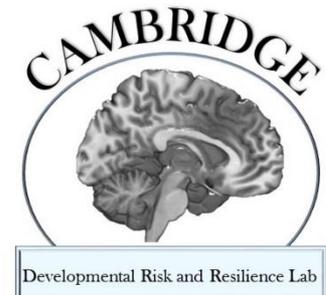


Mental health risk and resilience after Childhood Maltreatment

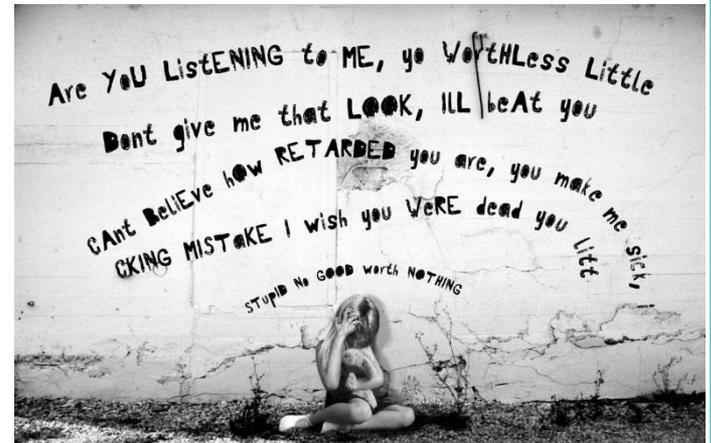
Anne-Laura van Harmelen
Royal Society Dorothy Hodgkin Fellow
University of Cambridge
Department of Psychiatry
av391@cam.ac.uk

@DrAnneLaura



Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors



Child Maltreatment

- In 2013, an estimated 1520 children died as a consequence of childhood maltreatment in the USA

‘any act, or series of acts by a parent or caregiver that results in the (potential for) harm, or threat of harm, to a child’

- **82% parents or other caregivers are perpetrators**



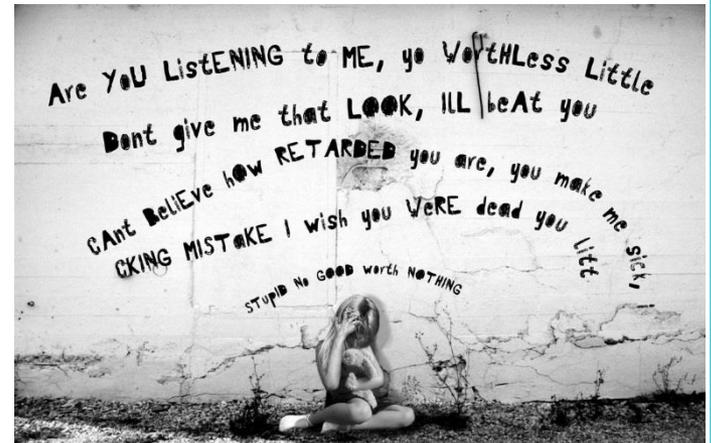
Childhood emotional maltreatment

- *Emotional abuse rarely occurs alone (1.2%; Widom, et al., 2009; van Harmelen et al., 2010)*
- *Very high co-occurrence with emotional neglect has been reported (i.e. 91%) Trickett et al., 2009.*
- *Childhood Emotional Maltreatment (CEM) :*
‘Any act of omissive (emotional neglect) or comissive (emotional abuse) behaviour that is potentially harmful to a child ’s emotional and psychological development ’

Egeland, 2009; Trocmé et al., 2011; Yates & Wekerle, 2009.

Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors

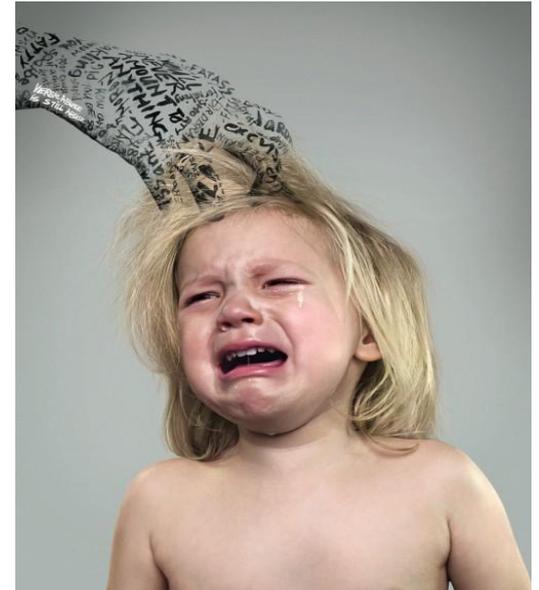


Consequences of CEM

- *During episodes of CEM, negative attitudes are provided to the child (Rose & Abramson, 1992).*

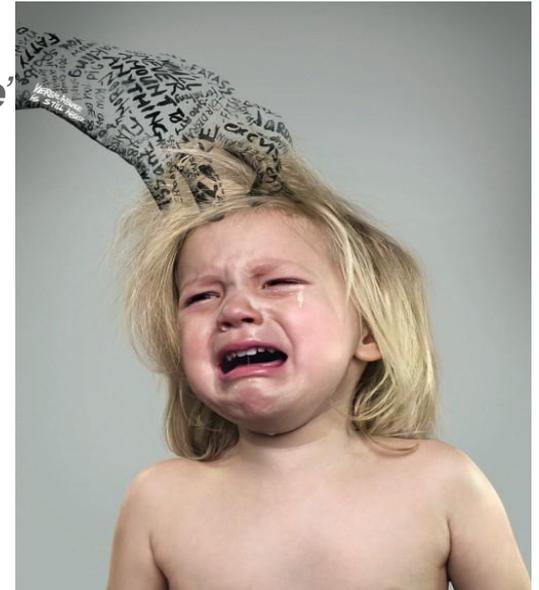
“You are worthless, I wish you were never born”

- *Develop negative self-cognitions, low self-esteem, negative life views, emotional instability, emotional unresponsiveness, and emotion dysregulation (Alloy, Abramson, Smith, Gibb, & Neeren, 2006)*



Enhanced negative self-associations

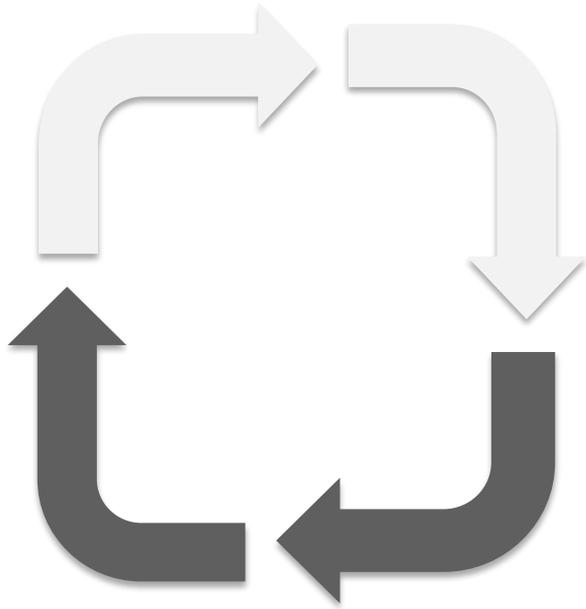
- Negative self-associations also develop when the cognitions are implied rather than expressed:
 - *'My mommy thinks I am worthless because she ignores me'*



Van Harmelen et al., 2010 BRAT

Negative self-cognitions

- *Negative self-associations enhance (negative) bias and recall when engaged in new situations, and when retrieving memories (Beck, 2008).*



Thinking about negative memories

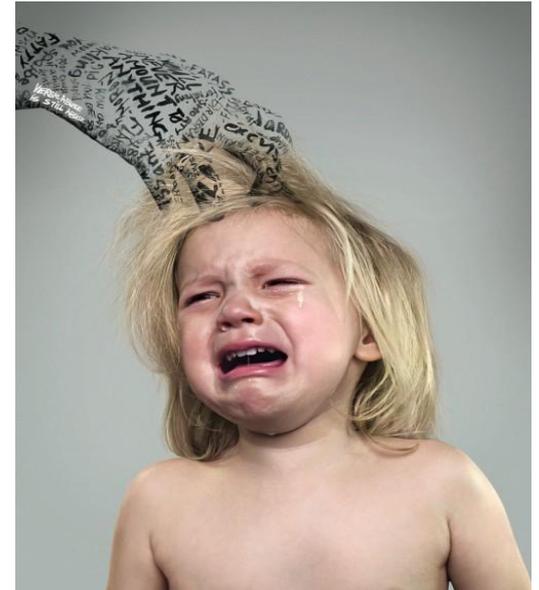
- ***CEM more avoidant coping strategies:
Try to not think about negative memories.***
- ***Sustained intrusions of autobiographical memories***
- ***Intrusions of negative memories related with general psychiatric distress***



van Harmelen et al., 2011; EJPT

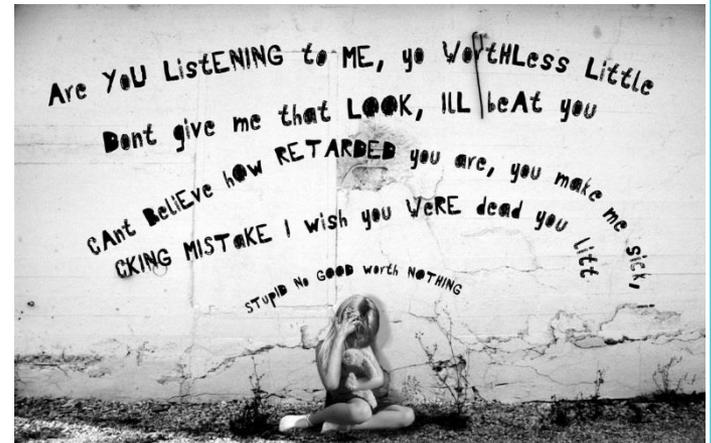
CEM and psychopathology

- ***CEM strong relationship with depression and anxiety disorders (e.g. Iffland et al., 2012; Spinhoven et al., 2010).***
 - ***The link between physical abuse and depression and anxiety in later life appears to be fully explained by a concurrent history of CEM (Iffland et al., 2012; Spinhoven et al., 2010)***
 - 45% of childhood onset and 30% of adult onset psychopathology.
 - More severe, more chronic, less responsive to treatment.



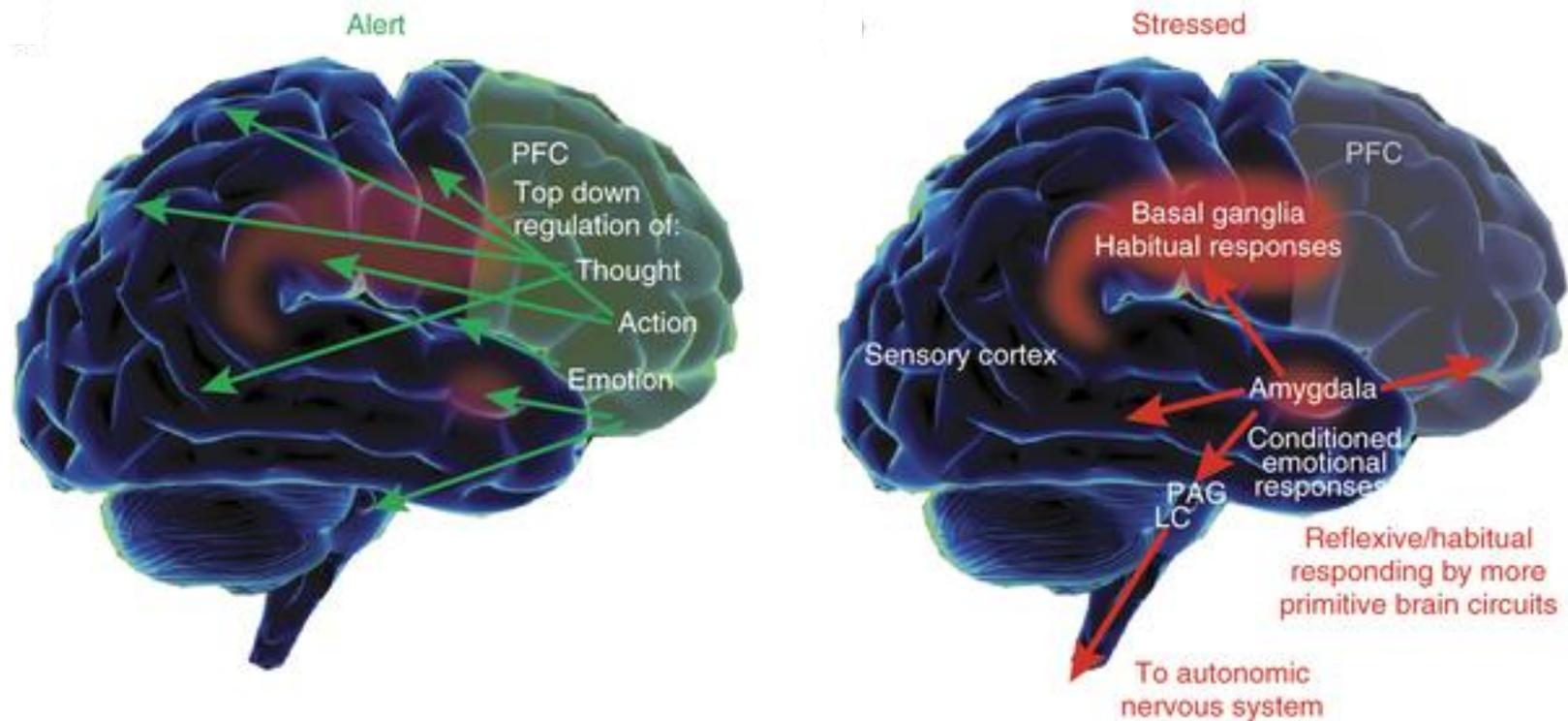
Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors

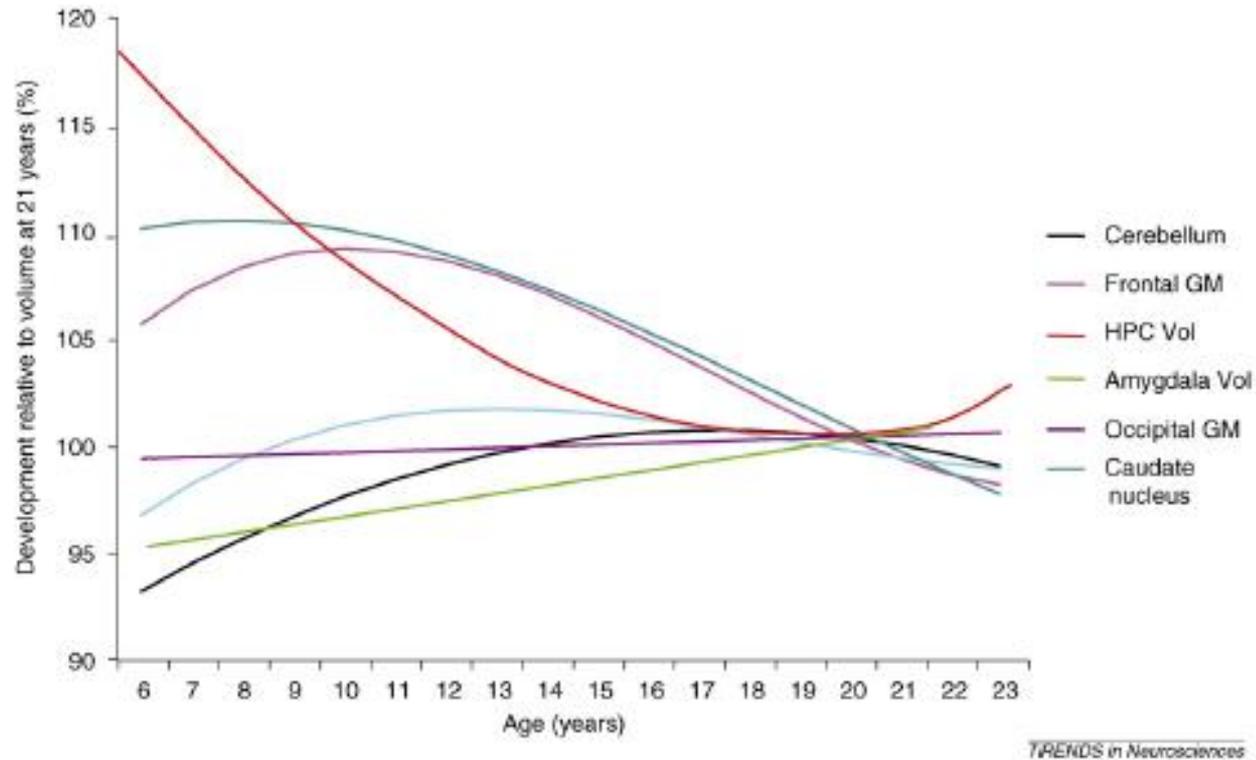


What happens during acute stress

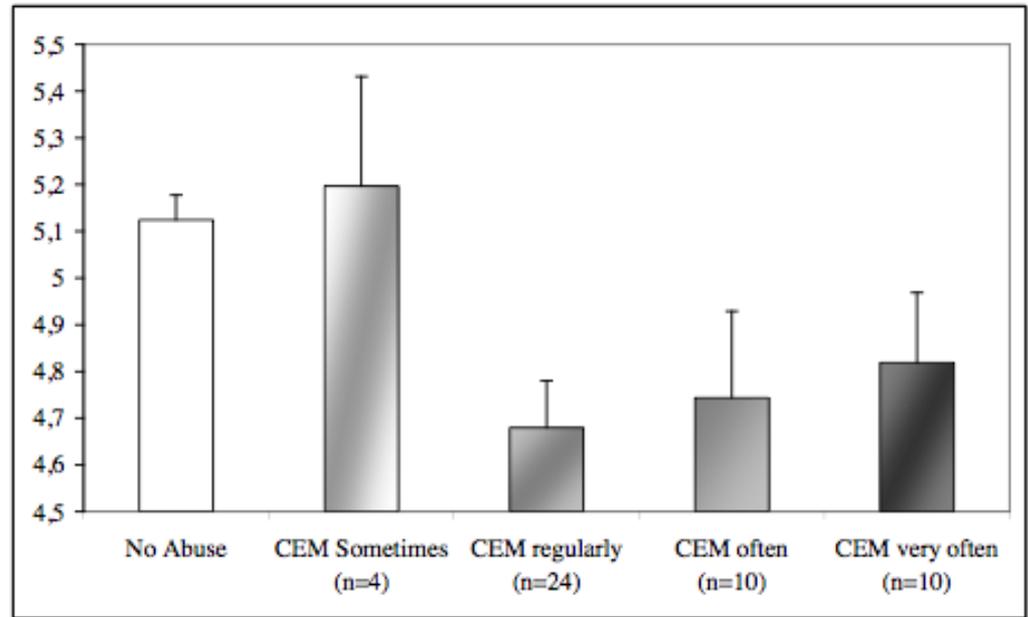
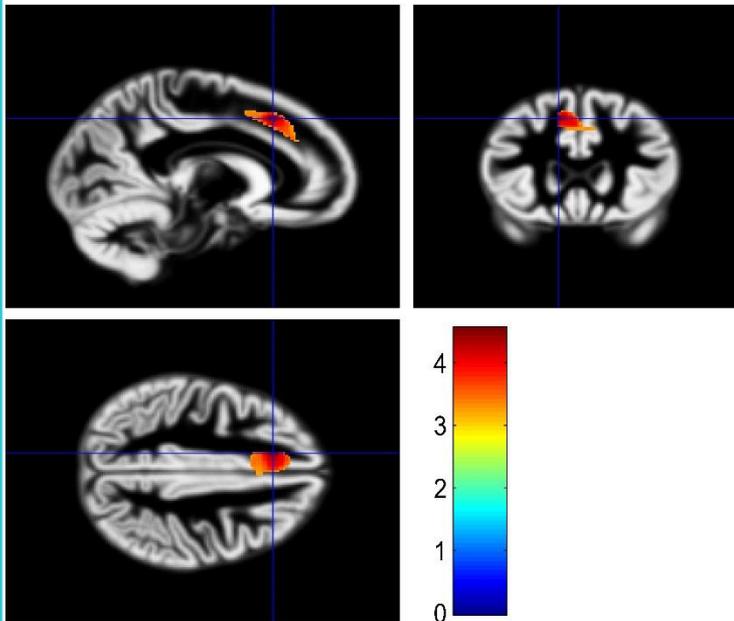
Acute stress shifts brain activations from 'cognitive control' to 'fight or flight'



In childhood and adolescence the brain is still developing



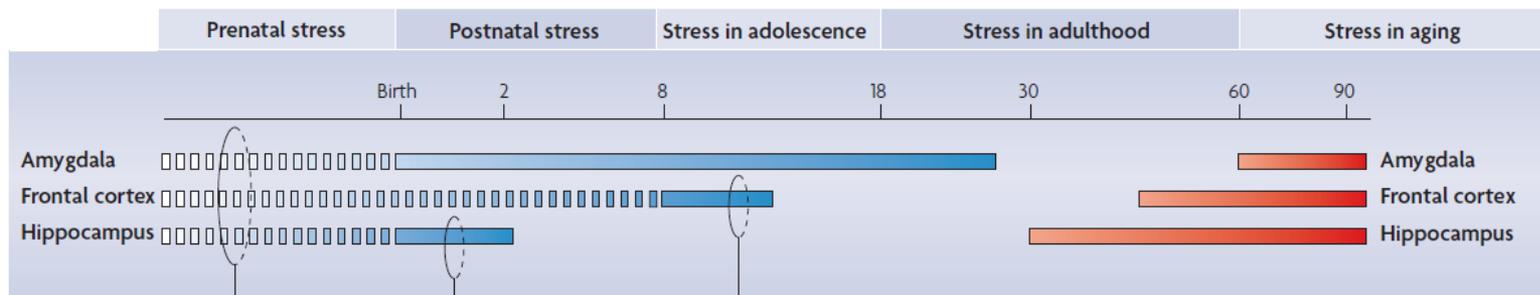
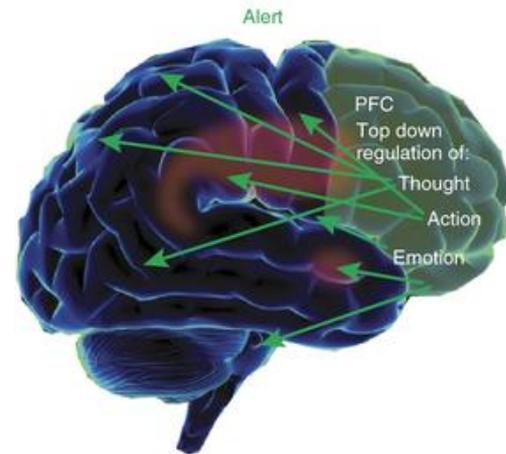
Reduced mPFC volume in adults reporting CEM (N=181)



Van Harmelen et al., 2010; Biological Psychiatry.

CEM impacts on the structure of the medial Prefrontal Cortex (mPFC)

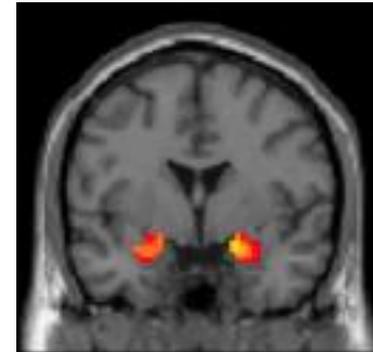
- *CEM impacts on the structure and function of:*
 - *Prefrontal cortex*
- *PFC is pivotal in regulating emotional behavior, stress response and self-referential processing.*



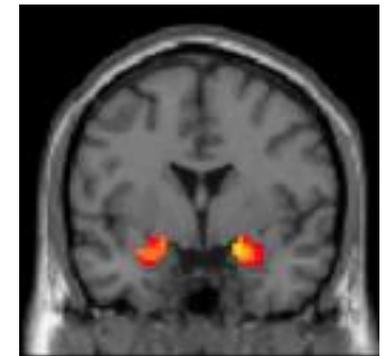
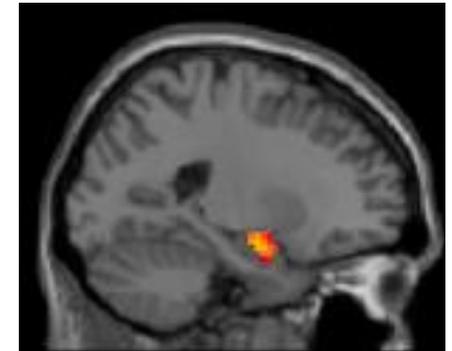
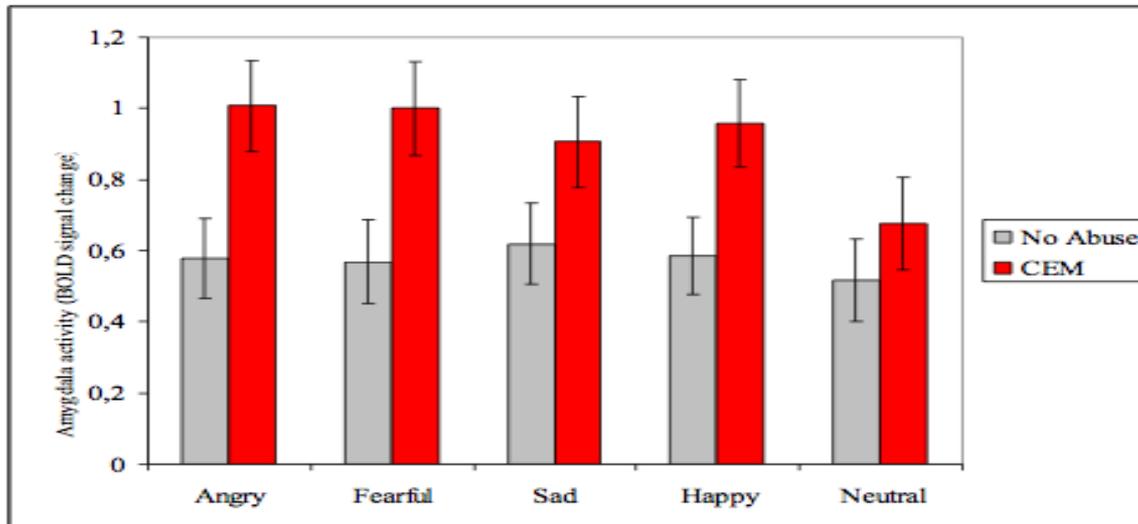
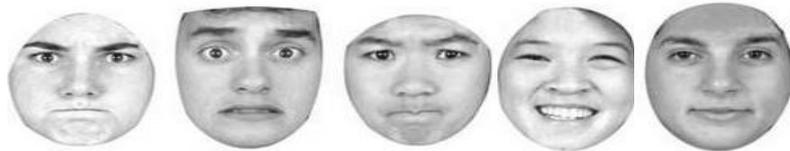
Van Harmelen et al., 2010; Biological Psychiatry.
See for overview Hart & Rubia 2012; Teicher et al., 2016

Adaptive responses during stress

- Detecting when someone is in a bad mood may be adaptive
- Amygdala crucial for quick emotion processing & salience detection (Davis & Whalen., 2006)
- Over time, this adaptive response may lead to hypervigilance to facial expressions (Gibb et al., 2009).



Enhanced amygdala reactivity in adult patients and controls reporting CEM (N=135)



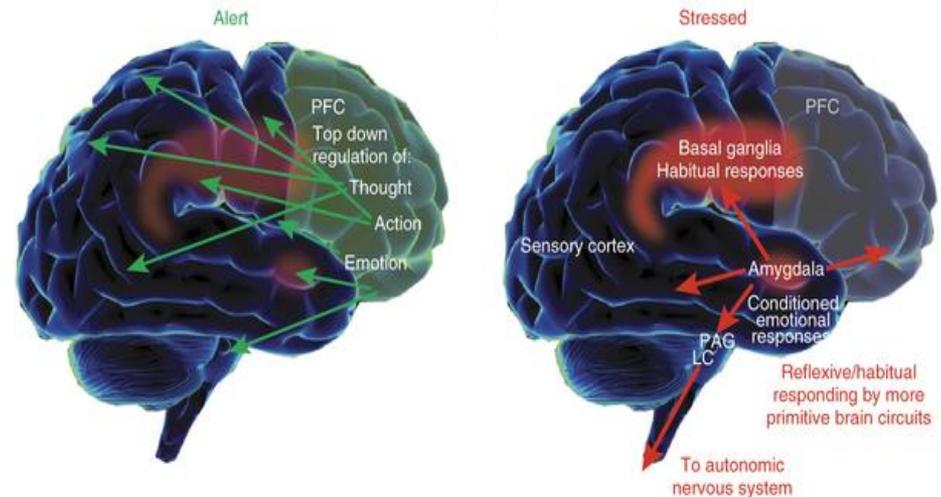
van Harmelen et al., 2013 SCAN

Amygdala reactivity and stress

- Maternal separation has been associated with enhanced fear response in animals (Feng et al., 2011; Oomen et al., 2010).
- Combat stress also increases amygdala responsiveness to biologically salient stimuli.
 - the *perceived* threat exposure appeared crucial in changing amygdala regulation (Van Wingen, Geuze, Vermetten, & Fernández, 2011).
- Replication of maltreatment related amygdala hyper-vigilance towards the detection of emotional faces (Dannlowski, Kugel, et al., 2012; Dannlowski, Stuhrmann, et al., 2012; McCrory et al., 2011, 2013; Ioannidis & van Harmelen, in prep).
- CEM is related to a lasting enhancement of amygdala hyper-vigilance towards the detection of negative and positive emotional facial expressions in others.

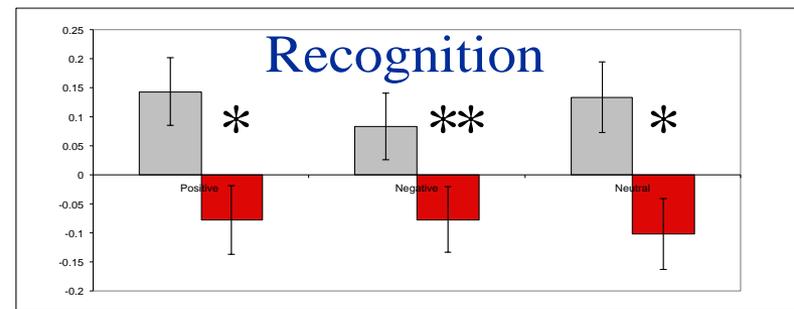
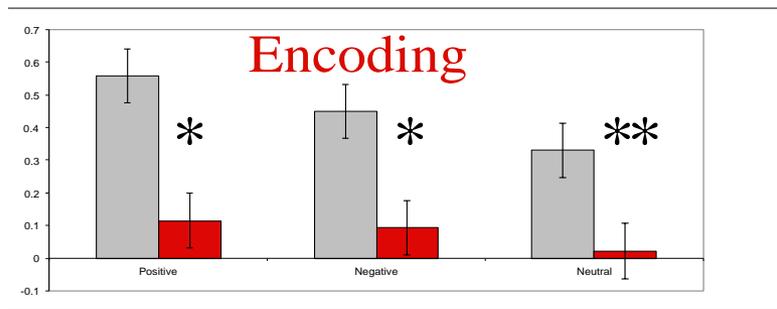
Sustained amygdala hypervigilance

- During stress, brain activity shifts from higher cortical regions (dMPFC) to 'lower' subcortical regions ('amygdala') (Hermans et al., 2011; Oei et al., 2012).
- Stress activates the amygdala at the detriment of higher order cognitive functions (Davis & Whalen, 2001; Hermans et al., 2011; Oei et al., 2012; Todd, Evans, Morris, Lewis, & Taylor, 2011; Whalen, 2007).
- Brain functioning during higher order cognitive functioning?

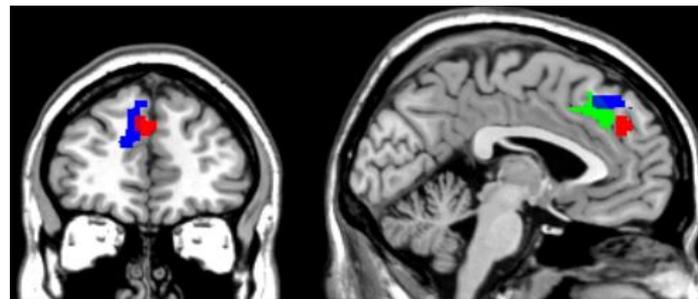


Arnsten, 2015 Nat Neuro

Encoding and recognition of emotional words (N=195)



No abuse CEM

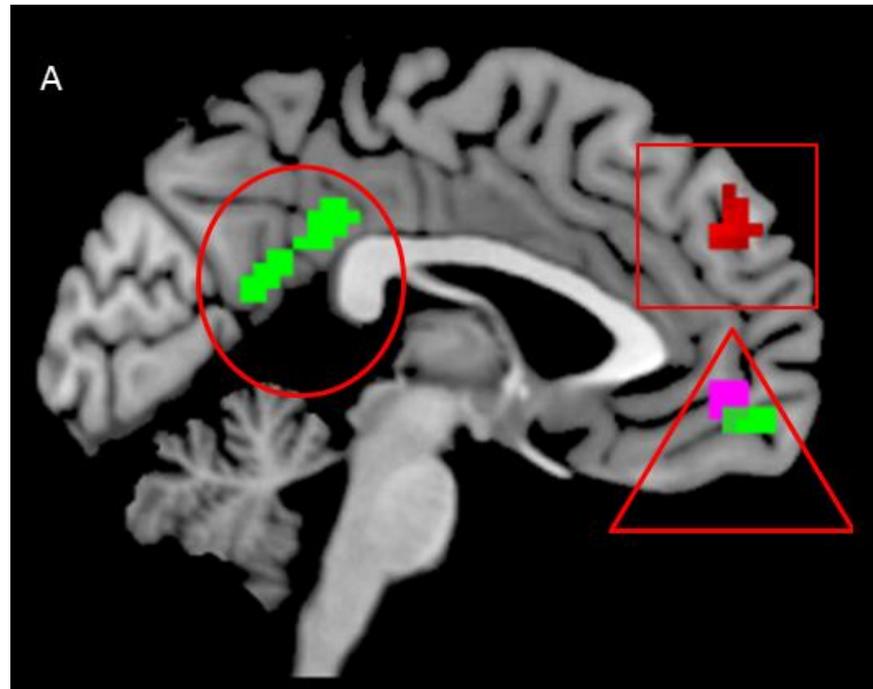


van Harmelen et al., 2014 SCAN

Peer rejection

- *Chronic parental rejection (active and/or passive) core aspect of CEM*
- *Social (peer) rejection induces a higher sensitivity towards future rejection (de Wall & Bushman, 2012).*
- *CEM may be especially sensitive to (perceived) social peer rejection.*
- *Individuals high in rejection sensitivity have a tendency to expect, perceive, and overreact to social rejection, and show enhanced distress and related neural responses to social rejection in the lab (de Wall & Bushman, 2012).*
- *Rejection sensitivity (both behaviourally and in terms of brain responses) is positively related to the development and maintenance of depression and social anxiety symptoms (e.g. Masten et al., 2012).*

Increased DMPFC responsivity to social rejection in young adult inpatients and controls reporting CEM (N=46)



Van Harmelen et al., 2014 PLOS One

CEM and social exclusion

- Social exclusion enhances self- and other-reflective processing (i.e. social uncertainty, distress, and social rumination) (for an overview see Cacioppo et al., 2013).
- Social exclusion activated posterior ACC, and ventral mPFC in our sample.
 - These regions have been implicated in a model for self-reflective processing (Van der Meer et al., 2010).
 - The dorsal mPFC: evaluation and decision making of self-and other referential information (the evaluation whether information is relevant to the self).
- Increased activity in the dorsal mPFC during social stress may underlie negative self- and other-referential thinking in these individuals.

CEM impacts on cognition and the brain

turning children into vulnerable adolescents and adults

Sticks and stones...



www.juvenile.org

Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors



What is resilience

A Review of Developmental Research on Resilience in Maltreated Children

J. Bart Klika and Todd I. Herrenkohl

Trauma Violence Abuse published online 10 May 2013

DOI: 10.1177/1524838013487808

considerably. For example, Jaffee et al. (2007) measured resilience in children at ages 5 and 7 using a measure of antisocial behavior from the CBCL. Those children who were maltreated and **scored at or below the sample median of non-maltreated** children on this measure of antisocial behavior were consid-

What is resilience

A Review of Developmental Research on Resilience in Maltreated Children

J. Bart Klika and Todd I. Herrenkohl

Trauma Violence Abuse published online 10 May 2013

DOI: 10.1177/1524838013487808

considerably. For example, Jaffee et al. (2007) measured resilience in children at ages 5 and 7 using a measure of antisocial behavior from the CBCL. Those children who were maltreated and scored at or below the sample median of non-maltreated children on this measure of antisocial behavior were consid-

... (e.g., warm, affectionate, and affectionate/friendly). Those children who scored in the top 40% of the full sample across social, emotional, and cognitive domains of functioning were considered resilient to

What is resilience

A Review of Developmental Research on Resilience in Maltreated Children

J. Bart Klika and Todd I. Herrenkohl

Trauma Violence Abuse published online 10 May 2013

DOI: 10.1177/1524838013487808

considerably. For example, Jaffee et al. (2007) measured resilience in children at ages 5 and 7 using a measure of antisocial behavior from the CBCL. Those children who were maltreated and scored at or below the sample median of non-maltreated children on this measure of antisocial behavior were consid-

...
tive, and affectionate/friendly). Those children who scored in the top 40% of the full sample across social, emotional, and cognitive domains of functioning were considered resilient to

resilience, a number of indicators were used to represent resilient functioning, including graduation from high school, absence of a diagnosis for a mental health disorder, absence of a diagnosable substance use problem, and the absence of both official and self-reported delinquency.

What is resilience

A Review of Developmental Research on Resilience in Maltreated Children

J. Bart Klika and Todd I. Herrenkohl

Trauma Violence Abuse published online 10 May 2013

DOI: 10.1177/1524838013487808

Conclusion

This review points to the need for ongoing longitudinal studies of resilience that extend over several periods of development and that examine resilience as a multifaceted phenomenon.

Greater consistency and clarity in the operationalization and measurement of resilience will help advance the field and further understanding of the ways in which maltreated children rebound from early trauma.

What is resilience

- Resilience:

‘The maintenance or quick recovery of mental health during and after exposure to significant stressors results from a dynamic process of adaptation to the given stressful life circumstances’.

What is resilience

- Resilience:

‘The maintenance or quick recovery of mental health during and after exposure to significant stressors results from a dynamic process of adaptation to the given stressful life circumstances’.

What is resilience

- Resilience should be assessed ex post facto:

Resilient functioning: Good mental health following an adverse life event or a period of difficult life circumstances.

- Resilience is not a predisposition and is not:
 - a trait or stable personality profile
 - a specific genotype/ brain correlate
- Stable traits or predispositions: ‘*Resilience factors*’
- Adaptive responses to stress: ‘*Resilience mechanisms*’

Kalisch...van Harmelen... et al., 2017 Nat Human Behaviour

What is resilience after CA?

- *Outcome of good mental health after adversity:*
 - *Resilient functioning*
 - Dynamic
 - Severity of CA



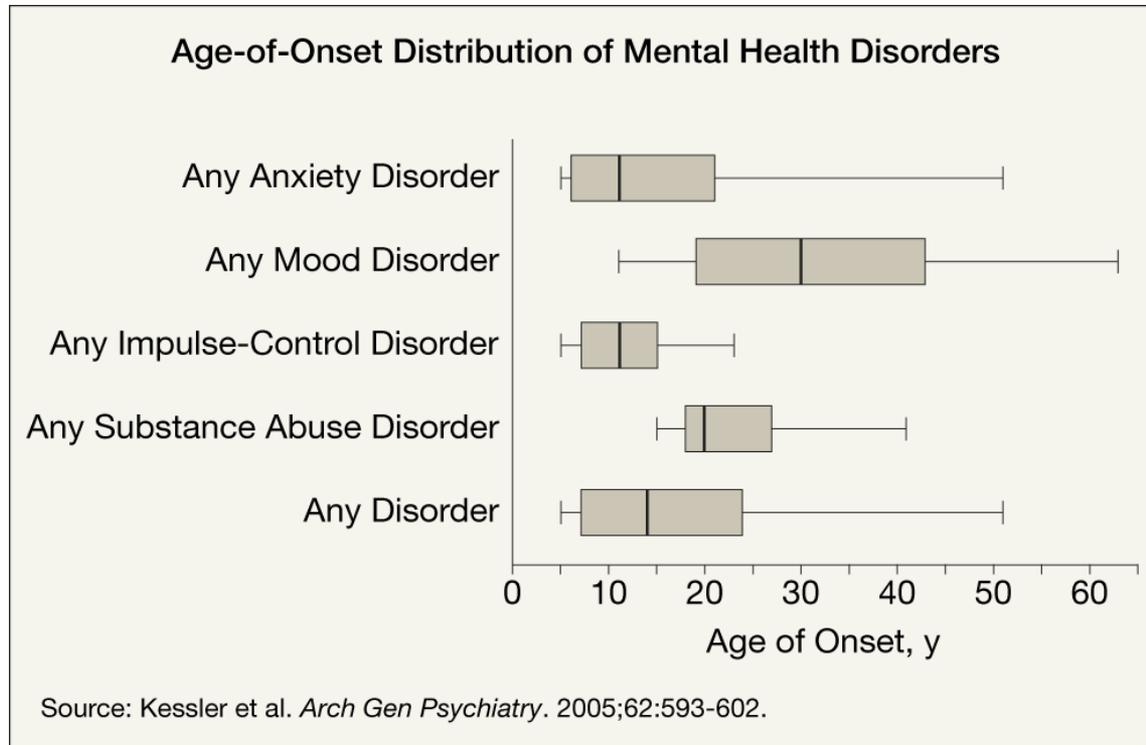
Kalisch...van Harmelen... et al., 2017 Nat Human Behaviour

Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors



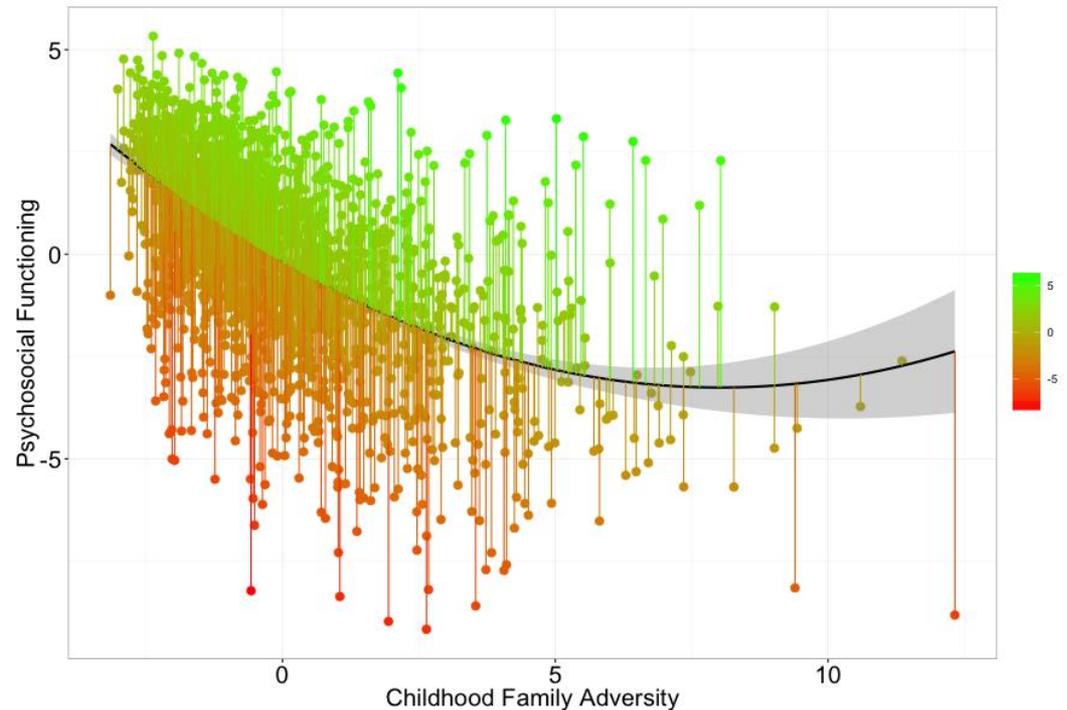
Adolescence as a critical period



To reduce stress related adolescent mental health problems it is vital to examine factors that may increase *resilience* in the aftermath of early life stress.

Resilient functioning in a healthy adolescent cohort (N=2389)

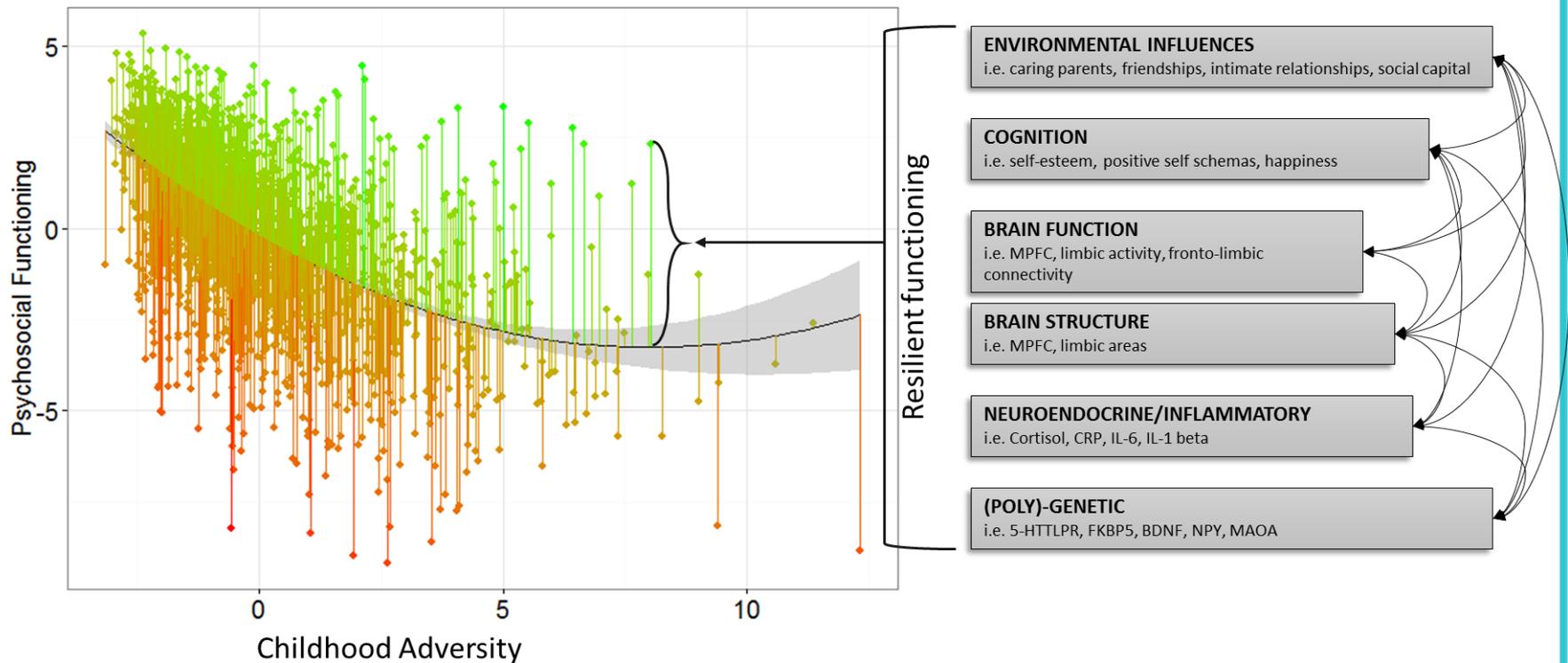
- Psycho-social Functioning
- CEM
- Better or worse than expected



Resilience scores. CEM: Est=-0.76, SE=0.03, t= -24.87, $P < 2e-16$ & CEM²: Est=0.05, SE=0.006, t=7.32, $P = 3.66e-13$. CEM explained 29% variance in PSF.

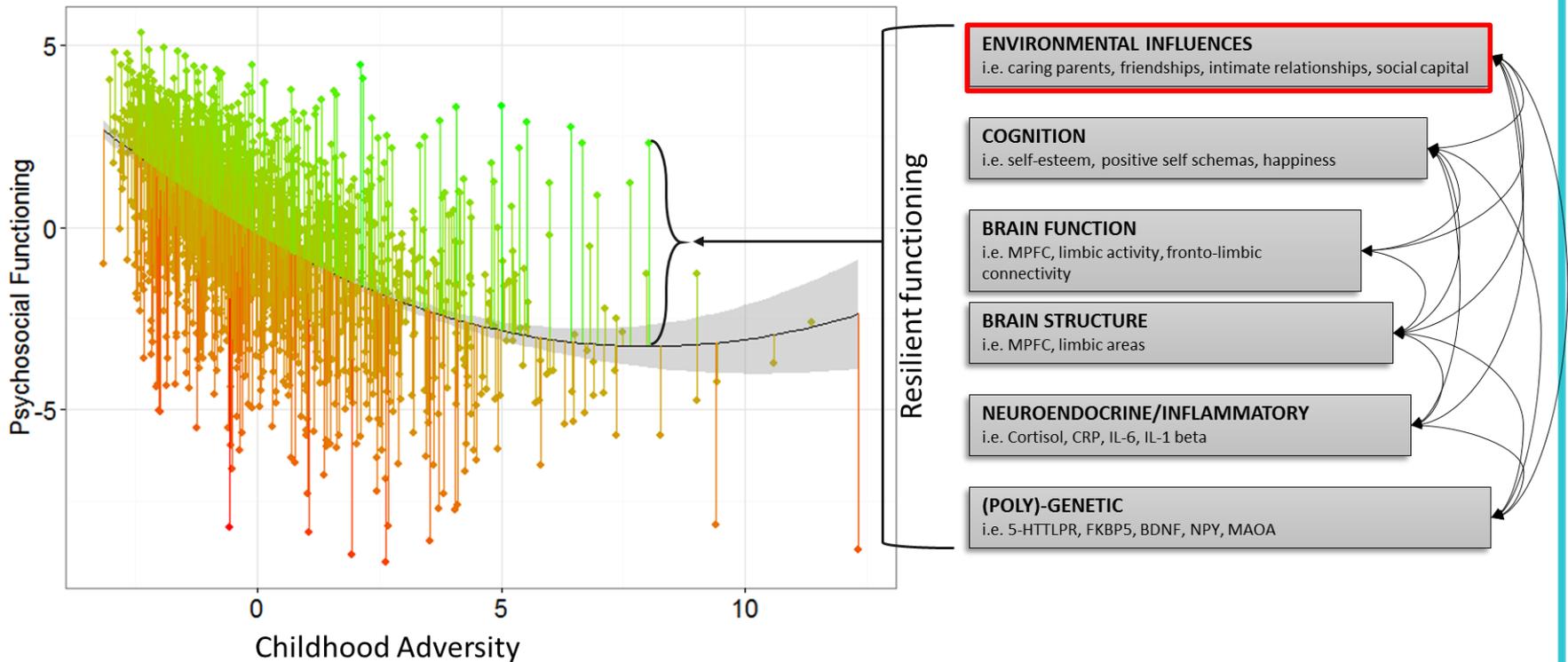
van Harmelen et al., 2017 Psych Med

Resilient functioning & Mechanisms



Ioannidis & van Harmelen, in revision

Resilient functioning & Mechanisms



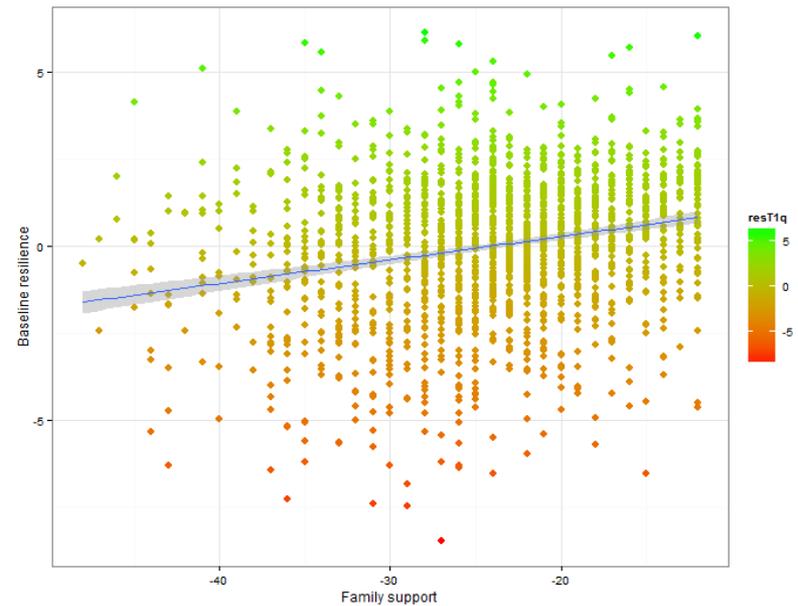
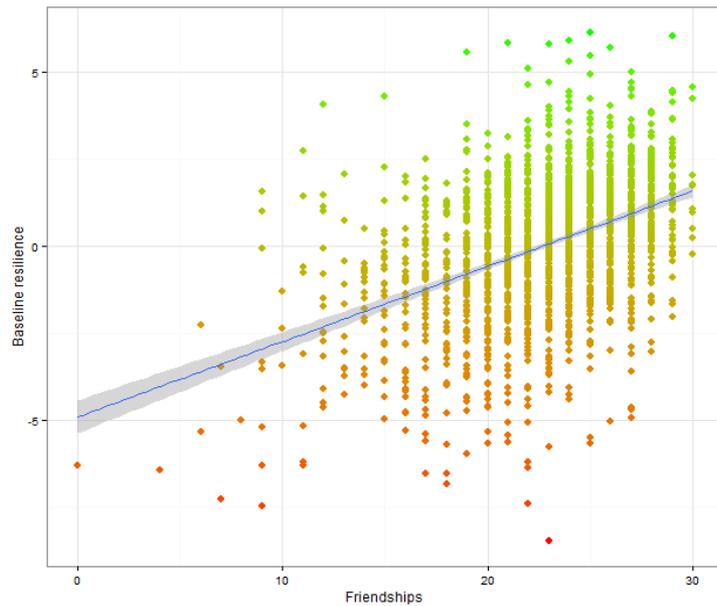
Ioannidis & van Harmelen, in revision

Adolescent resilience: Social support

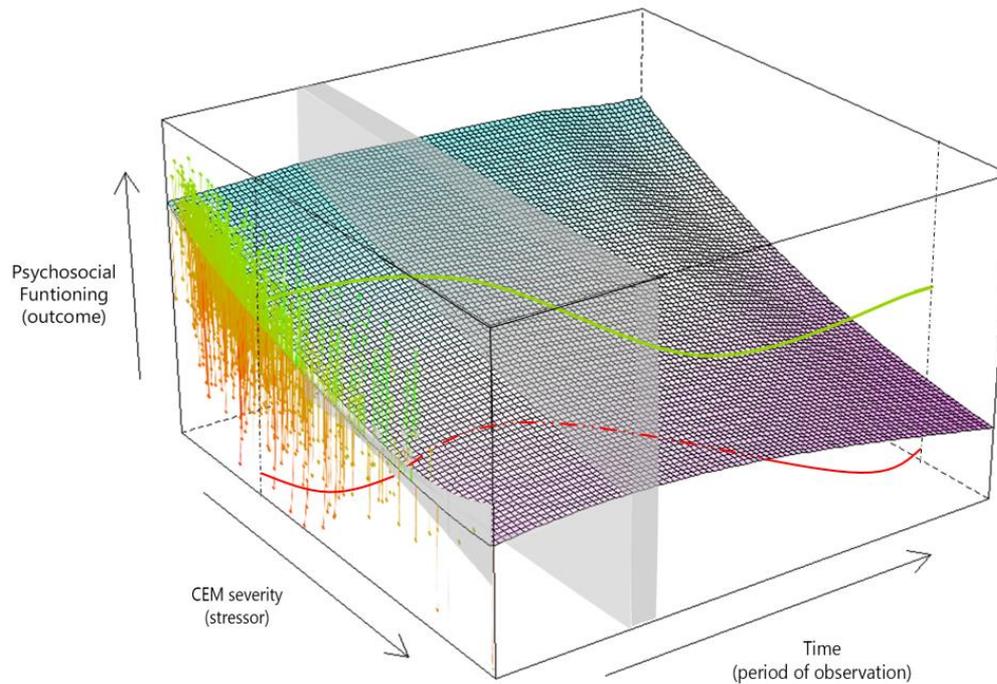
- The extent to which one is loved, accepted, and involved in relationships that provide positive resources
- Social support can come from family, friends, pets, community ties, co-workers etc.
 - Actual (e.g. number of friends)
 - Perceived support (e.g. quality of support).
- Perceived social support predictor of many psychological and physiological outcomes.



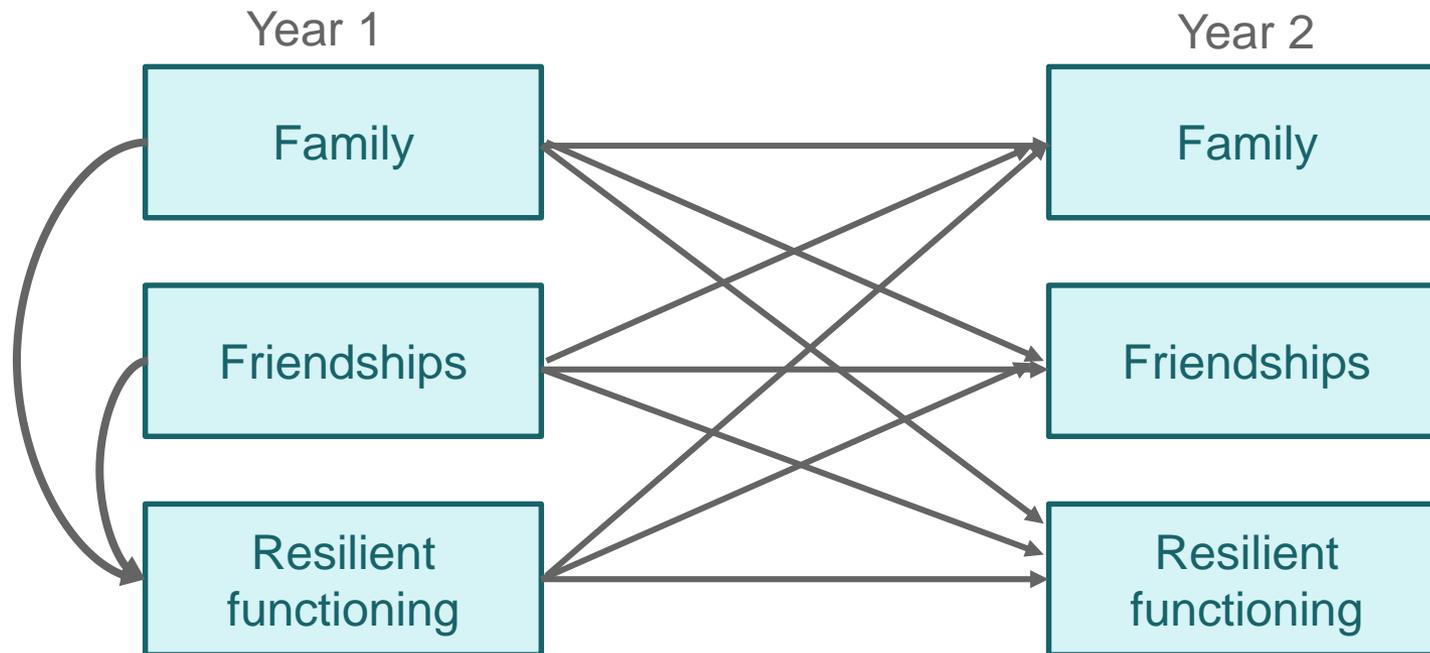
Family and friendship support in late adolescence



Resilient functioning is dynamic

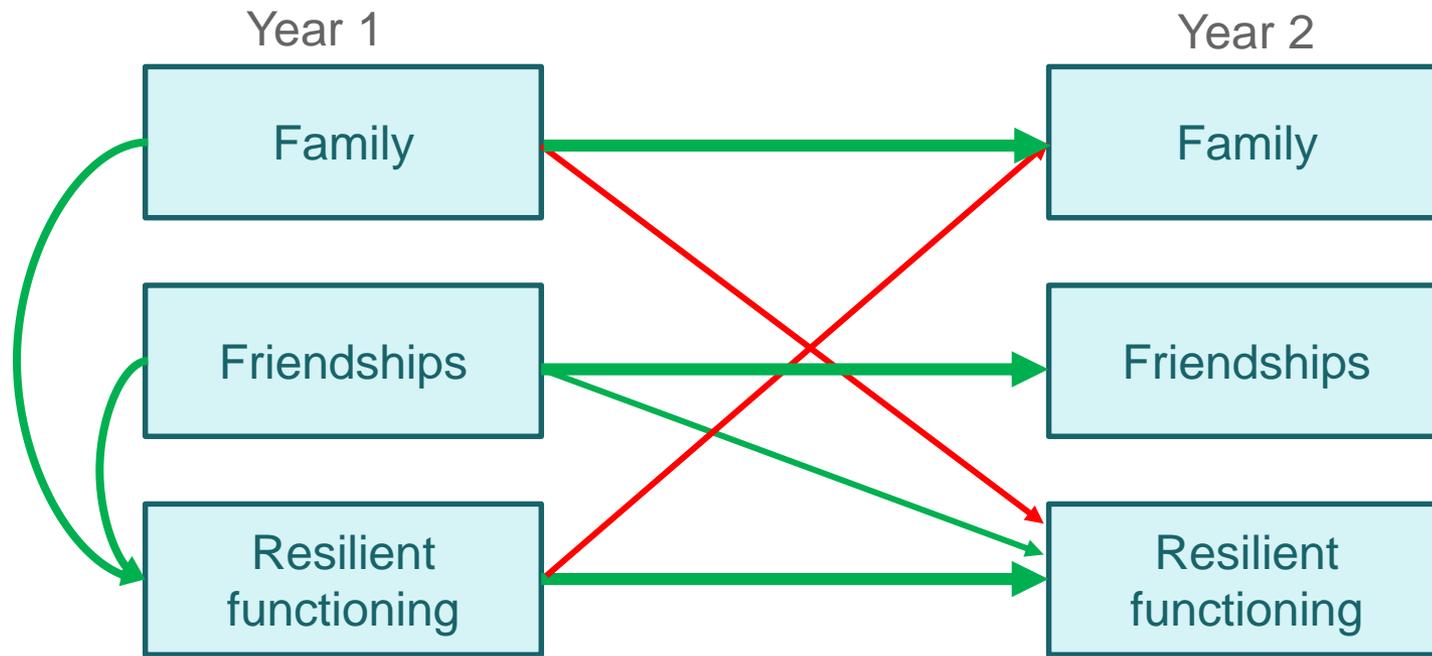


Family and friendship support in late adolescence



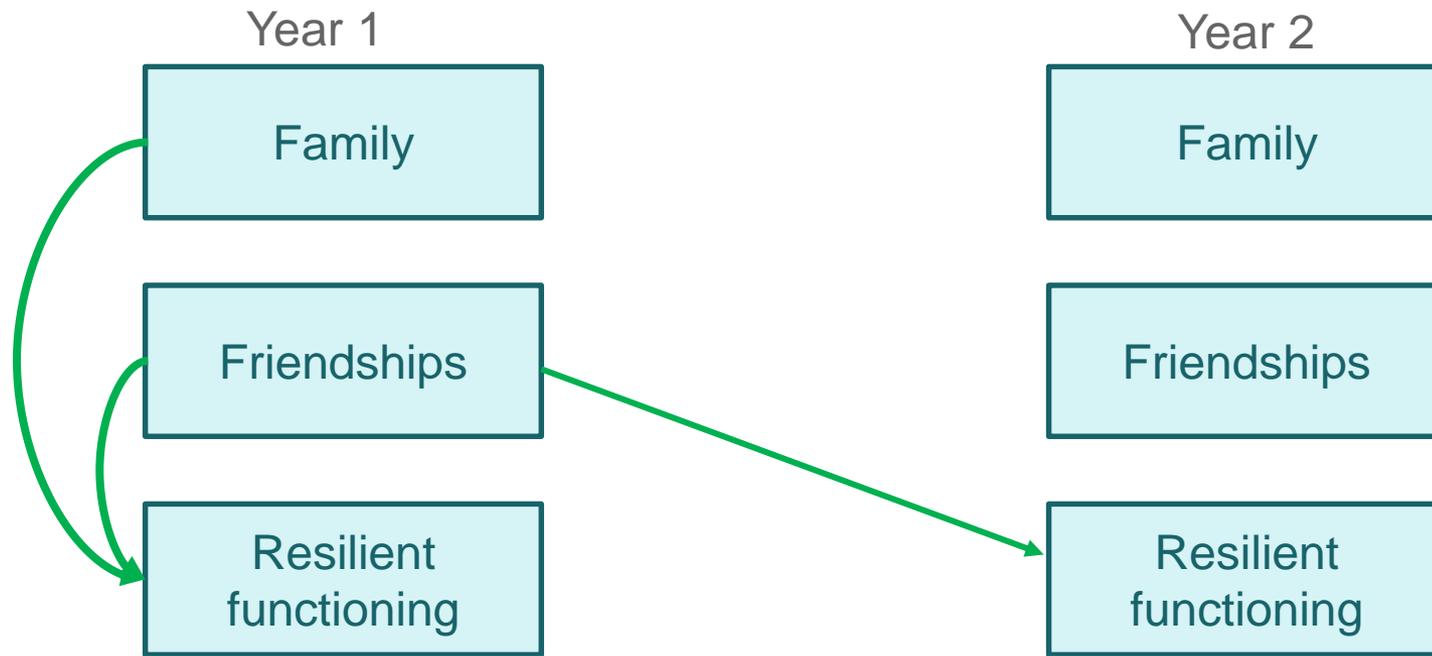
Covariates: Sex, SES, Age

Family and friendship support in late adolescence



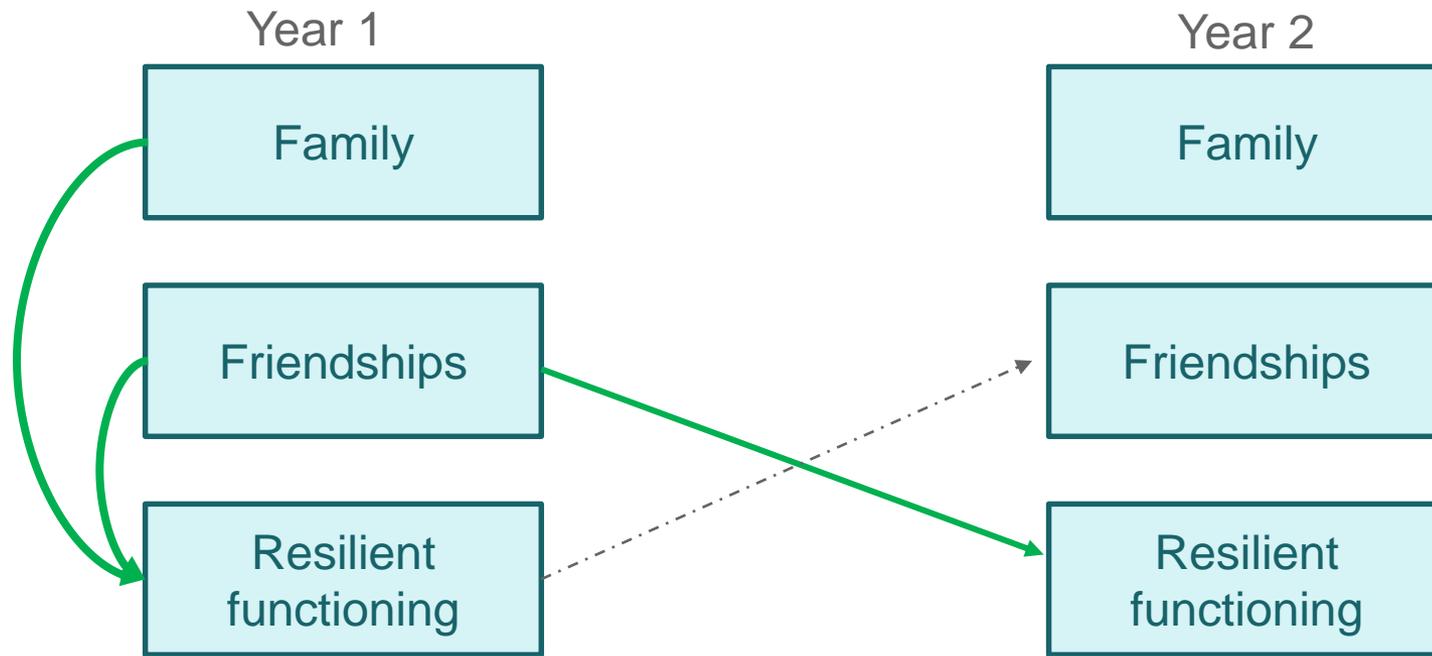
Covariates: Sex, SES, Age

Family and friendship support in late adolescence



Covariates: Sex, SES, Age

Family and friendship support in late adolescence

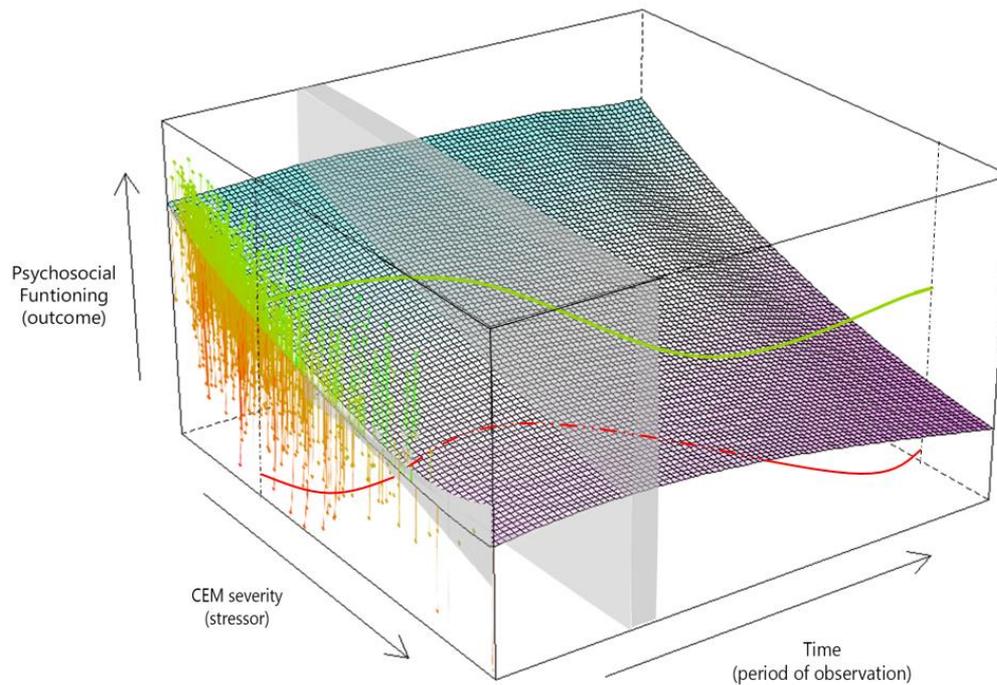


Covariates: Sex, SES, Age

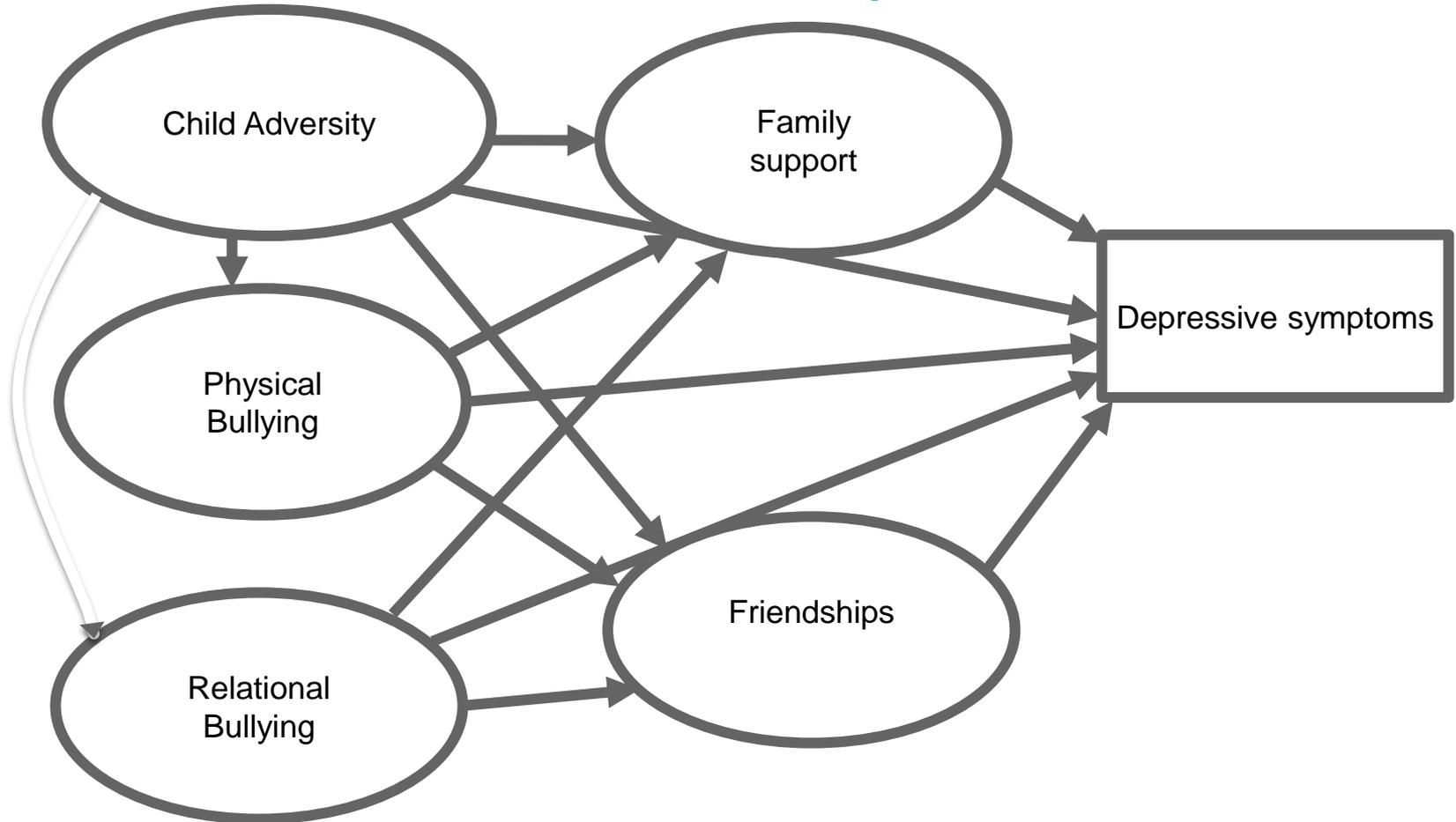
How do friendships work?

- Increasing:
 - positive self-views
 - interpersonal skills
 - decision making skills
- Reducing:
 - feelings of loneliness
 - Negative peer interactions
 - stress responses

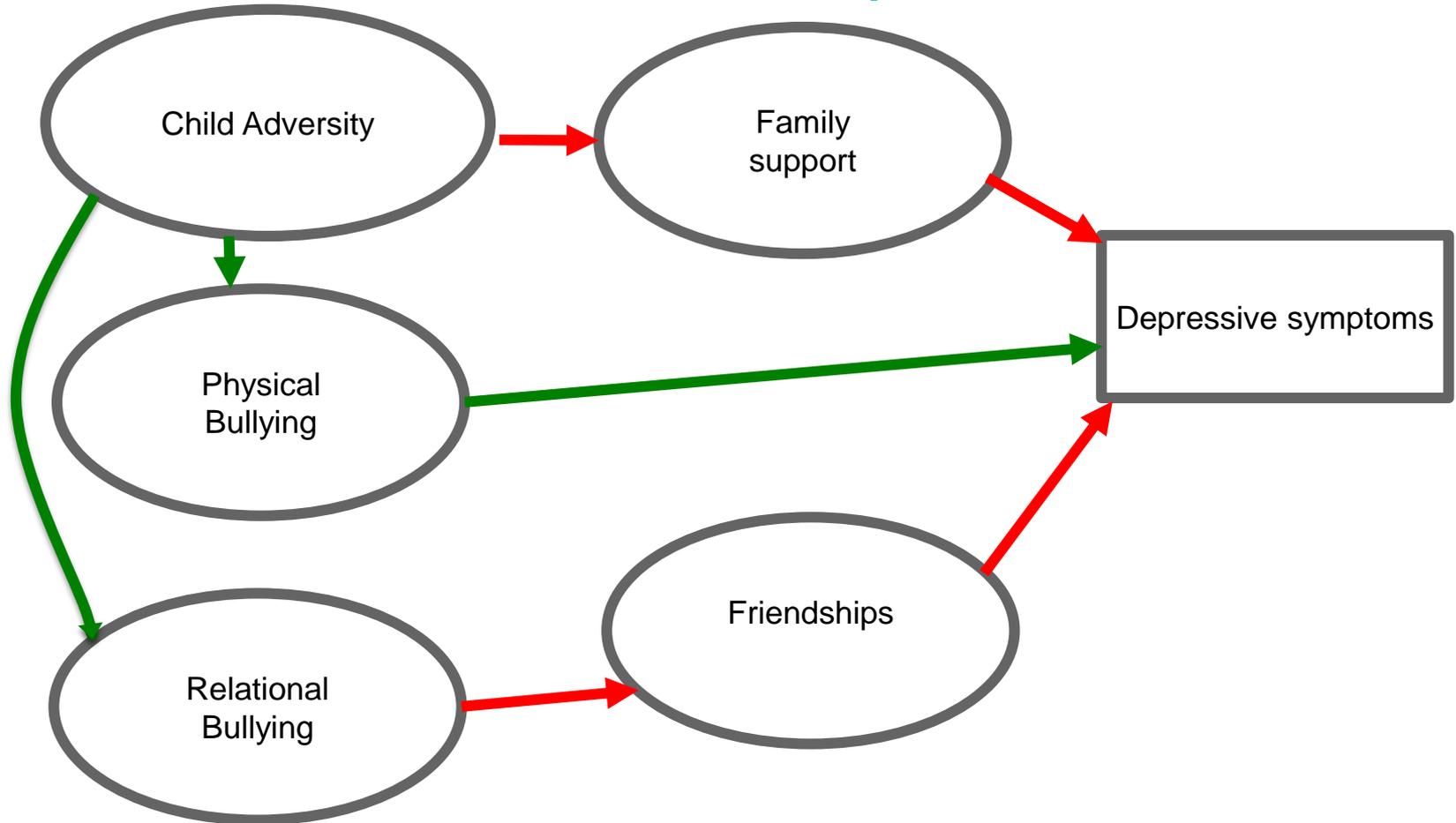
Resilience factors may depend on developmental timing



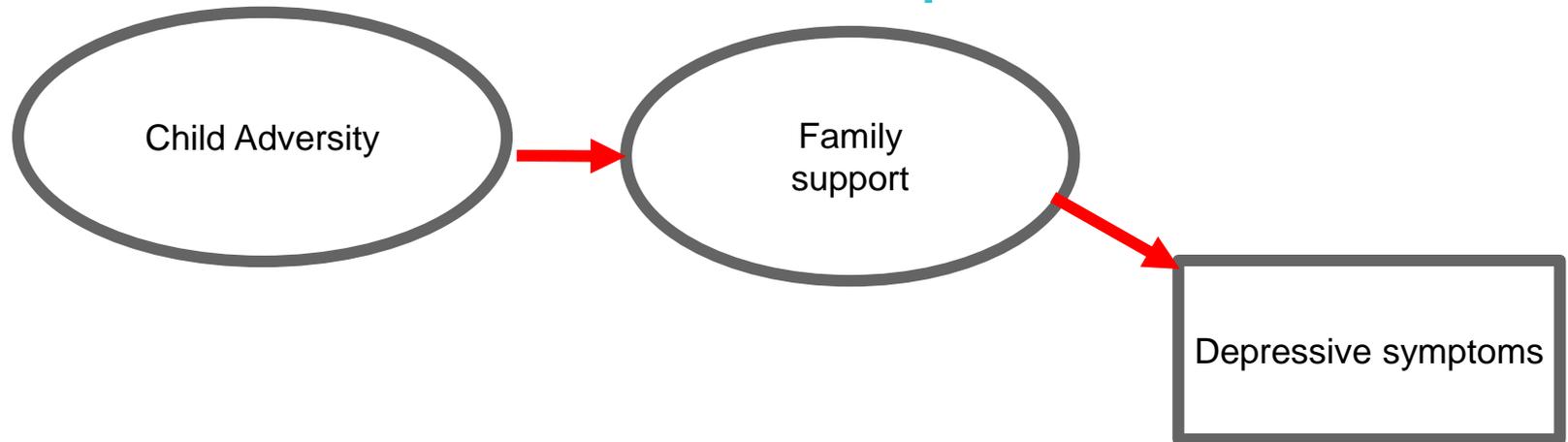
Family and friendship support in early adolescence: The ROOTS sample N=771



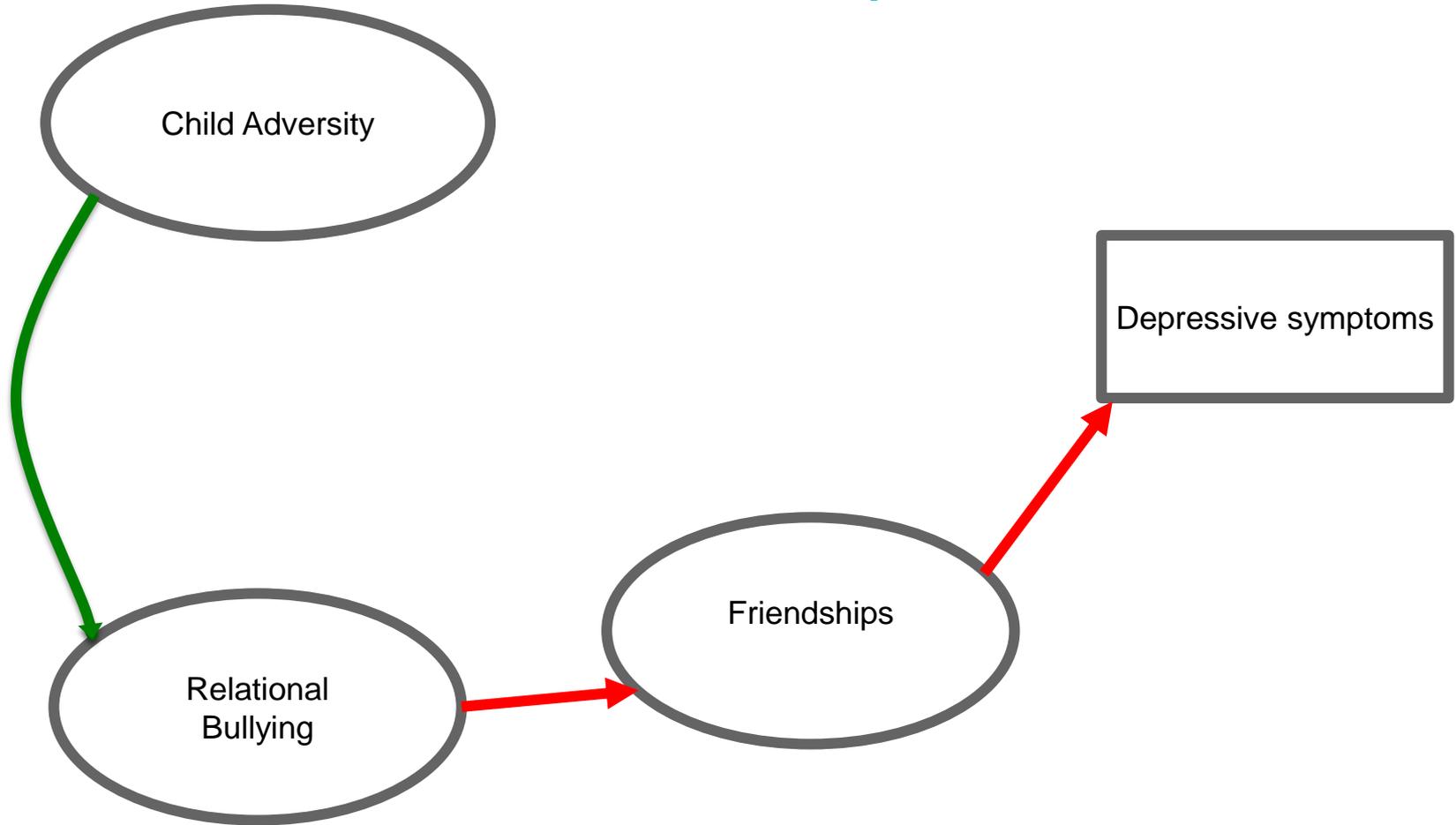
Family and friendship support in early adolescence: The ROOTS sample N=771



Family and friendship support in early adolescence: The ROOTS sample N=771



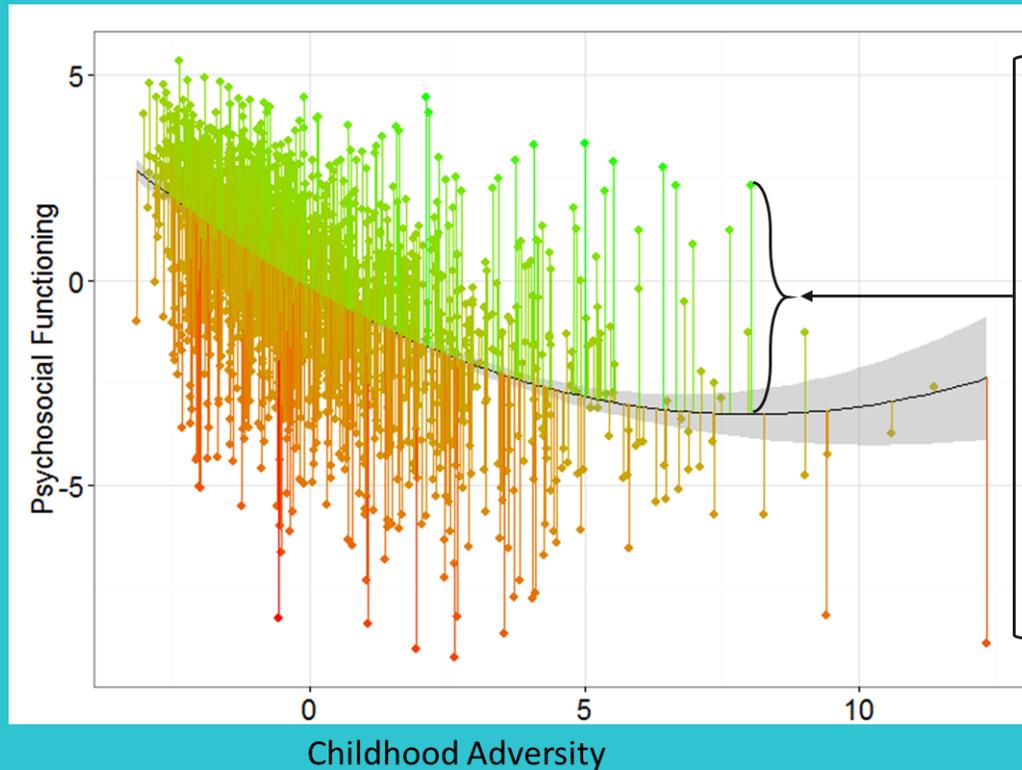
Family and friendship support in early adolescence: The ROOTS sample N=771



Social support as resilience factor

- Friendships predict resilient functioning in adolescence
- Effectiveness of support may depend on:
 - Type of adversity
 - Age of child

Resilient functioning



Resilient functioning

ENVIRONMENTAL INFLUENCES
i.e. caring parents, friendships, intimate relationships, social capital

COGNITION
i.e. self-esteem, positive self schemas, happiness

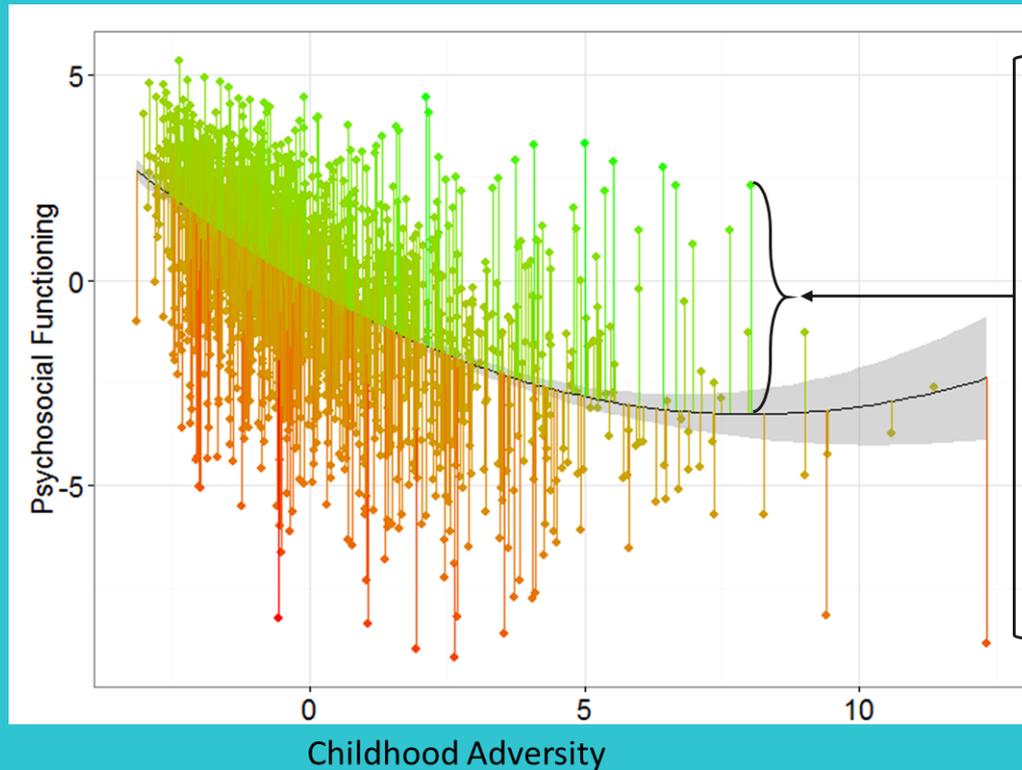
BRAIN FUNCTION
i.e. MPFC, limbic activity, fronto-limbic connectivity

BRAIN STRUCTURE
i.e. MPFC, limbic areas

NEUROENDOCRINE/INFLAMMATORY
i.e. Cortisol, CRP, IL-6, IL-1 beta

(POLY)-GENETIC
i.e. 5-HTTLPR, FKBP5, BDNF, NPY, MAOA

Resilient functioning



Resilient functioning

ENVIRONMENTAL INFLUENCES
i.e. caring parents, friendships, intimate relationships, social capital

COGNITION
i.e. self-esteem, positive self schemas, happiness

BRAIN FUNCTION
i.e. MPFC, limbic activity, fronto-limbic connectivity

BRAIN STRUCTURE
i.e. MPFC, limbic areas

NEUROENDOCRINE/INFLAMMATORY
i.e. Cortisol, CRP, IL-6, IL-1 beta

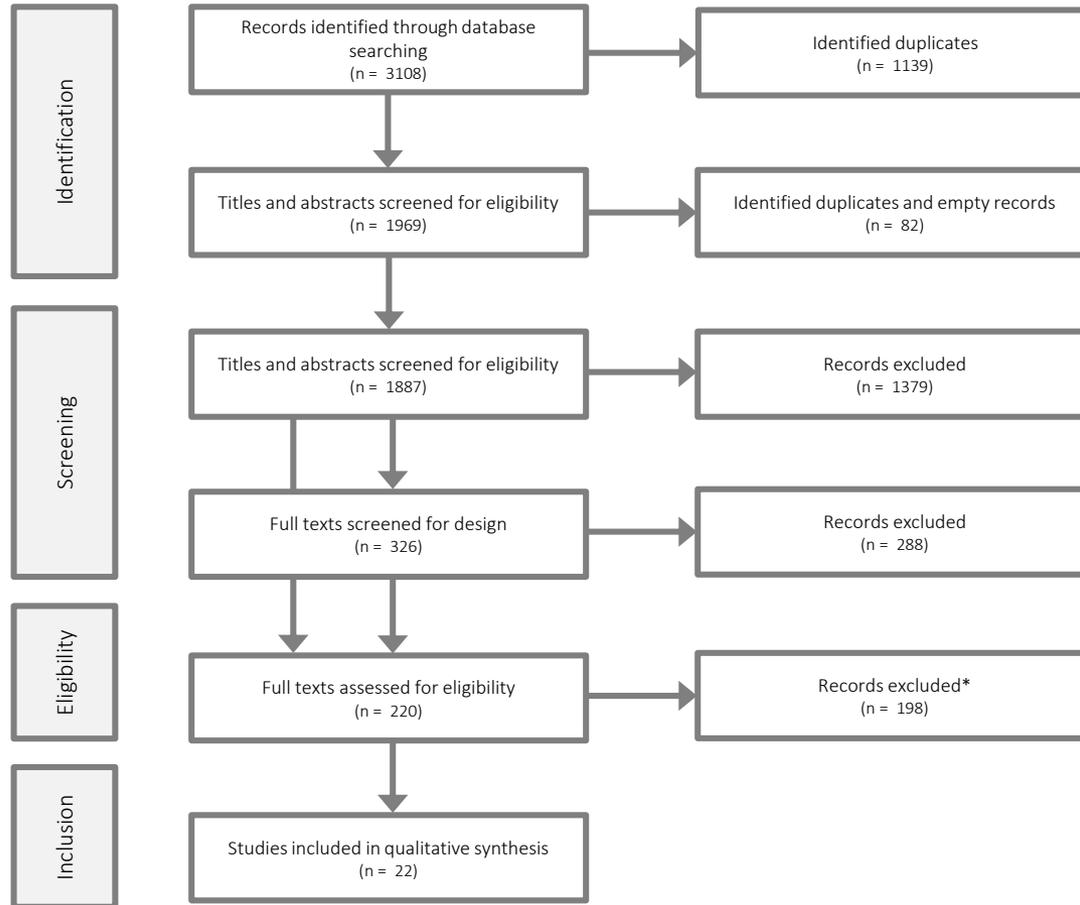
(POLY)-GENETIC
i.e. 5-HTTLPR, FKBP5, BDNF, NPY, MAOA

Mental health risk and resilience after Childhood Maltreatment

- Child maltreatment; focus on child emotional maltreatment (CEM)
- Impact CEM on cognition
- Impact CEM on emotional brain
- Resilient functioning after CM
- Adolescent social support
- Amenable resilience factors



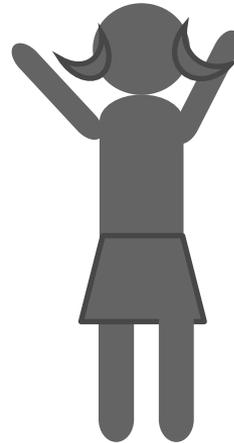
Study Selection Flow Chart



22 studies; RF heterogeneity

- We reviewed 22 studies, including 46 amenable RFs and found support for:
- **Individual-level:**
 - Cognition (high: cognitive reappraisal, mental flexibility; low: rumination)
 - Emotion regulation (high: distress tolerance; low: alcohol coping expectancy, aggression, expressive suppression)
 - Social interaction/attachment (low: insecure attachment, disconnection/rejection, other-directedness)
 - Personality/self-concept domains (high: self-esteem; low: ego over-control, ego under-control)
- **Family-level:**
 - Family-support (high: family cohesion, positive family climate, immediate family support, extended family support)
 - Parenting factors (high: positive parenting, parental involvement).
- **Community-level:**
 - Social support.

Adolescent resilience factors

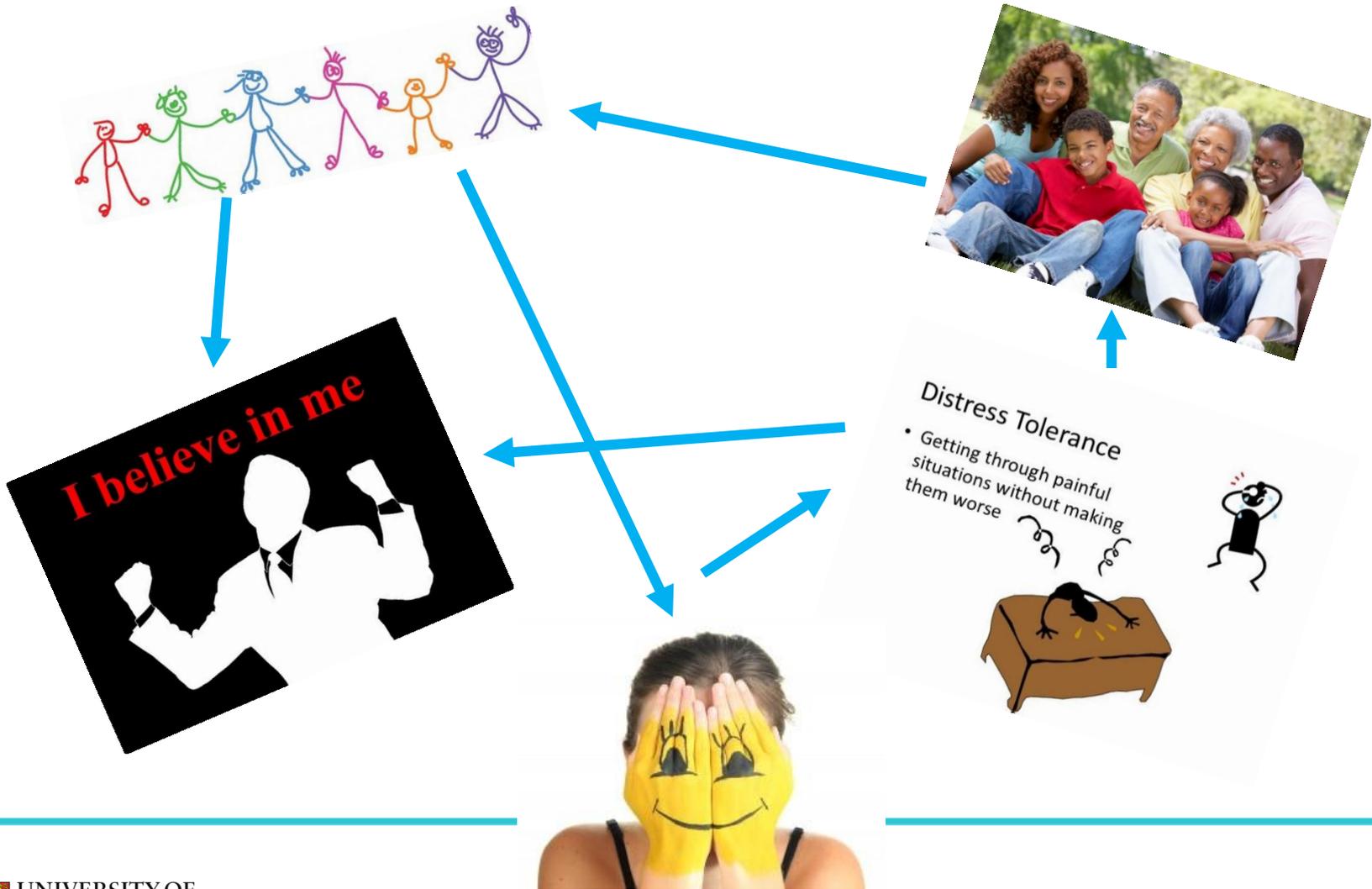


Distress Tolerance

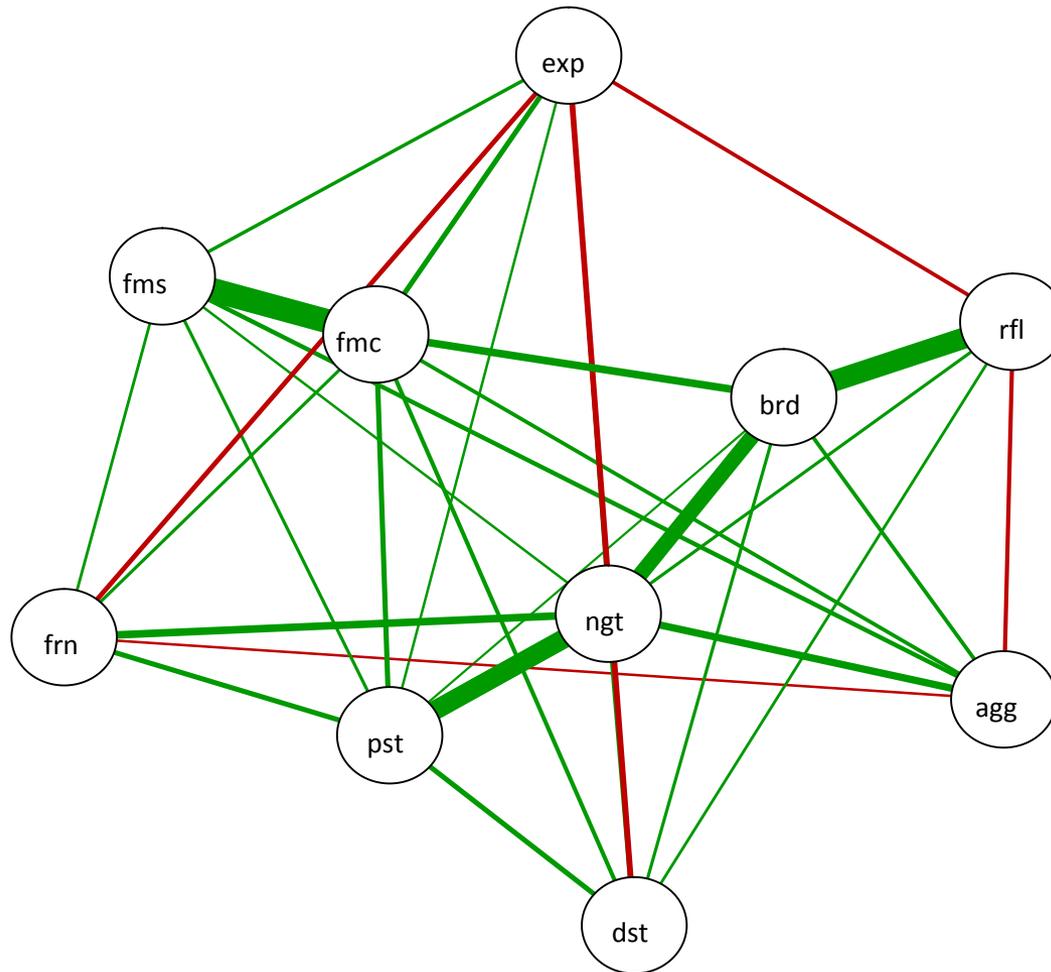
- Getting through painful situations without making them worse



Adolescent resilience factors



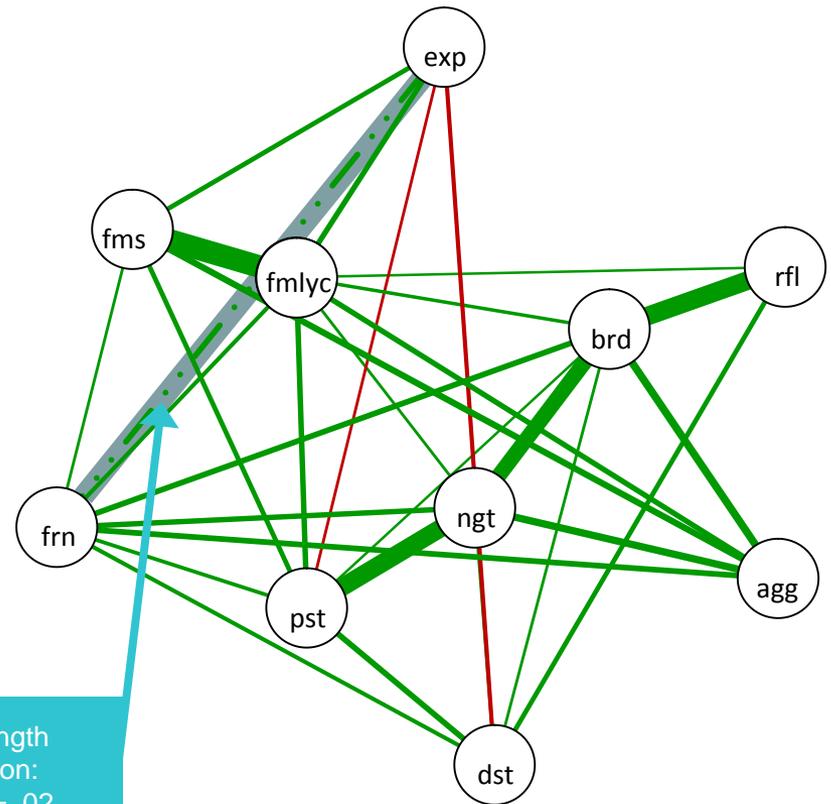
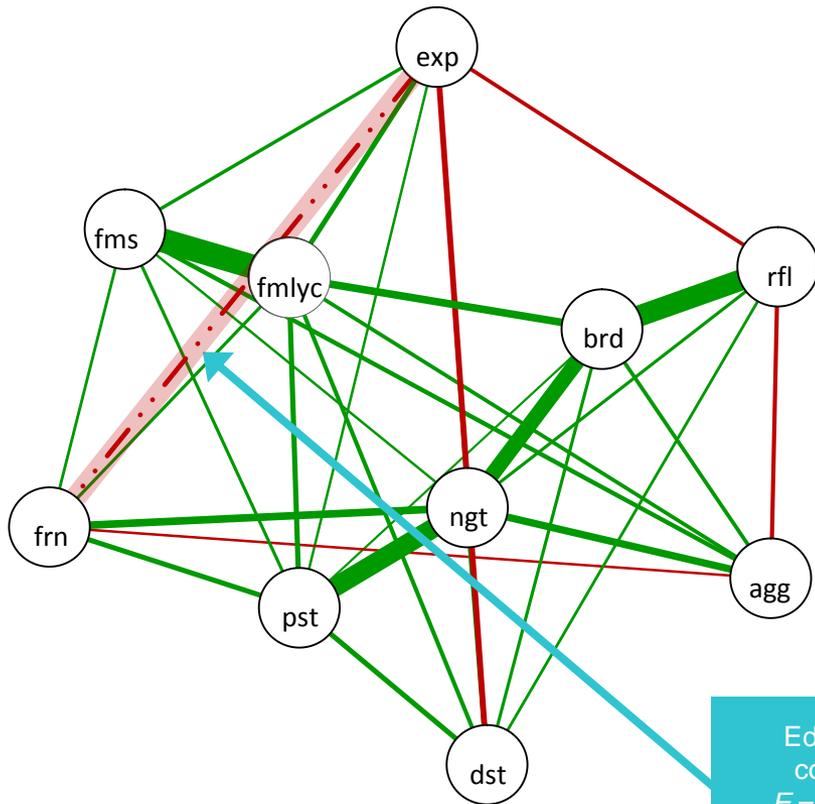
Unravelling the Complexity of Resilience:



Resilience factor networks

CA

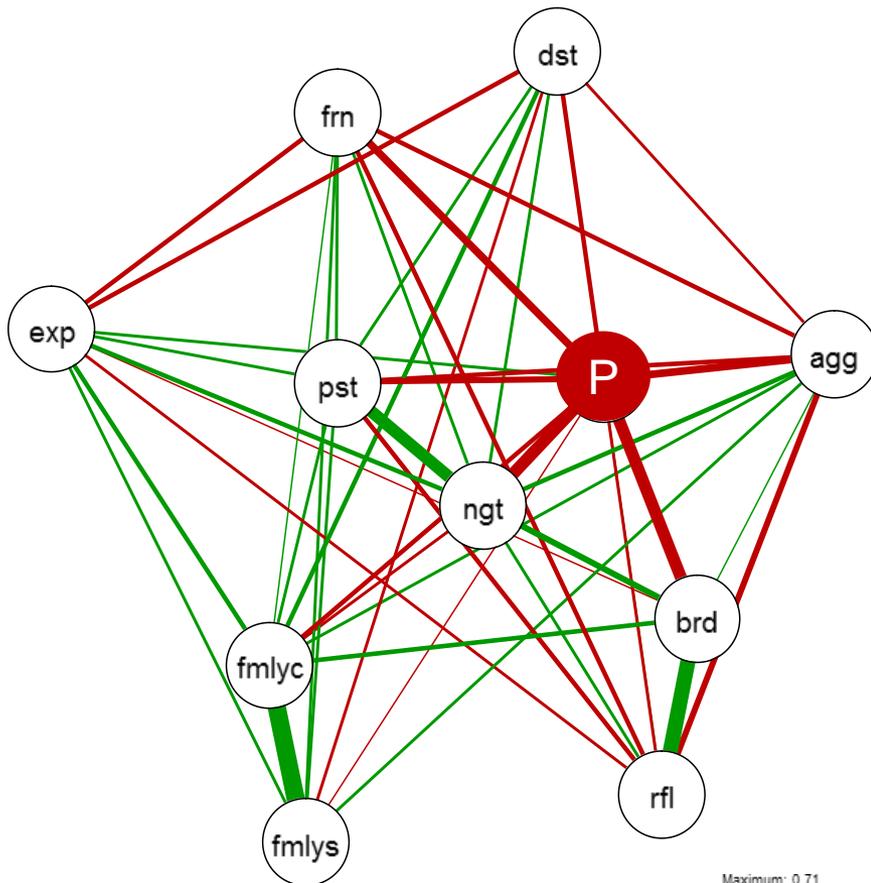
no-CA



Edge strength comparison:
 $E = .17, p = .02,$
5000 permutations

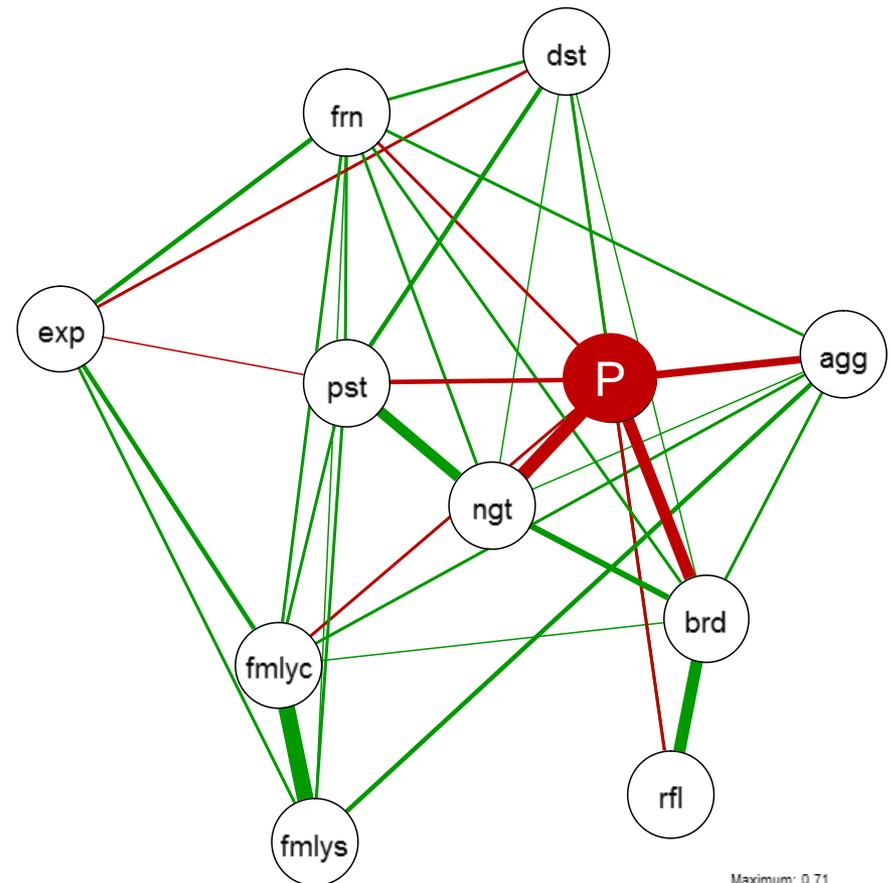
Resilience Factors and Psychopathology

CA



Maximum: 0.71

no-CA



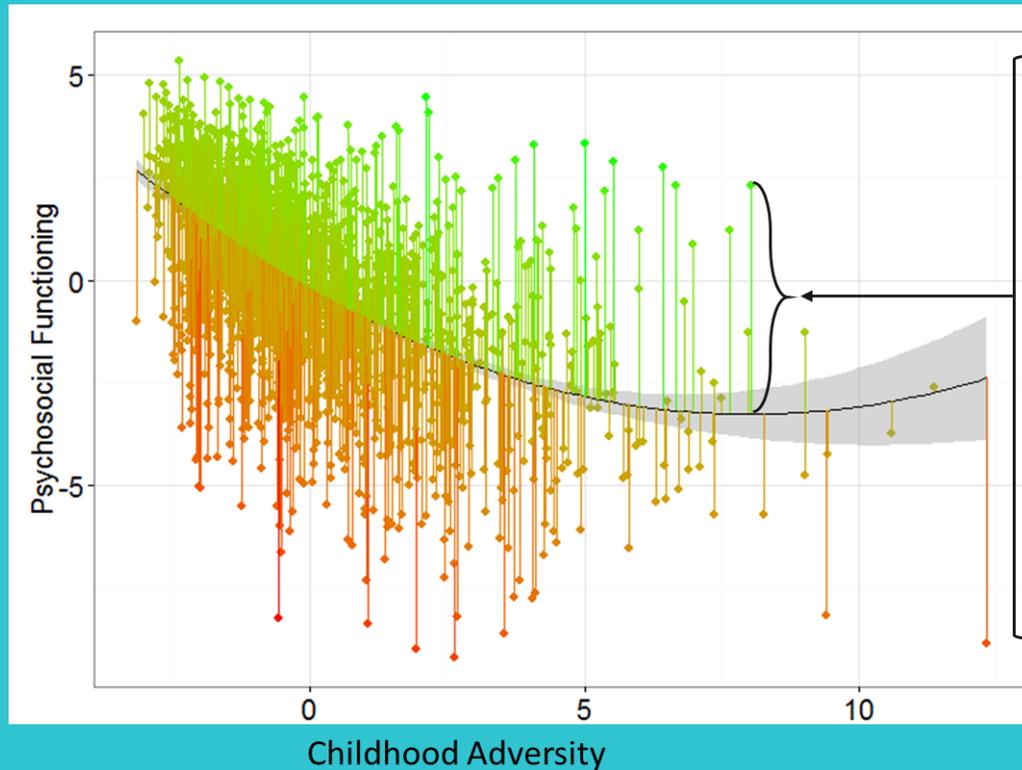
Maximum: 0.71

CEM impacts on cognition and neurobiology in such a way that it increases vulnerability to mental health disorders

However, social, cognitive and emotional resilience factors may help increase resilience in these children



Resilient functioning



ENVIRONMENTAL INFLUENCES
i.e. caring parents, friendships, intimate relationships, social capital

COGNITION
i.e. self-esteem, positive self schemas, happiness

BRAIN FUNCTION
i.e. MPFC, limbic activity, fronto-limbic connectivity

BRAIN STRUCTURE
i.e. MPFC, limbic areas

NEUROENDOCRINE/INFLAMMATORY
i.e. Cortisol, CRP, IL-6, IL-1 beta

(POLY)-GENETIC
i.e. 5-HTTLPR, FKBP5, BDNF, NPY, MAOA

Resilient functioning

Future work!



Thank you!

@DrAnneLaura
av391@cam.ac.uk

Worried about a child?
Contact the NSPCC:

help@nspcc.org.uk

0808 800 5000

How Action for Children works

Neglect law

**We campaigned to update
the law and tackle neglect.**



Better protection for children is now law.

**For the first time in over 80 years the criminal law protecting children in
England and Wales recognises sustained emotional abuse, which causes
psychological harm, as a crime.**

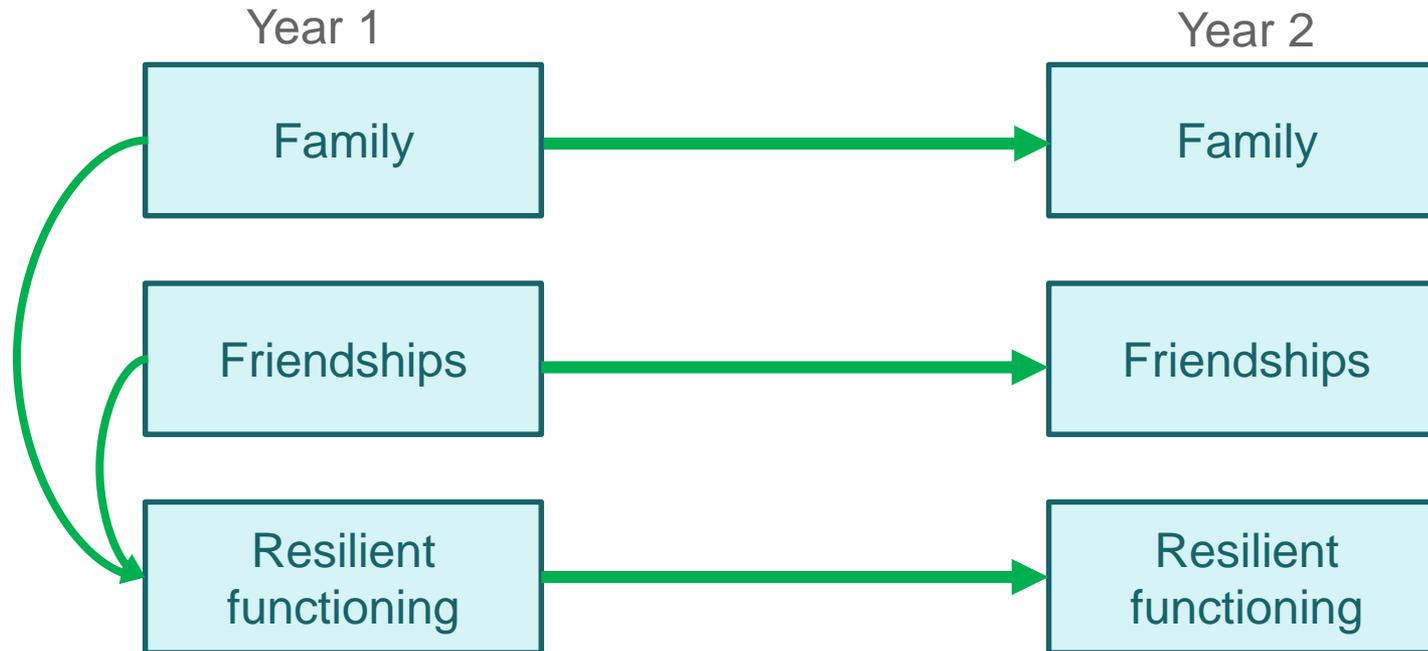
Eligibility Criteria

- One or multiple CA:
 - loss of a significant other,
 - discord within the family,
 - poor parenting,
 - traumatic life events/tragedy,
 - chronic or life stress,
 - hardship,
 - at-risk environment,
 - childhood abuse/maltreatment/mistreatment,
 - childhood neglect.
- The RF is a moderator and/or a mediator for the relationship between CA and psychopathology

Eligibility Criteria

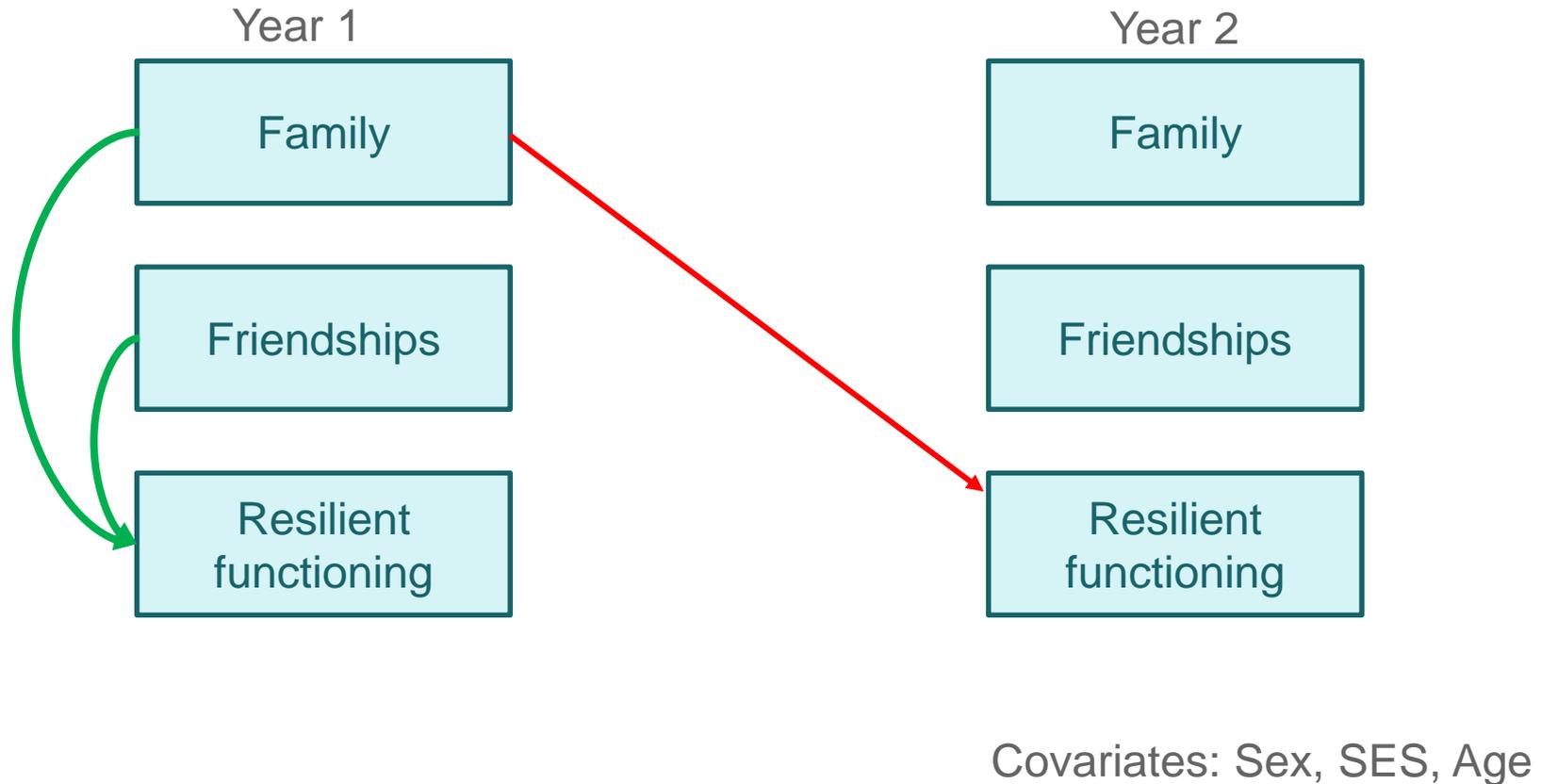
- Psychopathology:
 - diagnosis
 - Symptoms (DSM-IV-TR34)
 - general mental distress
 - self-harm behaviour
 - suicidal ideation.
- Psychopathology measured between the age of 13 and 24 (sample mean age).
- We only included cohort designs were:
 - the RF was assessed before psychopathology
 - CA was measured no later than the RF

Family and friendship support in late adolescence

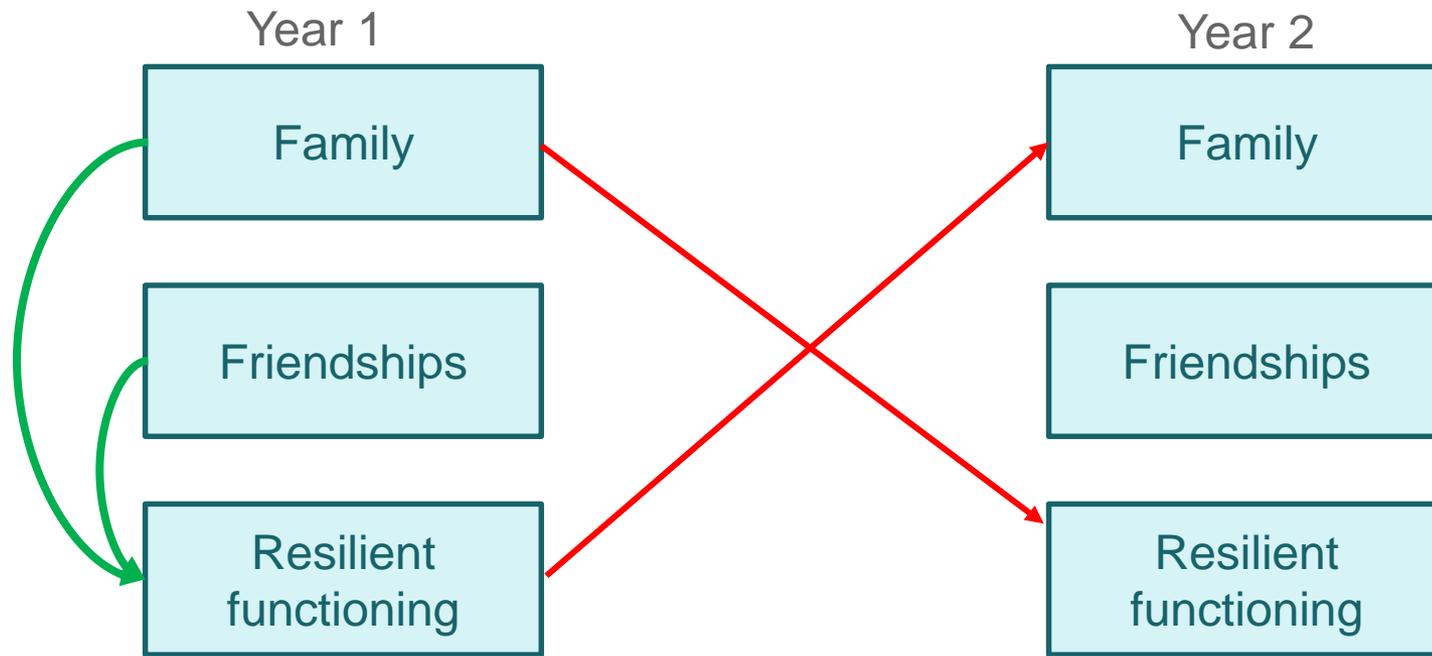


Covariates: Sex, SES, Age

Family and friendship support in late adolescence



Family and friendship support in late adolescence



Covariates: Sex, SES, Age