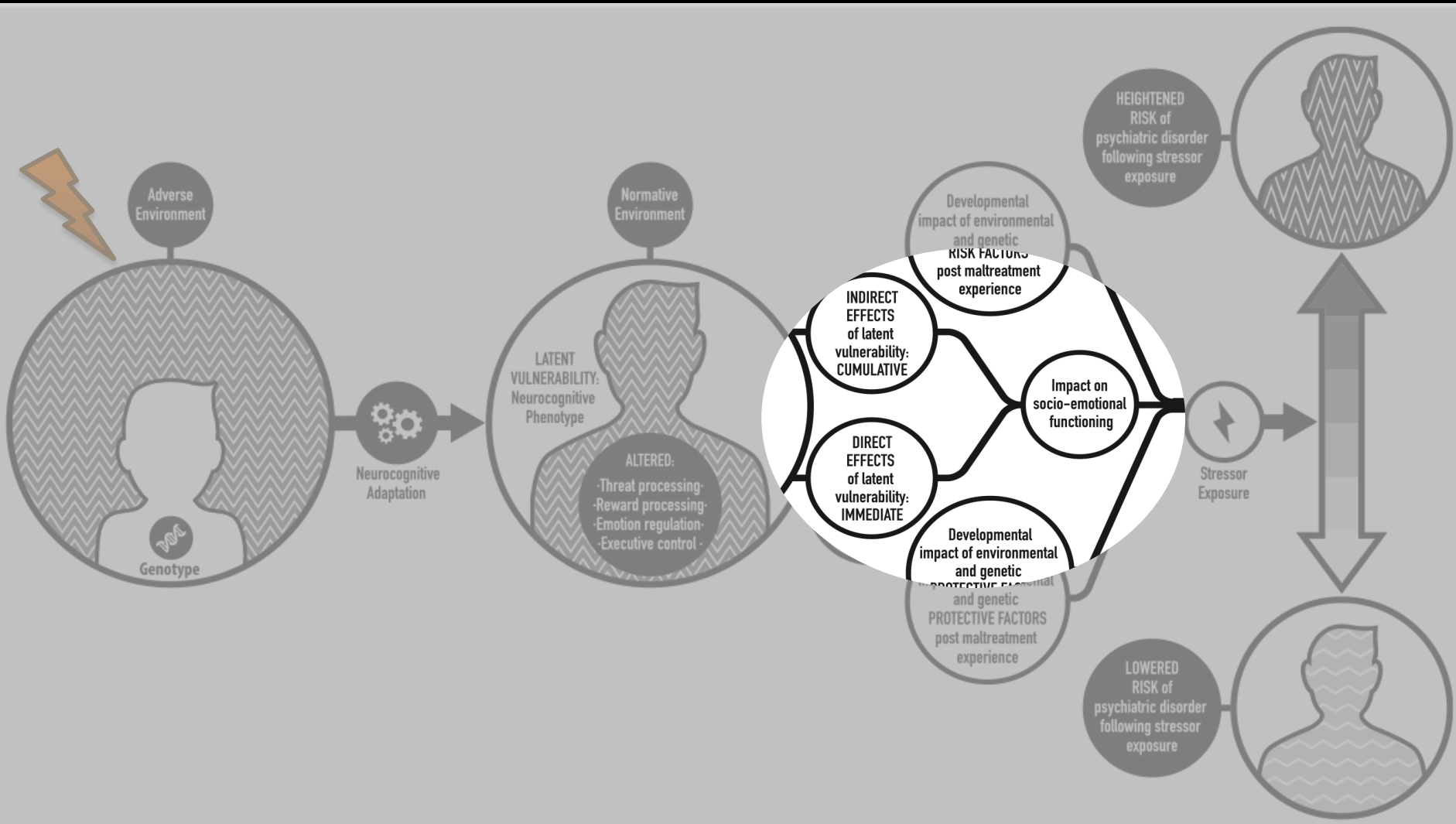
Development and Psychopathology **27** (2015), 493–505

doi:10.1017/S0954579415000115

The theory of latent vulnerability: Reconceptualizing the link between childhood maltreatment and psychiatric disorder

- Markers of latent vulnerability should be associated with maltreatment experience
- They are not necessarily symptoms
- They should be present even in the absence of psychiatric disorder
- They should be predictive of *future* psychiatric risk


Adverse Environment
Genotype
Neurocognitive Adaptation
Normative Environment
LATENT VULNERABILITY: Neurocognitive Phenotype
ALTERED:
·Threat processing·
·Reward processing·
·Emotion regulation·
·Executive control ·
INDIRECT EFFECTS of latent vulnerability: CUMULATIVE
DIRECT EFFECTS of latent vulnerability: IMMEDIATE
Developmental impact of environmental and genetic RISK FACTORS post maltreatment experience
Developmental impact of environmental and genetic PROTECTIVE FACTORS post maltreatment experience
Impact on socio-emotional functioning
Stressor Exposure
HEIGHTENED RISK of psychiatric disorder following stressor exposure
LOWERED RISK of psychiatric disorder following stressor exposure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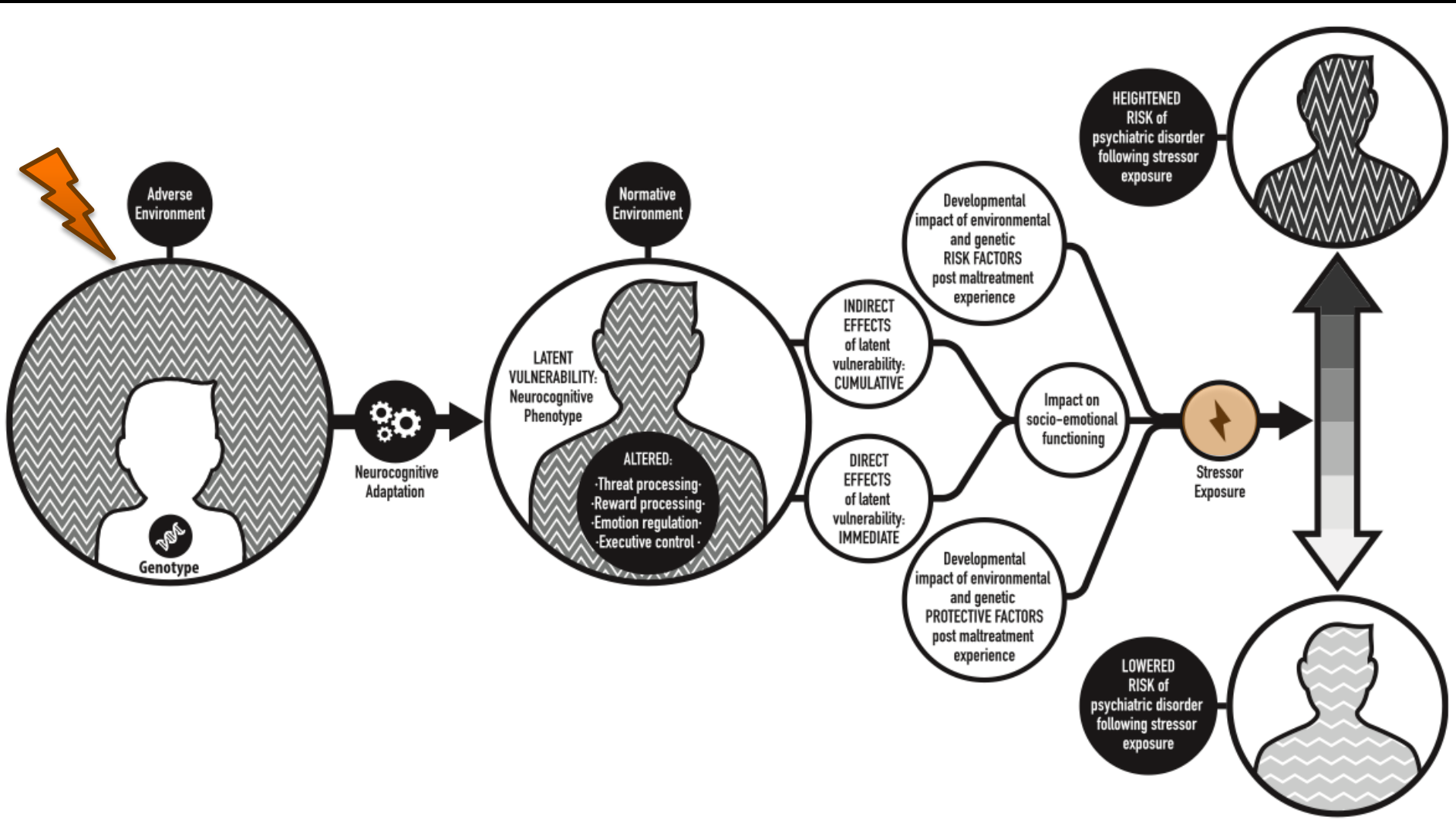
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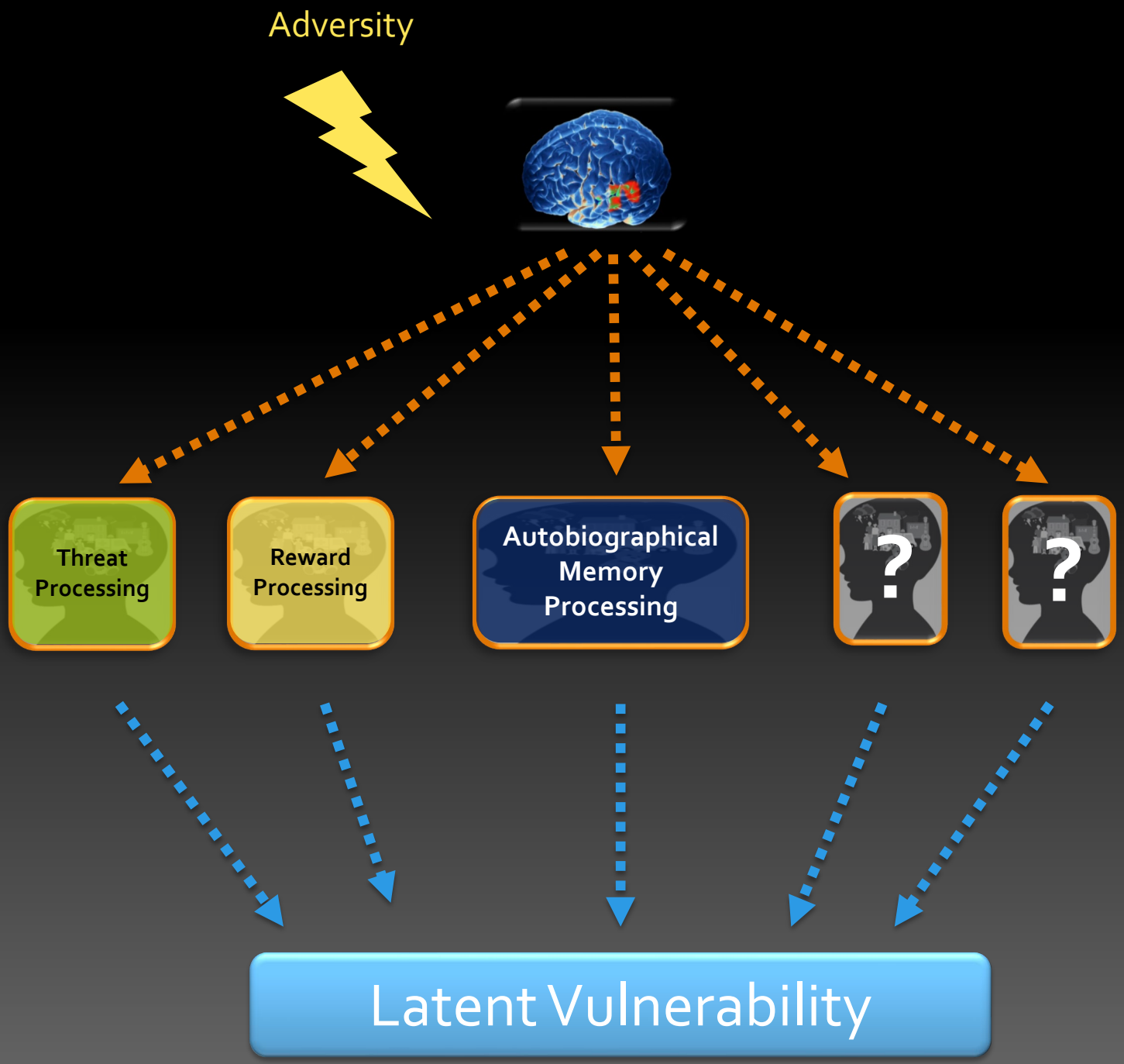
Adversity
Threat Processing
Reward Processing
Autobiographical Memory Processing
?
?
Latent Vulnerability

THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY

ACAMH THE ASSOCIATION FOR CHILD AND ADOLESCENT MENTAL HEALTH

Journal of Child Psychology and Psychiatry 58:4 (2017), pp 338–357

doi:10.1111/jcpp.12713

Annual Research Review: Childhood maltreatment, latent vulnerability and the shift to preventative psychiatry – the contribution of functional brain imaging

Eamon J. McCrory,[1,2] Mattia I. Gerin,[1,2] and Essi Viding[1]

- Threat processing
- Emotion Regulation
- Reward Processing
- Executive Functioning

i. Neural correlates

ii. Association with psychiatric disorder

iii. Association with maltreatment

THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY

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- Neurocognitive changes are observable even in the absence of psychiatric disorder and in some cases, predict future symptomatology. They are thought, in part, to reflect adaptations to early adverse environments.
- These changes are strikingly consistent with those seen in individuals presenting with psychiatric disorder suggesting such neurocognitive 'adaptations' embed latent vulnerability to future psychiatric disorder.

1. Altered threat processing

Children exposed to physical maltreatment have been shown to have altered processing of angry faces:

- able to more accurately identify angry facial expressions using sparse perceptual information than peers
- devote more attentional resources to the processing of angry faces - interpreted as increased hypervigilance to threat

Pollak & Sinha, 2002, Pollak et al., 2001

Cognition 110 (2009) 242–247

Contents lists available at ScienceDirect

Cognition

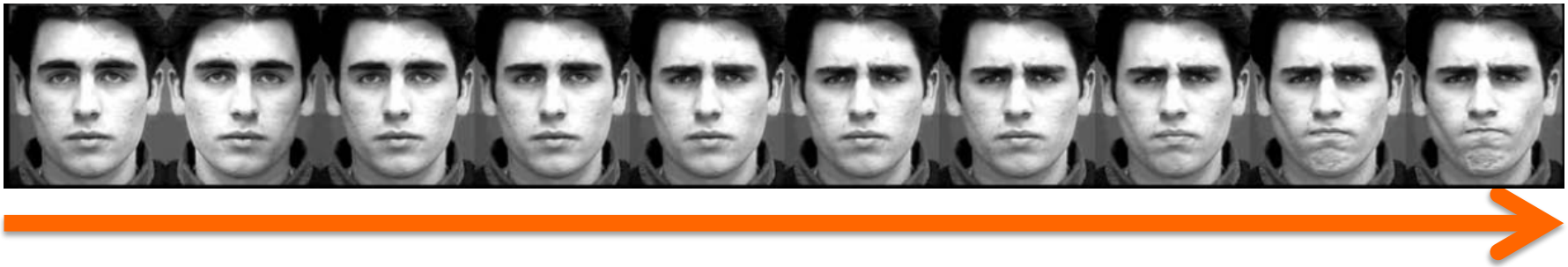
journal homepage: www.elsevier.com/locate/COGNIT

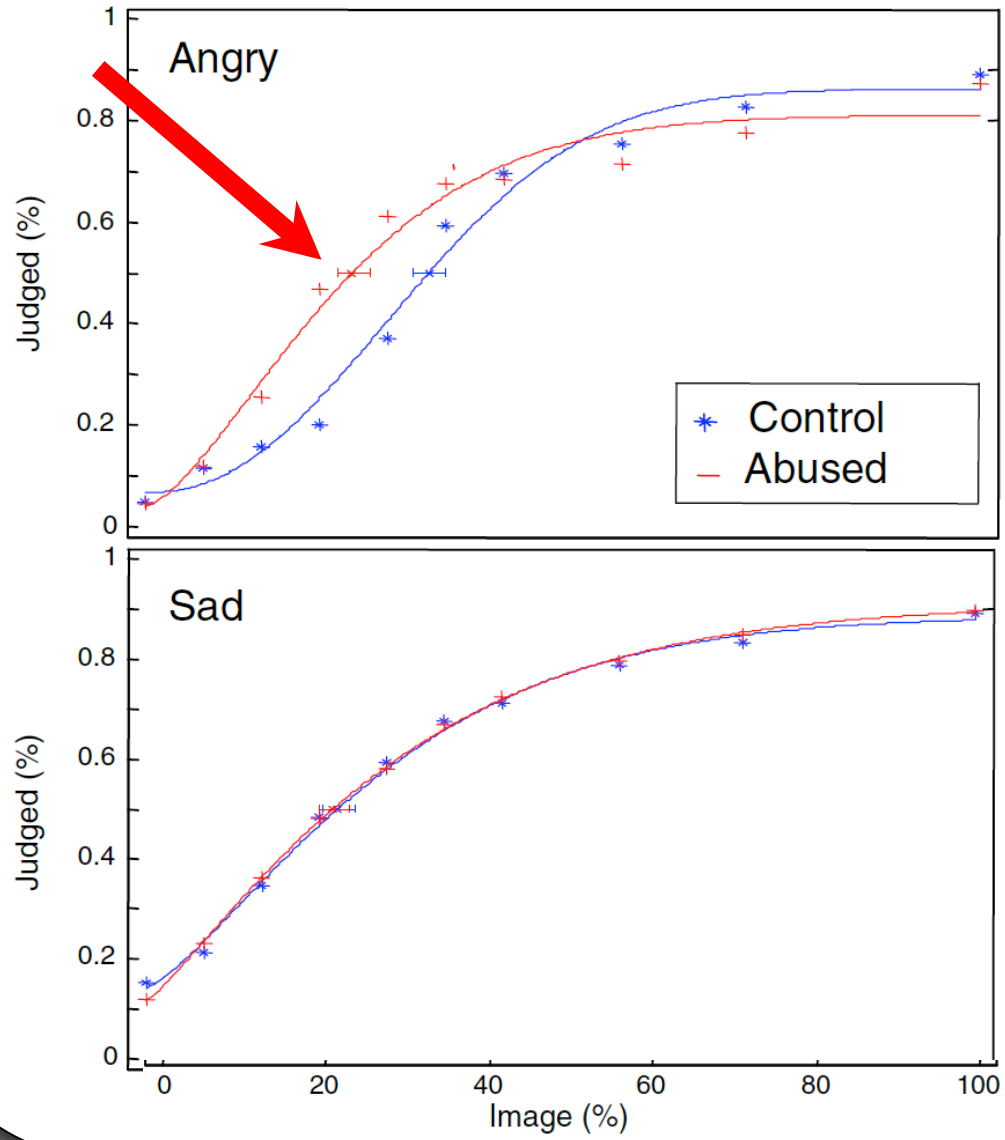
Brief article

Development of perceptual expertise in emotion recognition

Seth D. Pollak [a,*], Michael Messner [a], Doris J. Kistler [b], Jeffrey F. Cohn [c]

[a] Department of Psychology and Waisman Center, University of Wisconsin at Madison, 1500 Highland Avenue, Madison, WI 53711, USA
[b] University of Louisville, The Heuser Hearing Institute, 117 E. Kentucky Street, Louisville, KY 40203, USA
[c] University of Pittsburgh, 4327 Sennott Square, Pittsburgh, PA 15260, USA




Angry
Sad
Judged (%)
Judged (%)
Image (%)
Control
Abused
0
0.2
0.4
0.6
0.8
1
0
20
40
60
80
100

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Children exposed to physical maltreatment have been shown to have altered processing of angry faces:

- able to more accurately identify angry facial expressions using sparse perceptual information than peers
- devote more attentional resources to the processing of angry faces - interpreted as increased hyper-vigilance to threat
- In some contexts they show **avoidance** of threat cues – diverting attention away from threat cues that may be processed as aversive

Pollak & Sinha, 2002, Pollak et al., 2001, Kelly et al., 2015

Heightened neural reactivity to threat in child victims of family violence

Dec 2011

Eamon J. McCrory[1,2,*],
Stéphane A. De Brito[1,2,*],
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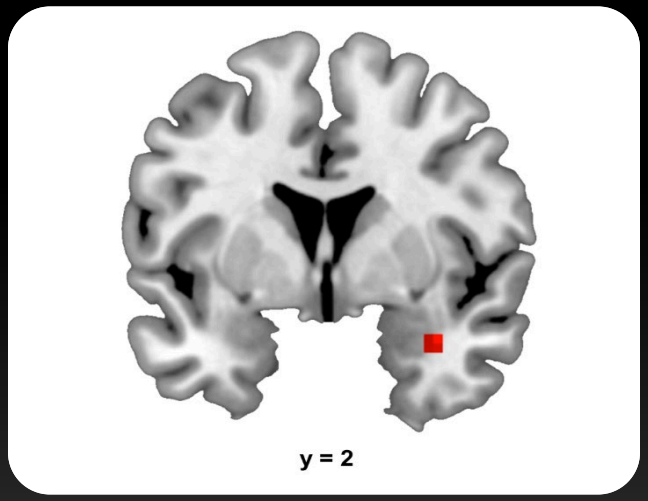
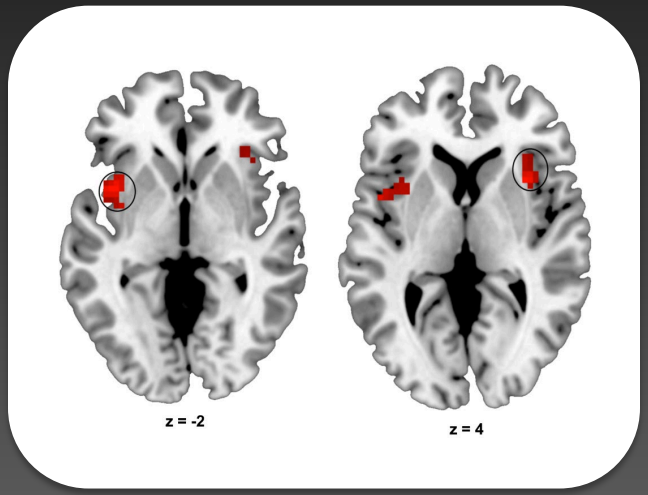




Increased right amygdala reactivity and increased bilateral anterior insula reactivity to angry vs. calm faces in children exposed to family violence.

This may be a latent neural marker of latent vulnerability – the same neural signature is common in anxiety disordered populations (Etkin & Wager, 2007).

Exposure to family violence may ‘recalibrate’ responsiveness of the anterior insula and amygdala in processing potential threat.

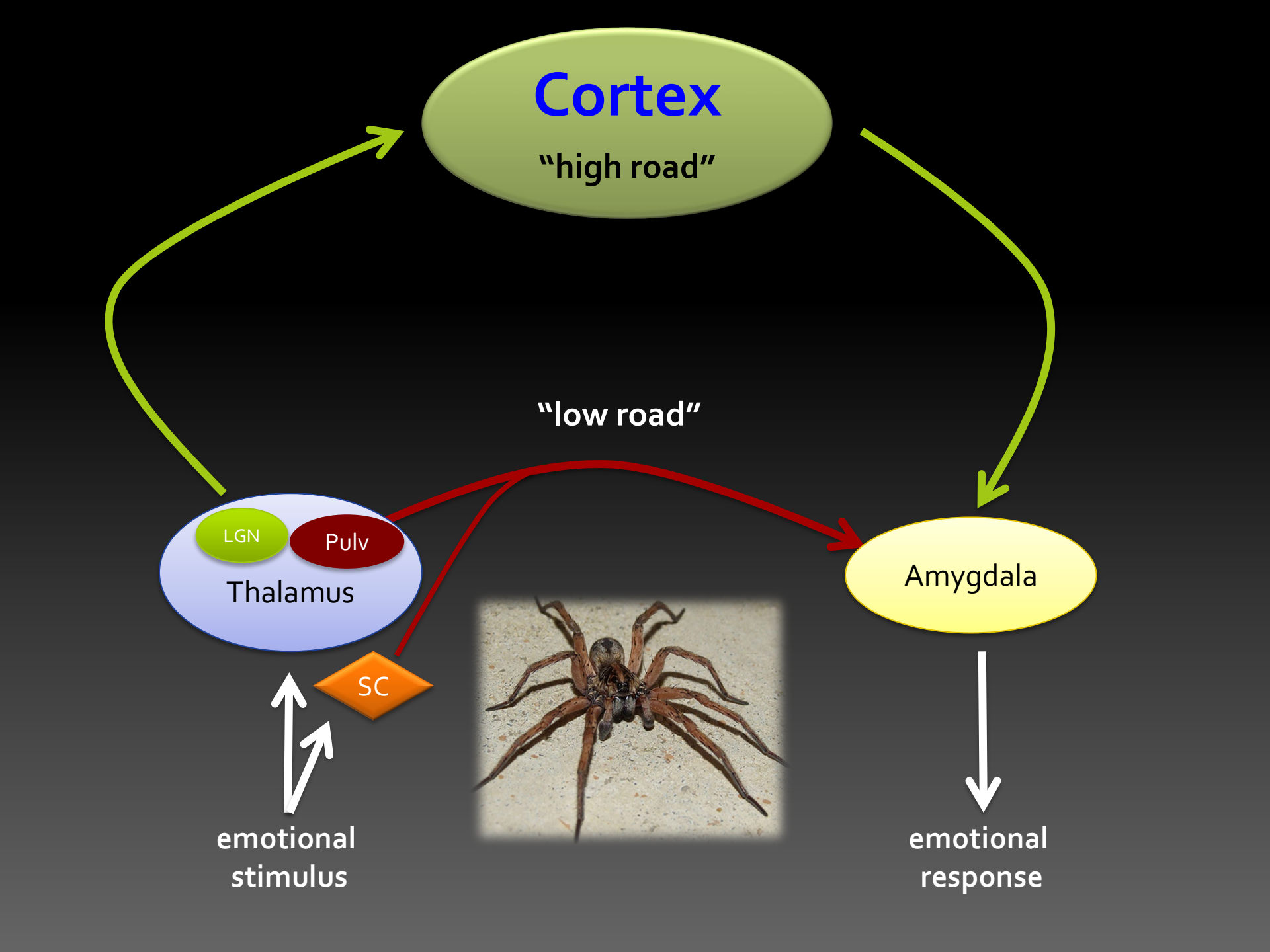
But is this a conscious process? In other words, is this hypervigilance to threat under higher order regulatory influence?

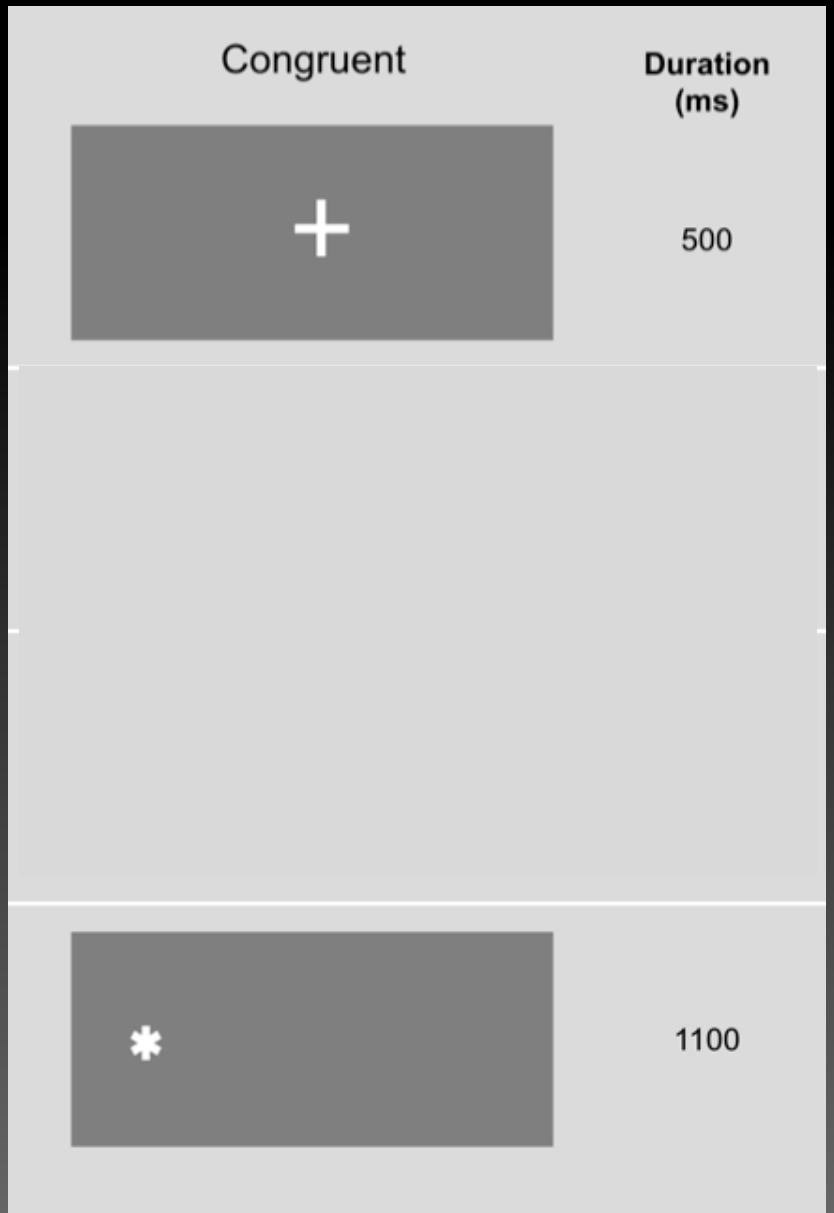
BJPsych | The British Journal of Psychiatry (2013)
202, 1–8. doi: 10.1192/bjp.bp.112.116624

Amygdala activation in maltreated children during pre-attentive emotional processing

Eamon J. McCrory, Stéphane A. De Brito, Philip A. Kelly, Geoffrey Bird, Catherine L. Sebastian, Andrea Mechelli, Sophie Samuel and Essi Viding

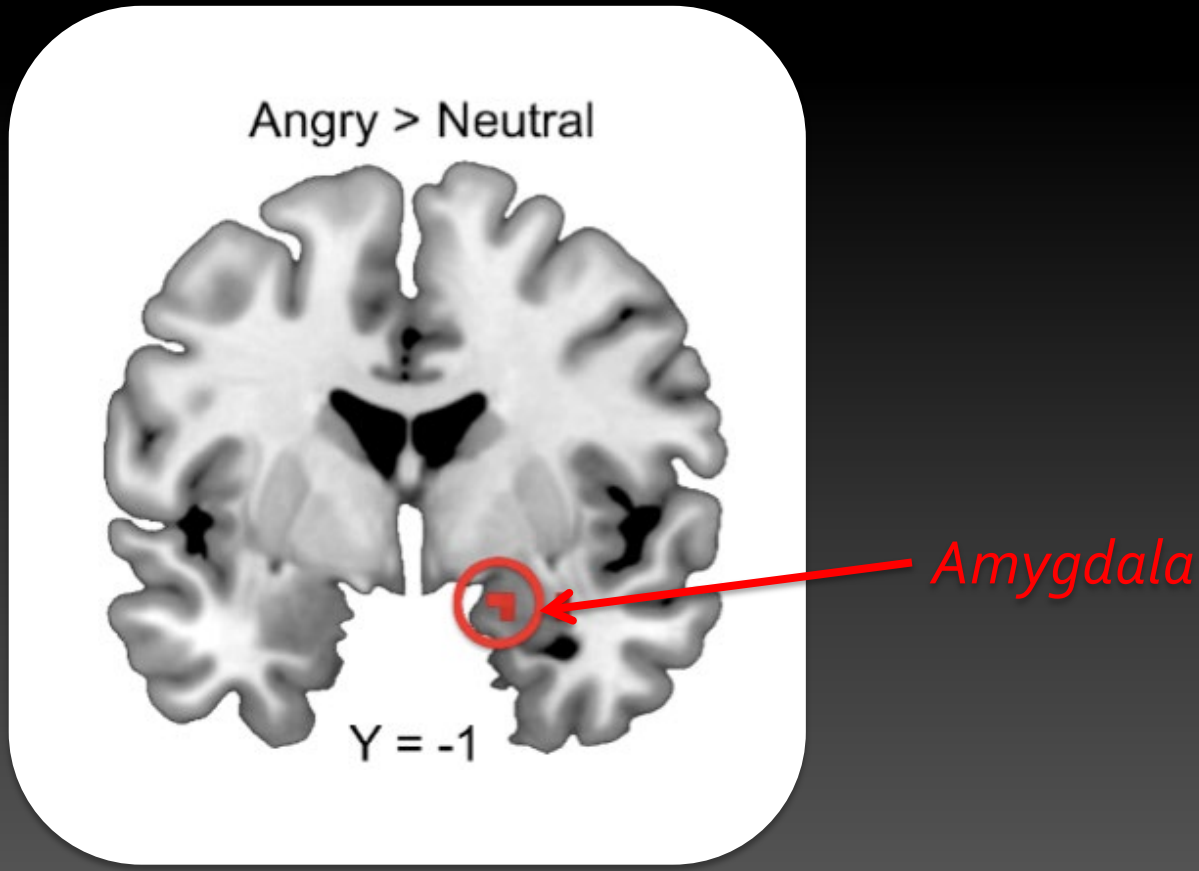
McCrory et al., (2013) *British Journal of Psychiatry*, 202: 1-8


Cortex
"high road"
"low road"
LGN
Pulv
Thalamus
SC
Amygdala
emotional stimulus
emotional response


Congruent
Duration (ms)
+
500
*
1100

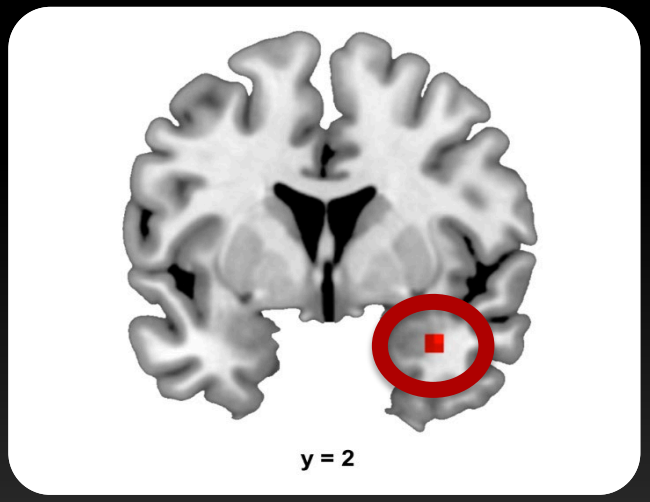
Congruent

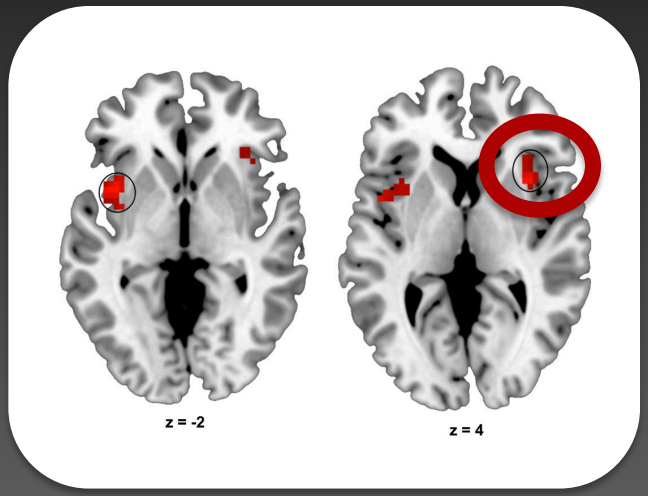
	Duration (ms)
+	500
	17
	68
*	1100


Angry > Neutral
Y = -1
Amygdala

Is increased amygdala reactivity an adaptive response to environmental threat?

Children





McCrory et al., (2011)

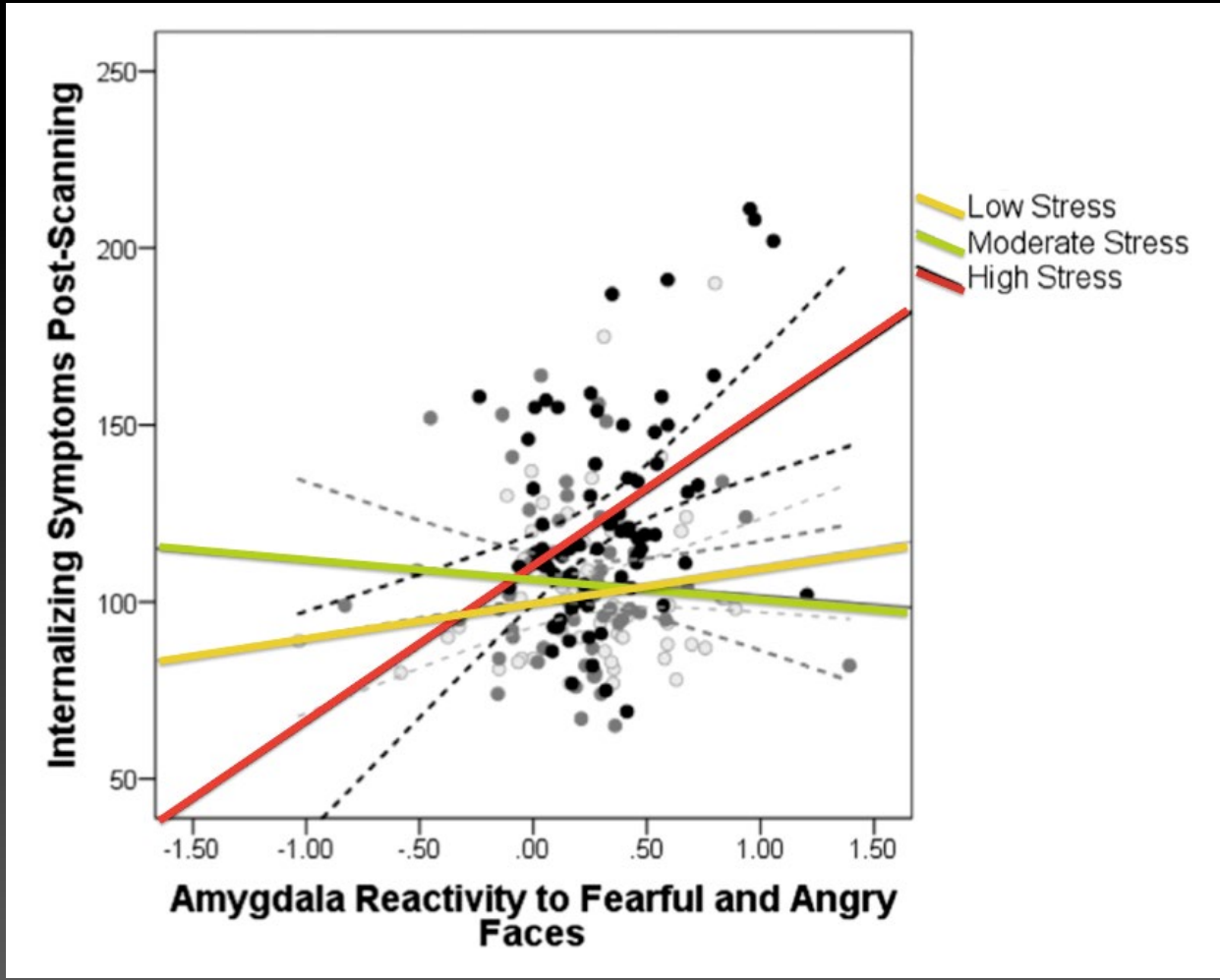
Amygdala

Anterior insula

Soldiers

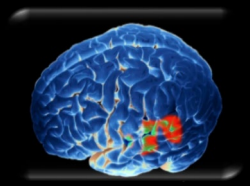
Wingen et al., (2011)

Prior amygdala reactivity to threat cues predicts anxiety and depression symptoms in a cohort of health adults (n=340) following future life stressors over a 1 – 4 year period



Swartz, Knodt, Radtke & Hariri (2015), Neuron, 85(3):505-11

Adversity



Altered Threat Processing

- Increasing likelihood of interpersonal conflict with peers

- Reducing cognitive capacity available for more normative developmental tasks and social learning

Social Environment

Psychiatric Vulnerability

Autobiographical Memory (ABM)

Autobiographical memory

- Autobiographical memory (ABM) is concerned with the recollection of personally experienced events and plays a central role in scaffolding our sense of self and our ability to remain oriented in the present

- A constructive, flexible ABM provides the 'data' that helps us simulate future events and negotiate them more effectively (The *Constructive Episodic Simulation Hypothesis*, Schacter & Addis, 2007).

- It is thought that episodic simulation has particular adaptive value because it allows us to simulate a variety of ways in which the future might unfold without having to engage in actual behaviour (cf., Ingvar, 1979; Schacter, 2012; Suddendorf & Corballis, 1997, 2007).

- If ABM is OVERGENERAL then memories are characterized by greater categorical recollection and a paucity of specific detail.

Autobiographical memory

- Over-general ABM is associated with *current* psychopathology:
  - Depression (Sumner et al., 2010)
  - PTSD (Ono et al., 2016)
  - Schizophrenia (e.g. McDougall et al., 2015)

- Overgeneral ABM *predicts* symptoms of Depression in at-risk adolescents (e.g. Rawal & Rice, 2015). It also *predicts* symptoms of PTSD in assault survivors 6 months later even taking into account assault severity and baseline symptoms (Kleim & Ehlers, 2008).

- These findings are consistent with the notion that OGM is implicated in the pathogenesis of psychiatric disorder.

- Maltreatment is reliably associated with OGM at the behavioural level (Valentino et al., 2009; see Hitchcock et al., 2014 for a review).

Autobiographical memory: a candidate latent vulnerability mechanism for psychiatric disorder following childhood maltreatment

Eamon J. McCrory, Vanessa B. Puetz, Eleanor A. Maguire, Andrea Mechelli, Amy Palmer, Mattia I. Gerin, Philip A. Kelly, Iakovina Koutoufa and Essi Viding

BJPsych The British Journal of Psychiatry

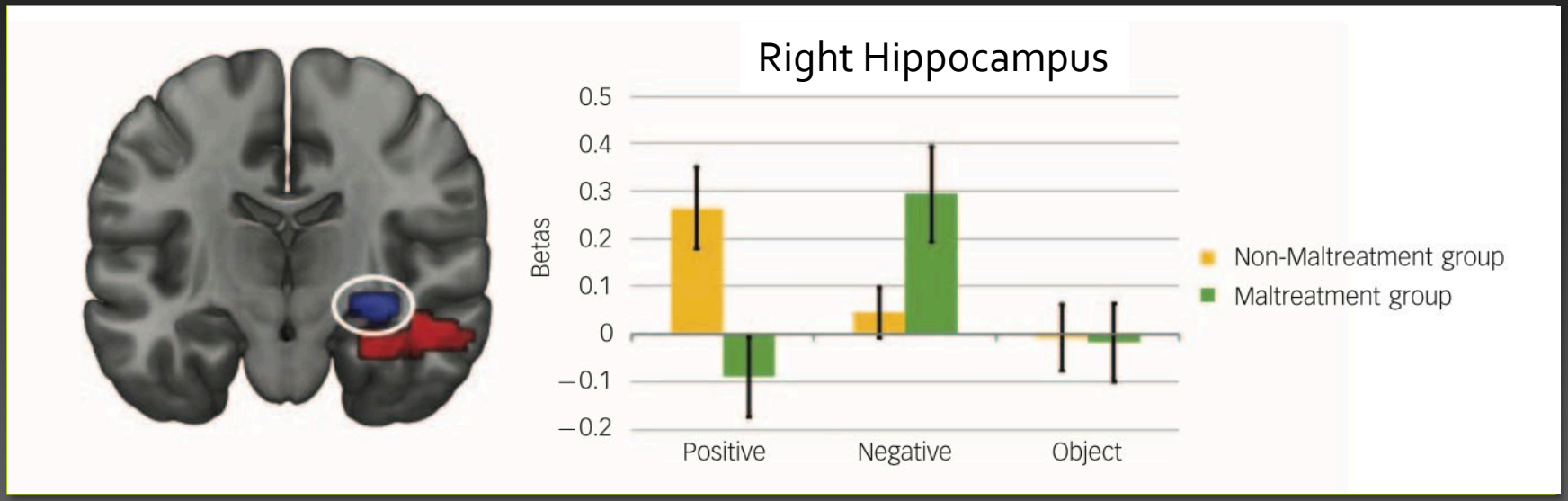
Sept 2017

- The Autobiographical Memory Test (AMT) , a standard measure of OGM, was administered to all participants in a session 1-3 weeks before scanning. Participants generated specific memories in response to 10 positive (e.g. achieve, caring) and 10 negative cue words (e.g. mistake, lonely). OGMs were defined as '*memories that did not contain at least one specific detail that identifies an event as a distinct episode*'.

	Maltreatment Group (N=34)	Non-Maltreatment Group (N=33)	*p*
AMT Total	17.4%	10.0%	.017
AMT Positive Memories	15.8%	9.6%	.066
AMT Negative Memories	19.0%	10.4%	.018

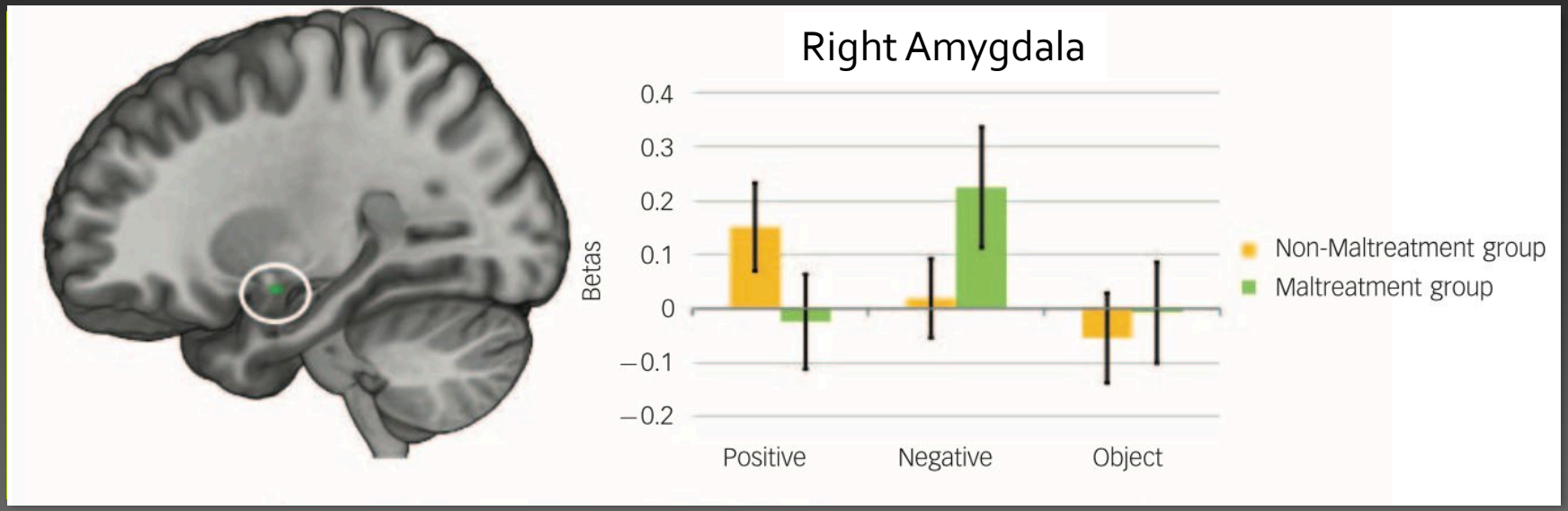
Autobiographical memory

- The maltreated vs. non-maltreated group showed DECREASED activation to positive memories in the hippocampus
- This was interpreted as possibly reflecting reduced memory specificity of positive memories in maltreated children
- SDQ Total Score correlated positively with hippocampal (r=0.47, *p*=0.007) activation during negative memory recall in the Maltreated group (*greater specification of negative memories?)*



Autobiographical memory

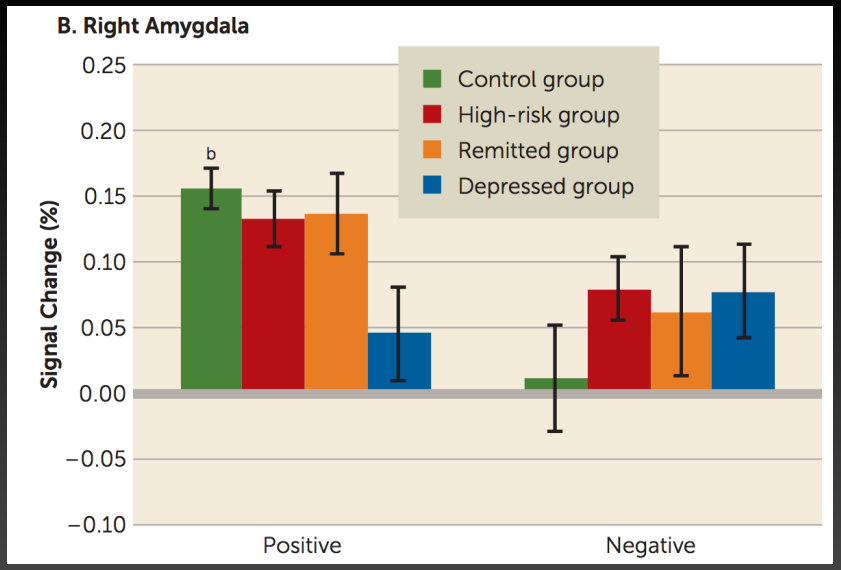
- The maltreated vs. non-maltreated group showed INCREASED activation to negative memories in the amygdala and increased connectivity between the amygdala and the mACC indicating heightened salience processing
- This was interpreted as possibly reflecting a privileging of negative memories in the maltreated children.
- SDQ Total Score correlated positively with amygdala (r=0.36, *p*=0.049) activation during negative memory recall in the maltreated group



Autobiographical memory

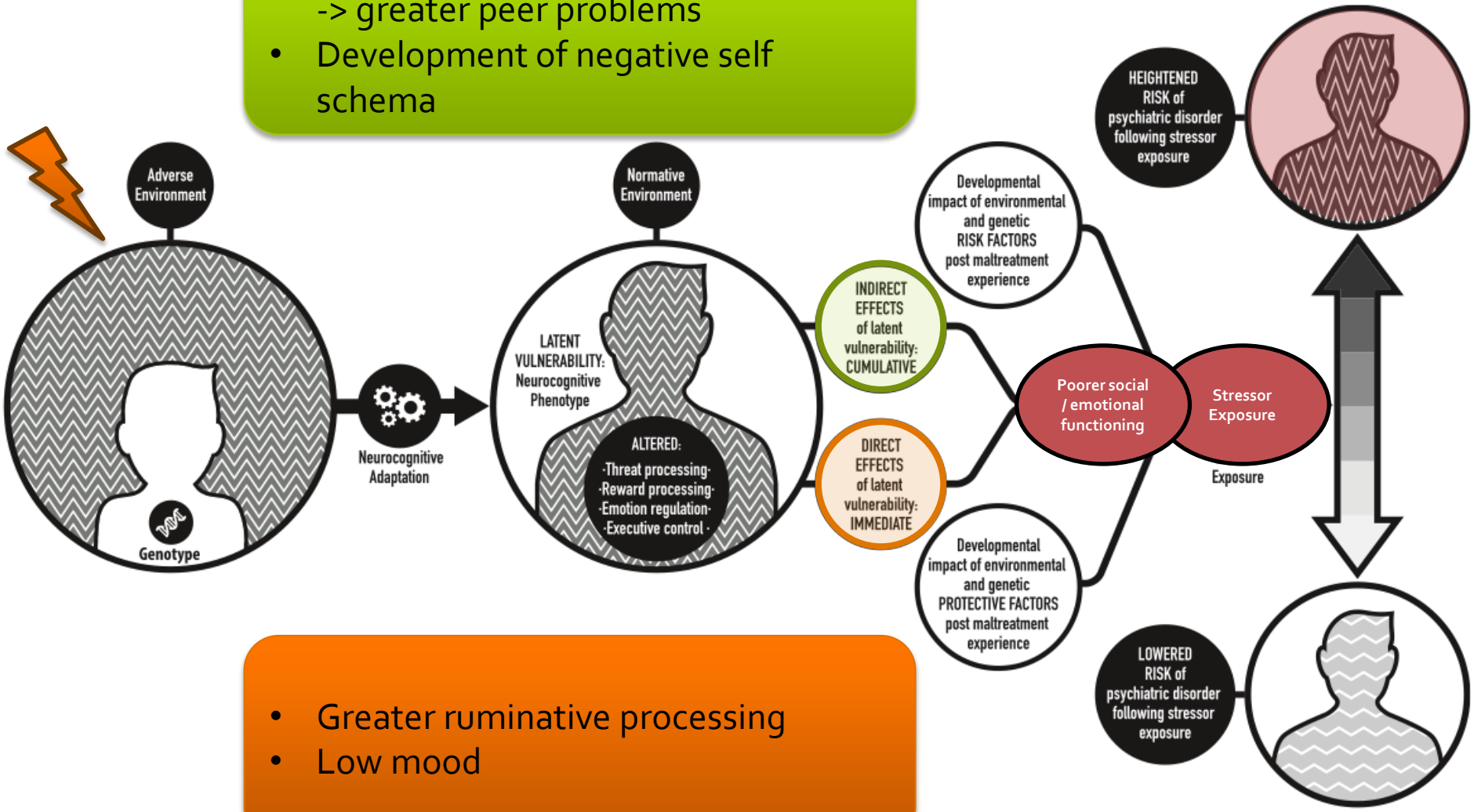
- In a study of depressed patients, remitted patients and individuals at high familial risk of depression, Young and colleagues (2016) reported increased amygdala activation, and functional connectivity with regions implicated in salience processing (including the dorsal anterior cingulate cortex) during negative ABM recall in all three groups relative to healthy controls.

- This suggests that heightened amygdala activation and functional connectivity with the salience network during negative ABM recall may therefore represent a trait-like marker of depression.



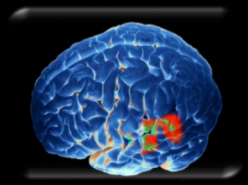
Young et al., AJP, 2016

- Poorer social problem solving -> greater peer problems
- Development of negative self schema



- Greater ruminative processing
- Low mood

Adversity



Over-general Autobiographical Memory

- Poorer social problem solving – greater peer problems

- Increased negative ruminative style
- Poorer ability to conceptualize the future self

Social Environment

Psychiatric Vulnerability

Summary

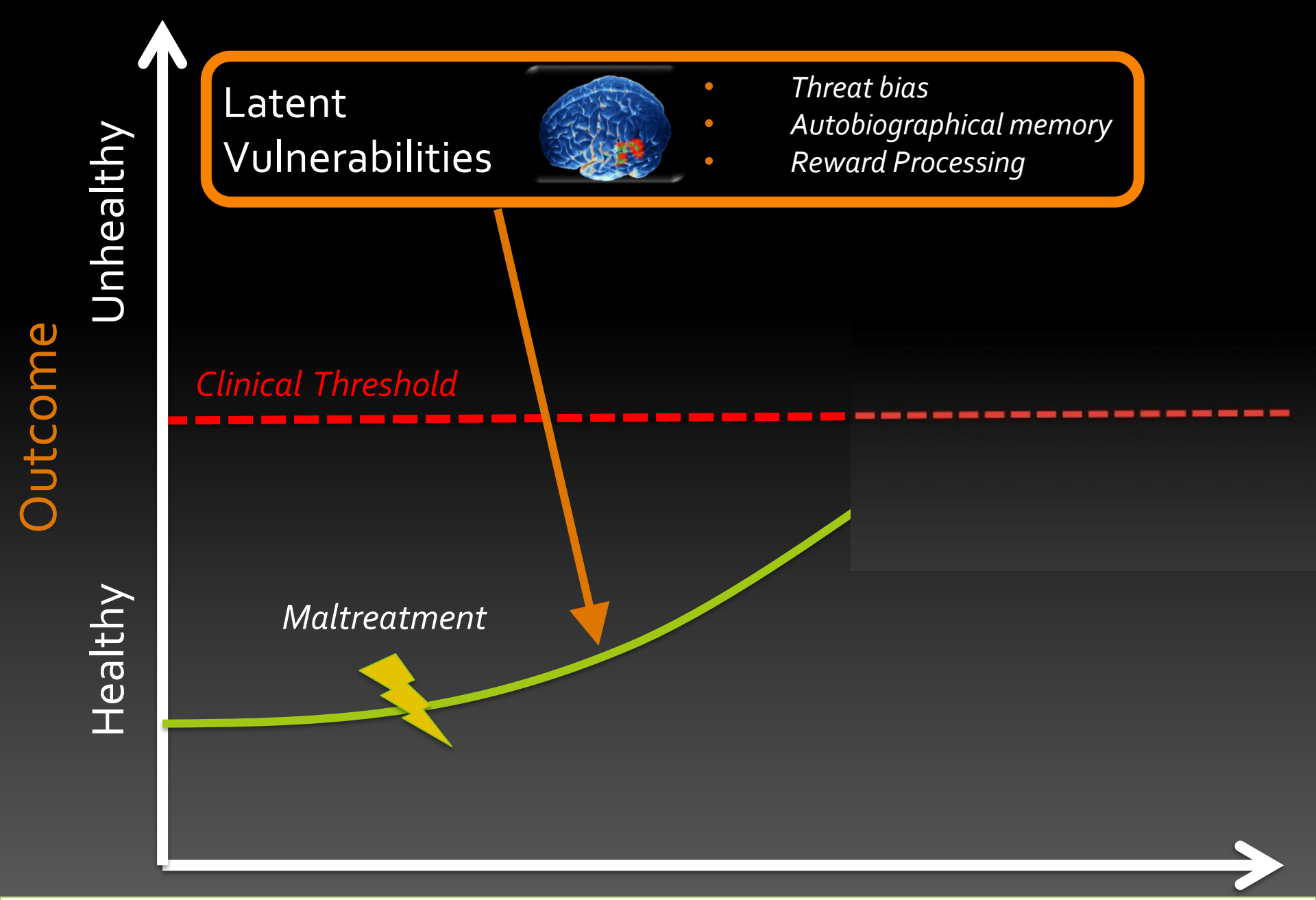
- Relatively recent fMRI research has demonstrated that childhood maltreatment is associated with altered functioning in a range of neurocognitive systems including: threat processing and autobiographical memory processing. Reward processing is also implicated.

- Such changes are observable even in the absence of psychiatric disorder and in some cases, predict future symptomatology. They are thought, in part, to reflect adaptations to early adverse environments.

- These changes are strikingly consistent with those seen in individuals presenting with psychiatric disorder suggesting such neurocognitive 'adaptations' embed latent vulnerability to future psychiatric disorder.

- These findings establish a compelling case to develop a more precise mechanistic understanding of the pathogenesis of psychiatric disorder following maltreatment and the need to invigorate efforts to build a preventative clinical approach.

- Need to move on from meta-level clinical constructs such as 'trauma-focussed' and 'attachment-focussed'. Both are important, but primarily signpost the direction of travel; more precision needed as to the targets and mechanisms of change.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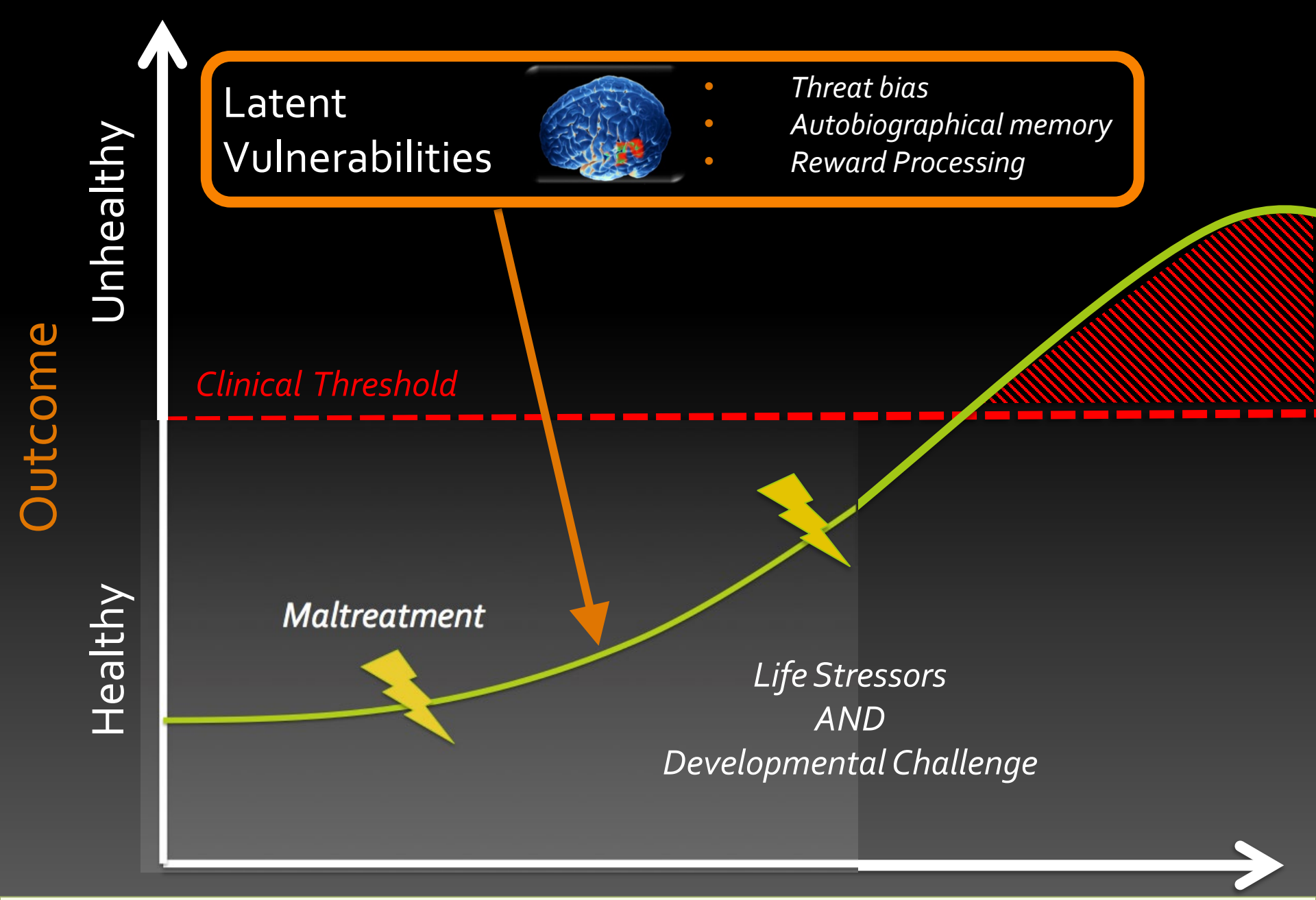
Threat bias
Autobiographical memory
Reward Processing
Outcome
Unhealthy
Healthy
Clinical Threshold
Maltreatment
Infancy.....Childhood.....Adolescence.....Adulthood


Latent Vulnerabilities
Threat bias
Autobiographical memory
Reward Processing
Outcome
Unhealthy
Healthy
Clinical Threshold
Maltreatment
Life Stressors AND Developmental Challenge
Infancy.....Childhood.....Adolescence.....Adulthood

Outcome

Unhealthy

Healthy

Clinical Threshold

?

Maltreatment

Infancy.....Childhood.....Adolescence.....Adulthood

Summary

Long term objectives:

1. Development of a screening tool, useable by frontline clinicians, that accurately captures individual differences in latent vulnerability. This would allow the identification of those children at most risk of future disorder.

2. Investigate whether targeting these neurocognitive systems – through social interventions – can help young people recalibrate these systems in ways that ‘fit’ with their new environments. Understanding this process of recalibration will be key to developing effective preventative interventions.

Thank-you!

Developmental Risk and Resilience Unit

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Anna Freud National Centre for Children and Families