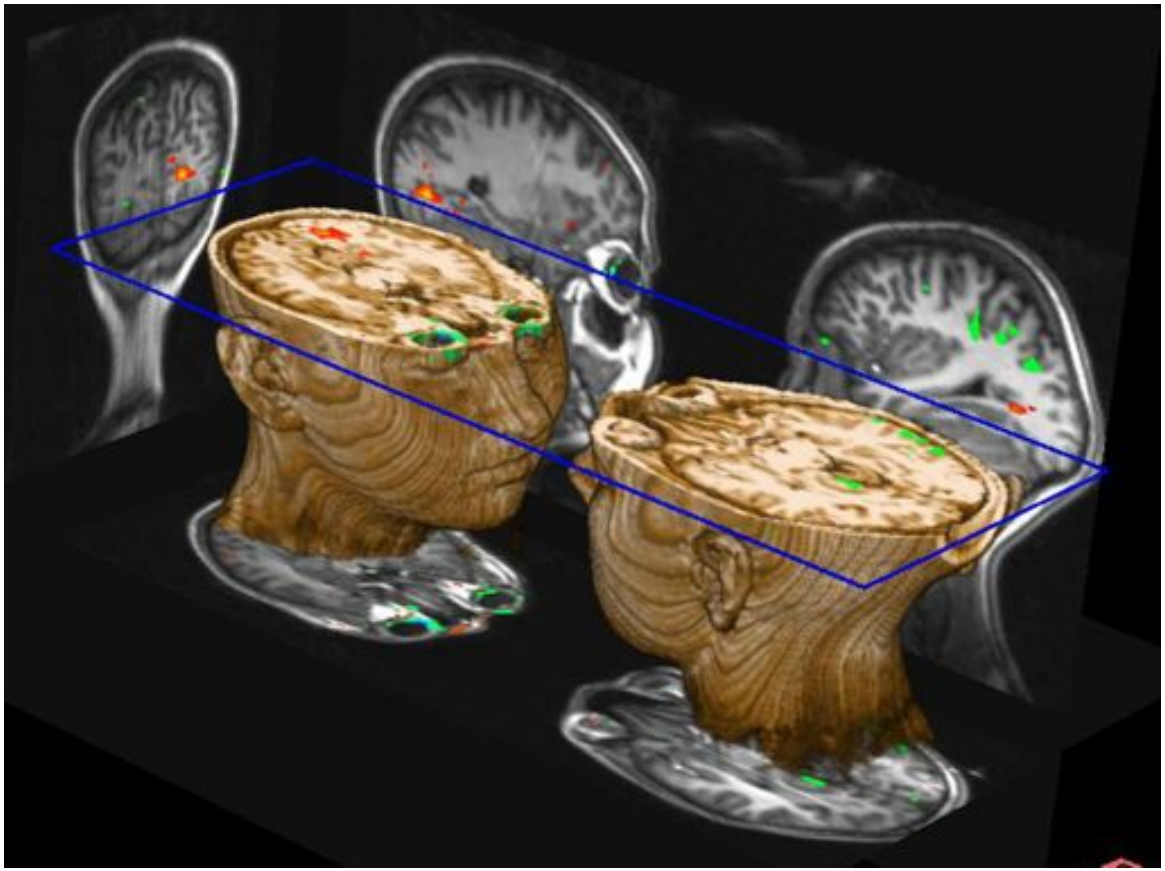
Building brains for the life course



Lee, Princeton Neuroscience Institute

Atkinson Centre Summer Institute, 2012

Cooperation is the most important activity that we do with one another Tomasello, Dunbar

It is the basis of creativity and culture

The cooperative brain

- Regulating emotions
- Mental health
- Managing relationships
- Language
- Reading and mathematics

My message

- Emotional and behavioral regulation and early learning are a ‘package’ and influenced by the same processes
- Cumulative distal risk influences relationships
- Important processes in relationships (parent, sibling and teacher): responsivity/challenge AND differential reactivity
- Individual differences in children that elicit different reactions from people
- Building a system to support young children

Longitudinal, bio-social study of early development

To be in the study: newborn plus at least one older sibling

Follow-up from birth to school entry

500 families: observation in homes, filmed and coded tapes, biological measurement

Collaborators and thanks

Special thanks to Mark Wade Heather Prime

CIHR IRSC
Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

The Atkinson Charitable Foundation

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Collaborators: Janet Astington, Heidi Bailey, Cathy Barr, Mira Boskovic,Michael Boyle,Alison Fleming,Kathy Georgiades,George Leckie, Greg Moran,Chris Moore, Tom O'Connor,Dave Pederson,Michal Perlman,Jon Rasbash, Hildy Ross,Louis Schmidt, Jennifer Tackett

The assessment of emotional and behavioral regulation and academic achievement from 18 months to 4 years

Empathy

cooperation

Emotion regulation

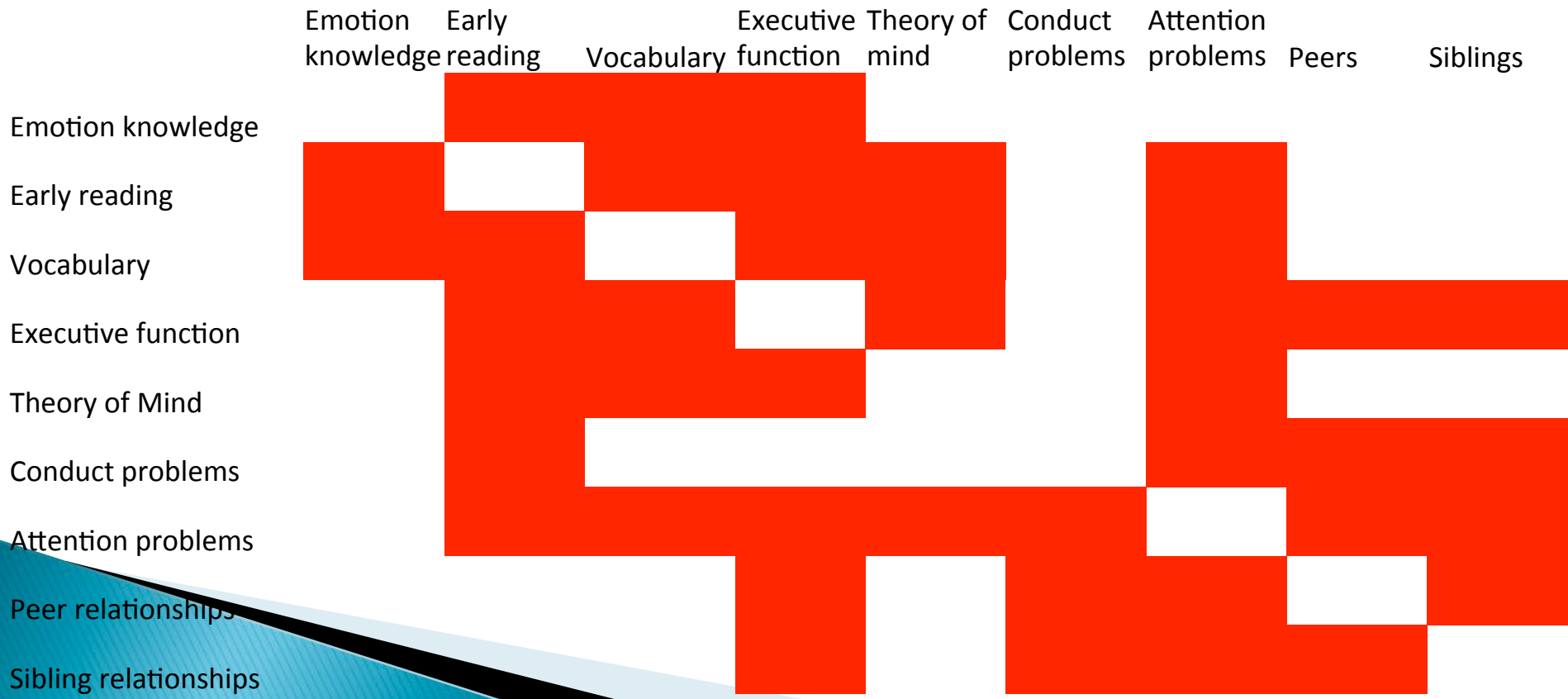
Receptive language: PPVT

Two minds sharing attention to the same object

TOM: Knowing what others know

Print recognition

Correlations of emotional and behavioral regulation, academic achievement, social cognition and relationships



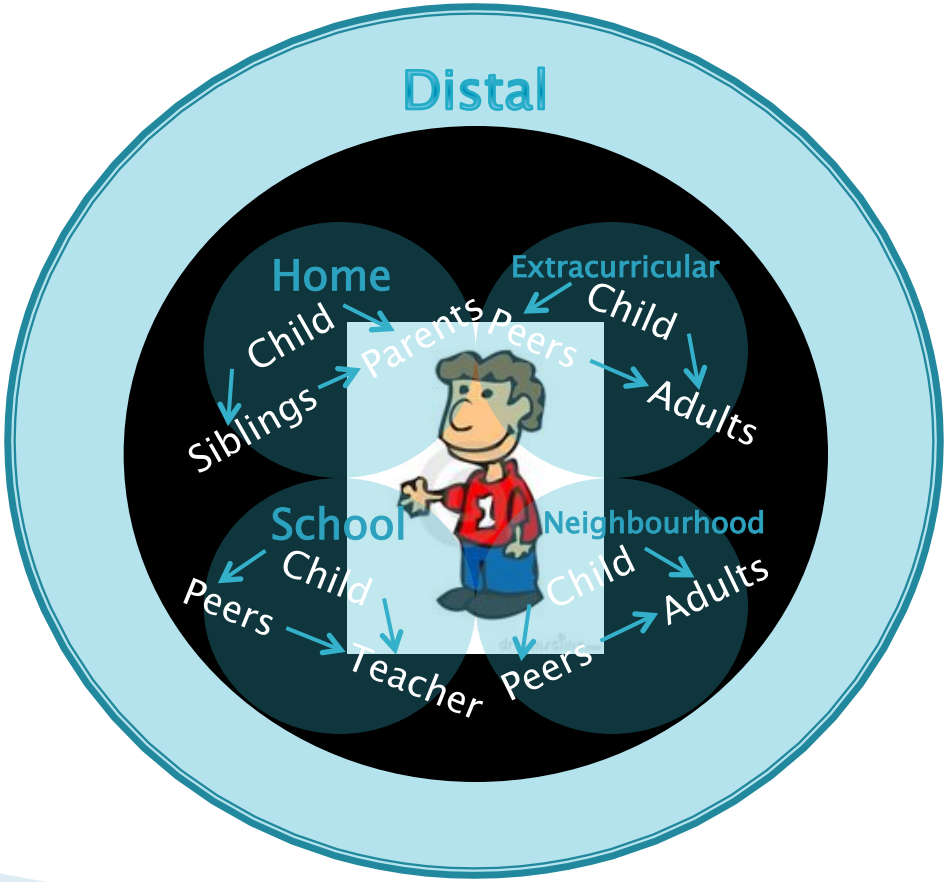
Implication

The social and academic skills of early childhood are related to one another

They are the expression of a well developing brain

The same environmental predictors explain their development

Risky environments: Distal to Proximal



‘Cumulative risk’ in childhood affects health, learning and social functioning

chaos

Maternal depression

Poverty
/poor neighbourhood

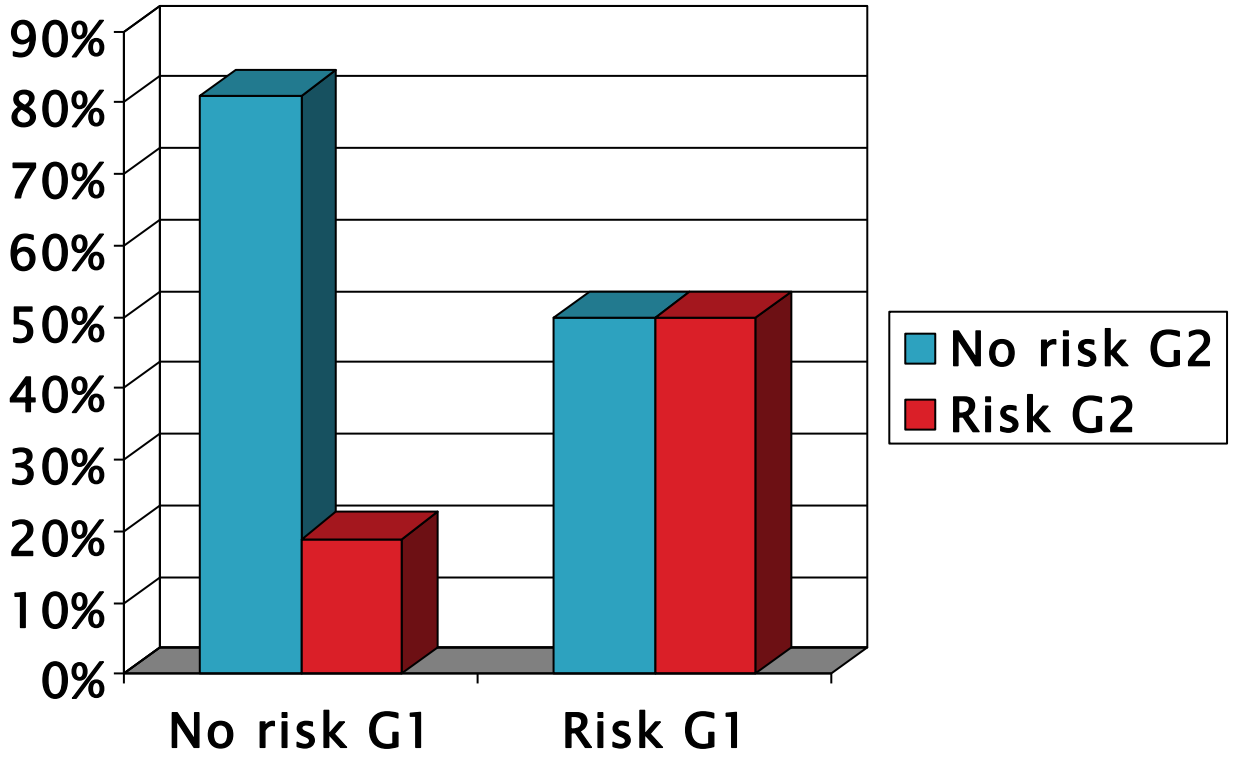
Teen parent

Marital conflict

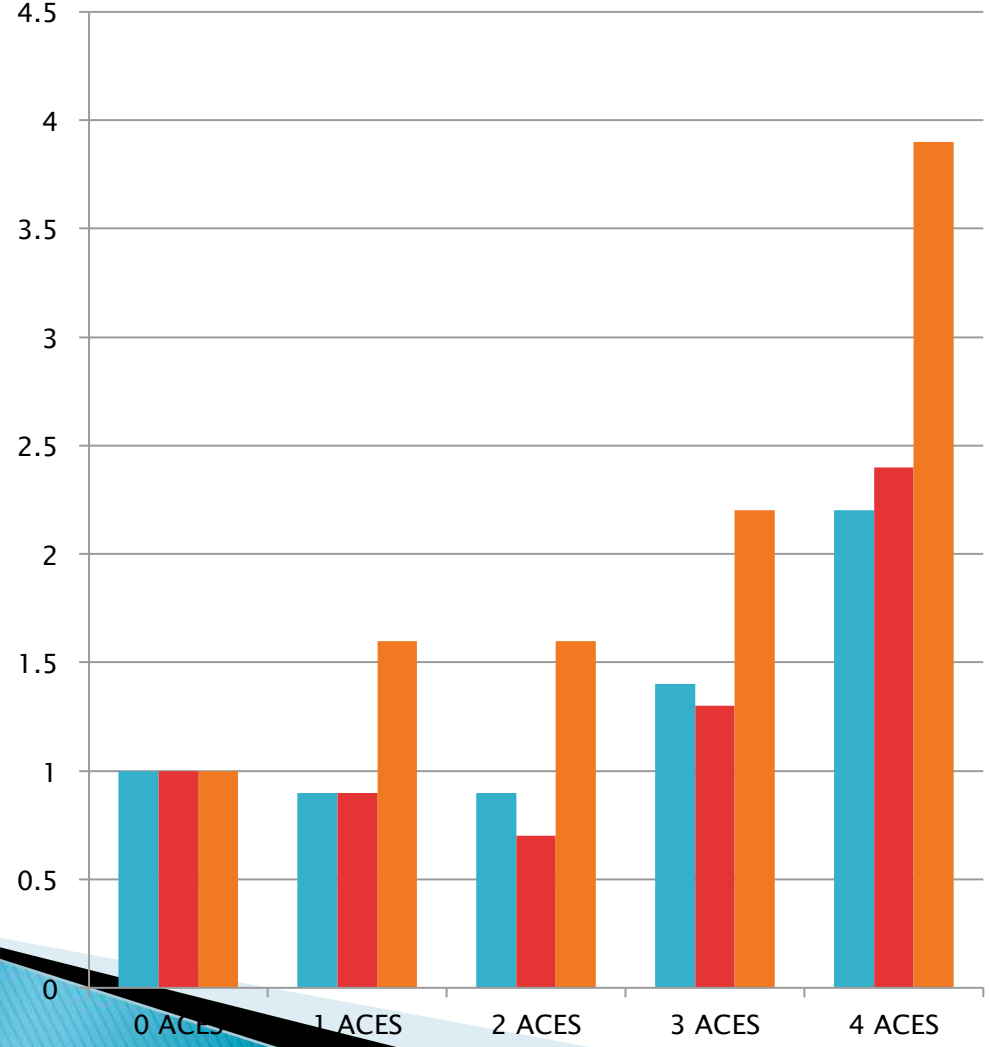
Number of risks that affects a wide range of developmental outcomes

NOT single risks

Cumulative risk in a parent's childhood predicts the cumulative risk to which their children will be exposed



Exposure to cumulative risk in childhood and adult physical health



- Ischemic heart disease
- Stroke
- Chronic Bronchitis and emphysema

Felitti et al. (1998) American J of Prev Med. 14, 245-258

Why does cumulative risk affect children's learning, social cognition and health?

Brain development occurs within the context of relationships

Social understanding at 18 months: Tasks with the experimenter

Empathy

Cooperation

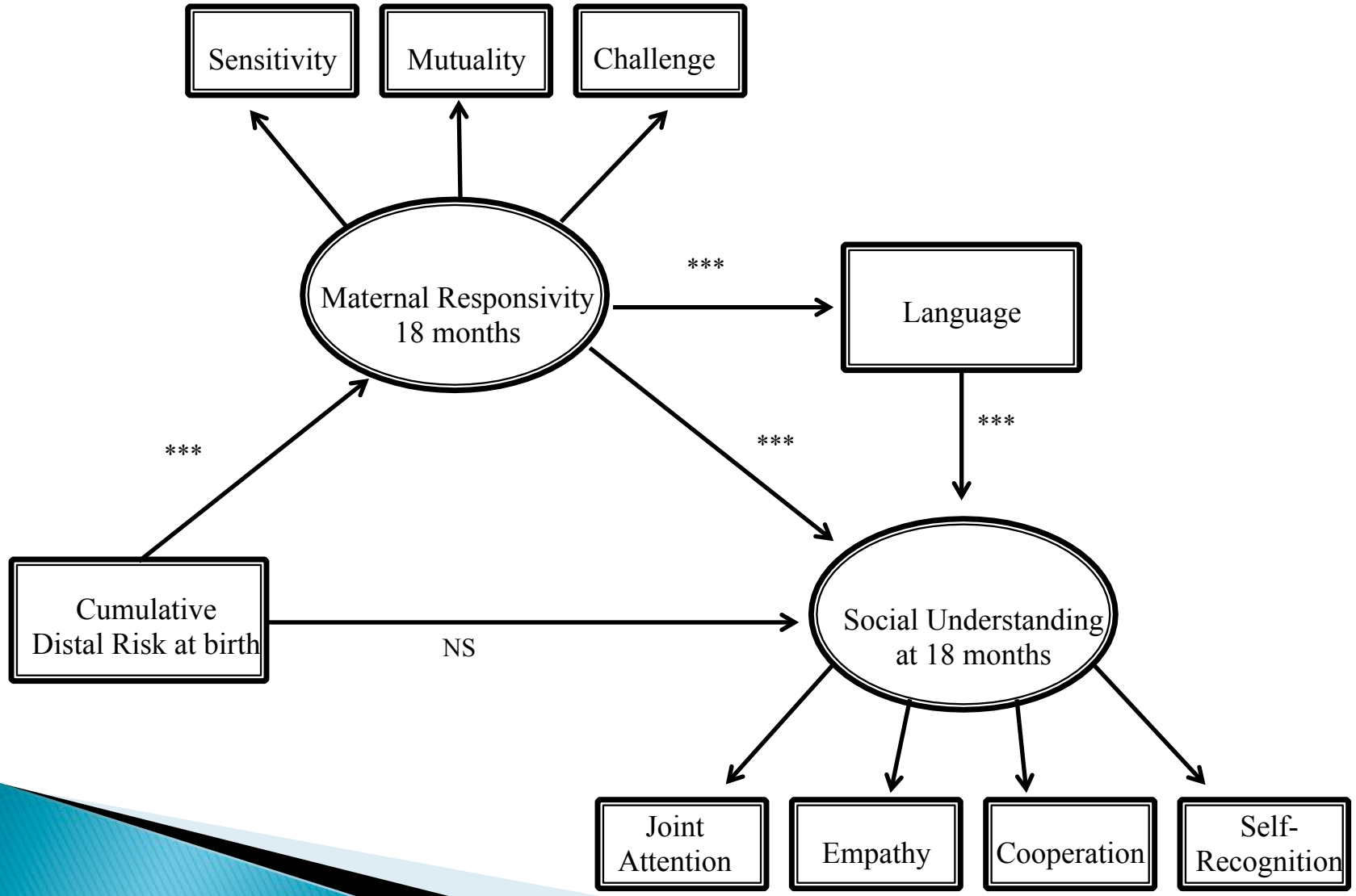
Joint attention

Mirror self recognition

Observed maternal behaviors to child

- Sensitivity
- Mutuality
- Challenge

Effects of cumulative risk on 18 month old social understanding: Operates through parenting



Wade, Moore, Astington, Jenkins, 2012

Interactions for the mind

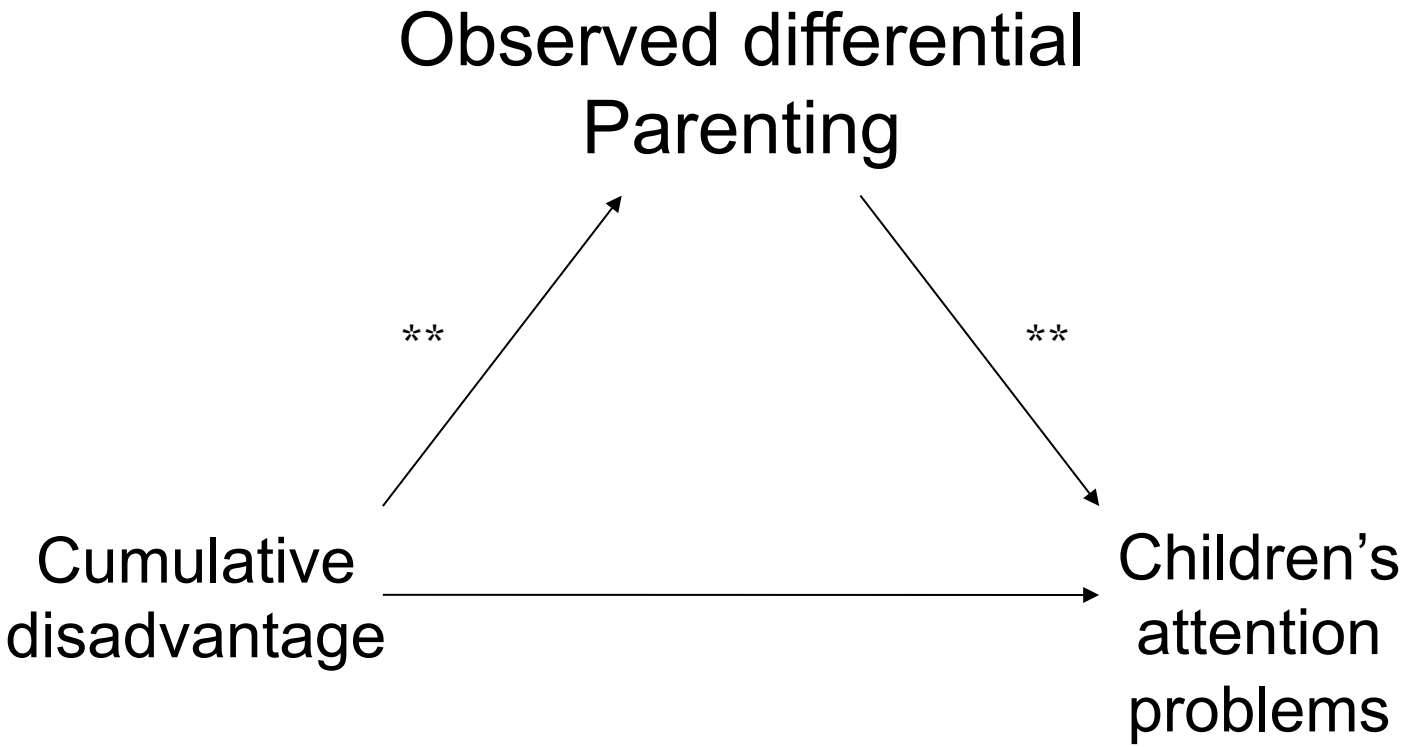
Responding to the child's interest
Contingent
Talk about the mind
Challenging: support the child to go just beyond what they can manage

Same processes siblings... and in all likelihood teachers.

Differential positivity and negativity to siblings

- In most families this is pretty balanced but when it is not all children are worse off.
- This predicts an increase in children's emotional and behavioral problems over time

Cumulative disadvantage influences children's attention problems through , differential parenting



Indirect effect, p< .05

Meunier, Boyle, O'Connor, Jenkins, 2012

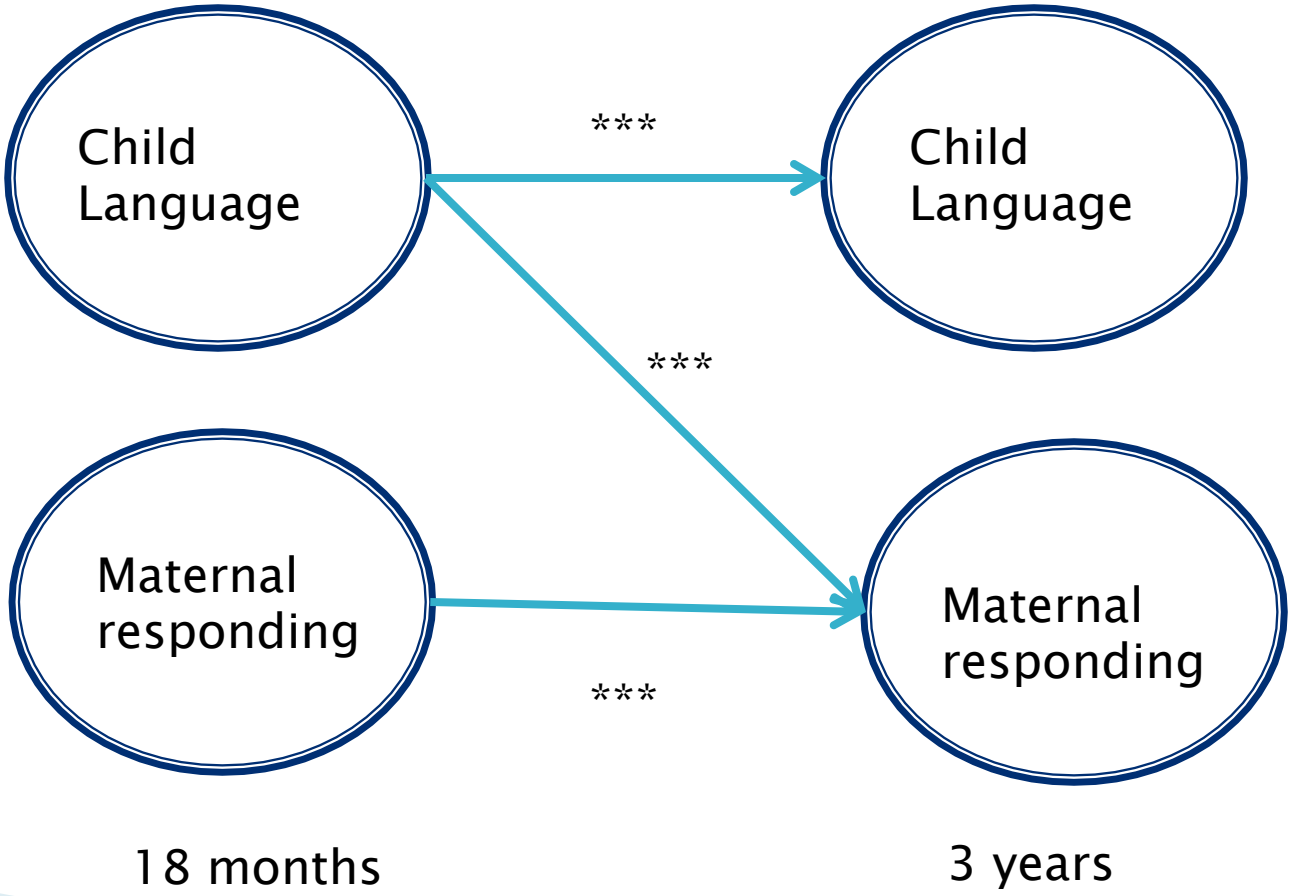
Summary: Cumulative disadvantage affects parenting in two ways: reducing responsivity/challenge and parents being more differential with siblings.

These parenting behaviors contribute to the problems that we see in failures in social understanding, less good mental health, less good physical health.

Child characteristics affect the parenting that children receive

- Biological influences (genetic, growth in utero, exposure to toxins) result in subtle differences between siblings in language, attention and child temperament
- These are indicative of neurodevelopmental vulnerability.

Cross-lagged models for causal effects: early child language predicts change in maternal responding

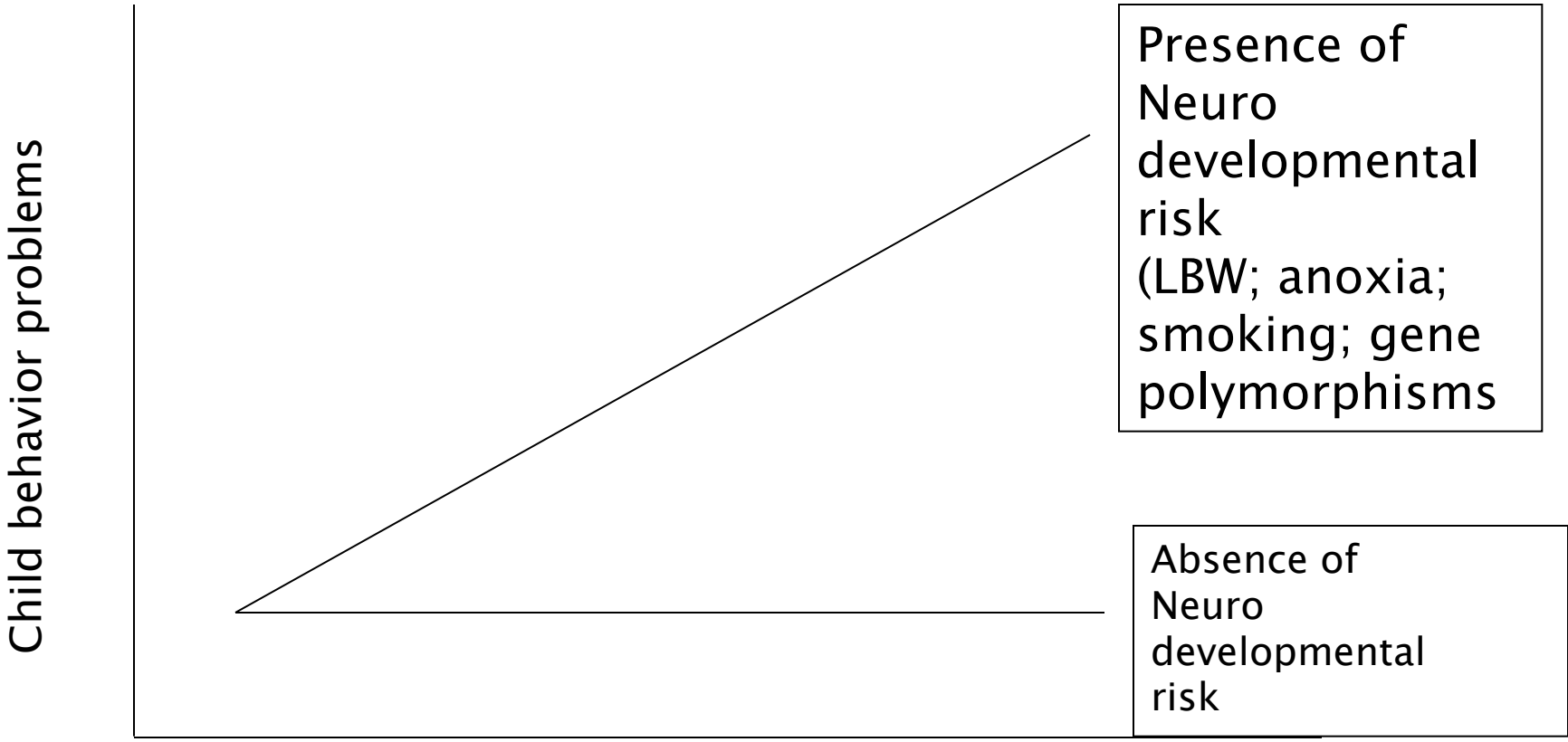


Language, affect and attention vulnerable children elicit behavior from their parents that feeds into a negative spiral.

Such vulnerabilities are subtle rather than severe

How do such child vulnerabilities combine with relationship problems in the family?

Vulnerability and Resilience



Jenkins, 2008

Resilience is the *decoupling* of risks

Summary

- The number of distal risks is critical
- More distal risks leads to more problematic parenting: less responsive and challenging AND more differential across siblings which in turn explains learning, emotional and health outcomes in children.

We can decouple risk and foster natural resilience by

Programs in pregnancy to reduce neurodevelopmental problems

A focus on parenting in the first two years with subsequent boosters: responsivity/ challenge and non-reactivity

Target high cumulative risk families

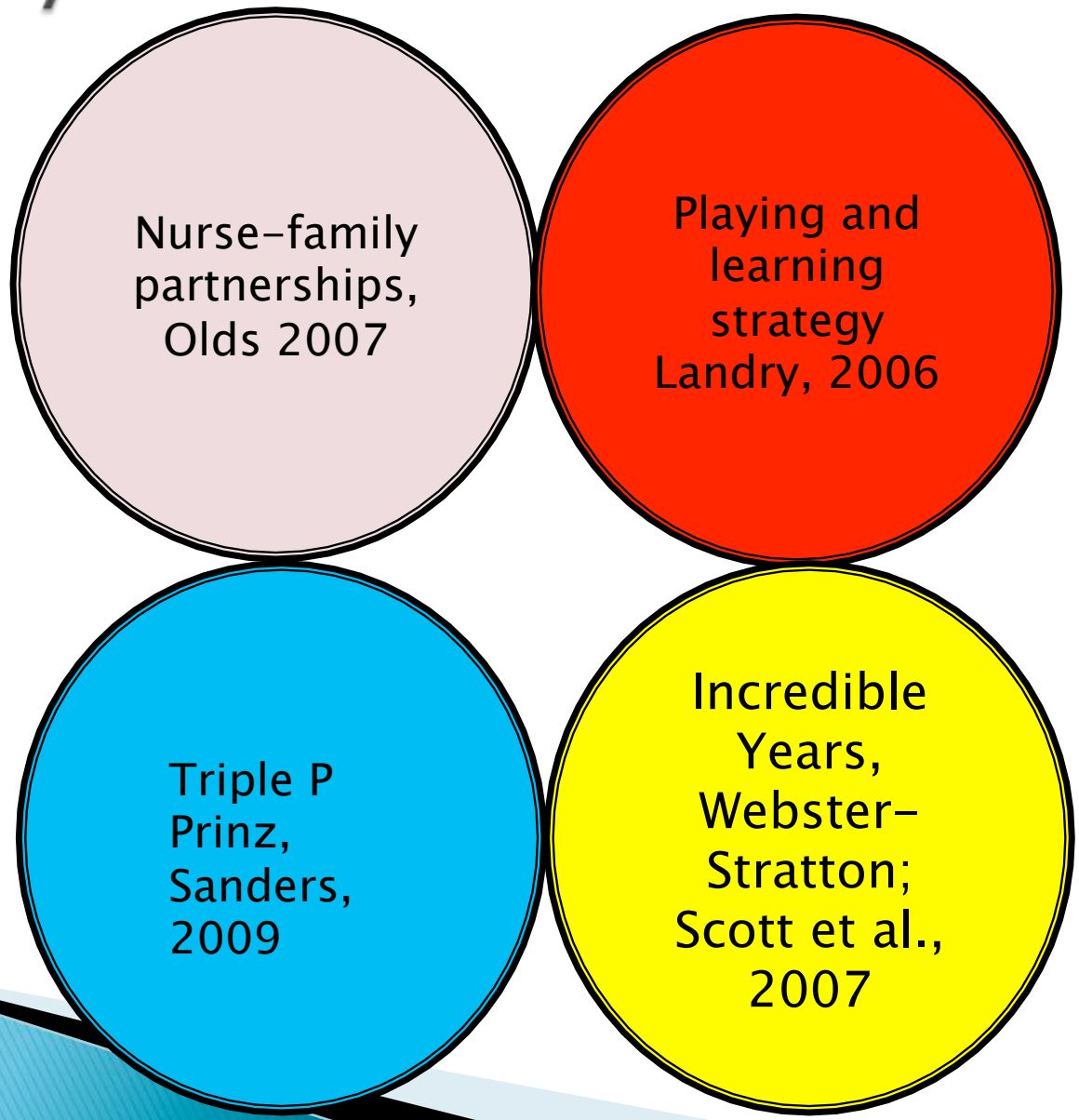
Childcare and early education has a large role to play in supporting children and families. Others are discussing this today.

My focus: the necessity to get inside families

My opinion: build our programs and social policy on the highest scientific evidence: RCTs

- Off the shelf: We adapt to the context but keep program fidelity
- Experimenting with our children: Exactly the opposite.
- Problems with roll out: let's solve them

Evidence-base relating to the family

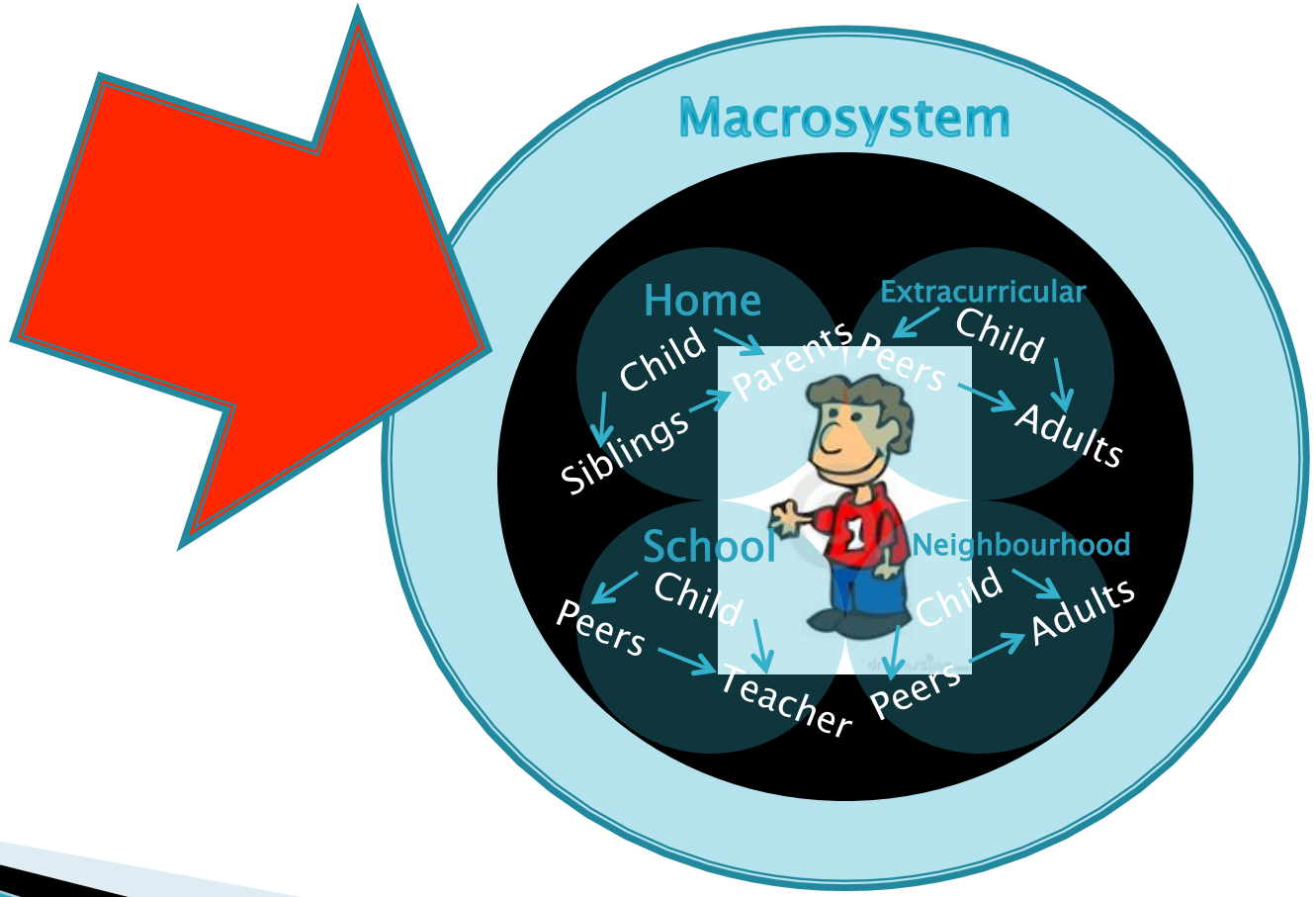


At the macro level the processes we need to deal with are *clustering of disadvantage* to support the parenting role

Randomized control trials

Income support Huston

Example of the Nordic Countries



In summary

- Cumulative distal risk influences family relationships
- Relationships (responsivity/challenge AND differential reactivity) influence the way that the brain develops
- These processes occur in parent, sibling and teacher relationships.
- Child characteristics contribute
- The supports that we develop for families need to help in the DECOUPLING OF RISK to capitalize on resilience
- The value of approaches that have been trialed.