Children's physical, social-emotional and cognitive outcomes at 8-9 years: Do they share the same drivers?

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Growing Up in Ireland
Research Conference
Dublin, 29 November 2010

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Growing Up in Australia: From an idea to reality

- Late 1990s: Recognition of need for national longitudinal study – lobbying, preparatory work
- April 2000: Funding announced by federal Govt - broad consultation on design and research questions
- Feb 2001: Consortium formed to bid for study
- August 2001: Proposal submitted
- March 2002: Contract signed
- 2002: Staff appointed
- 2003: Negotiations with HIC (Medicare), contract with
- data collection agency
- Feb 2004: Official launch
- 2004: Wave 1 completed

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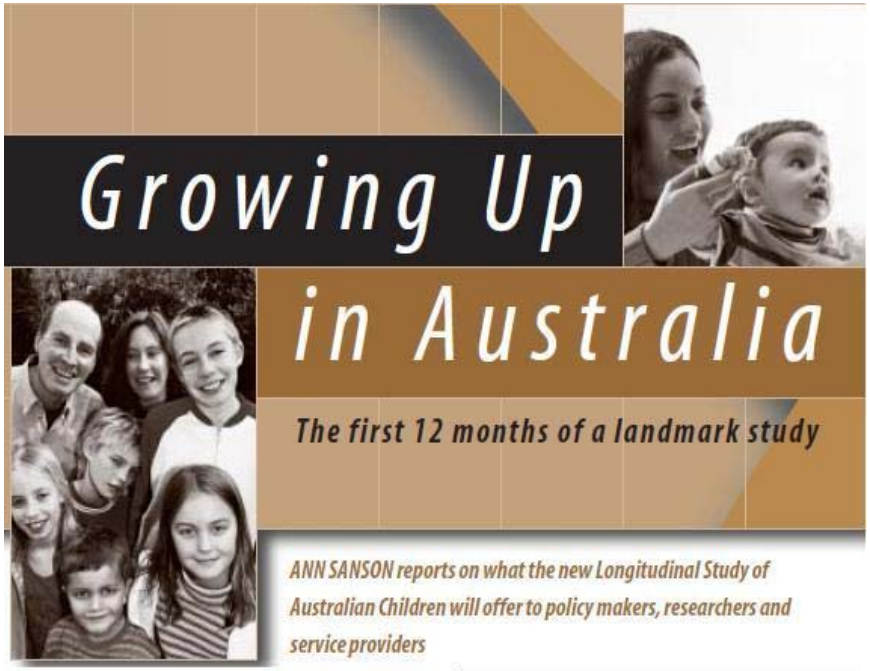
Feb 2004: Launch at the Children's Museum

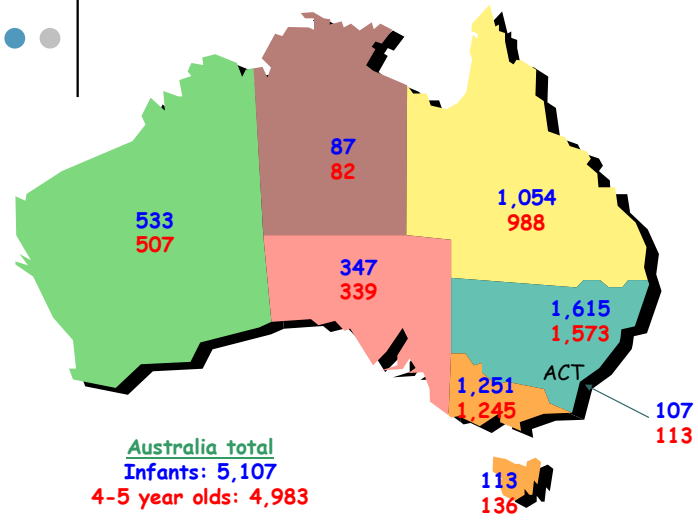
Family Matters 2003 - 2005



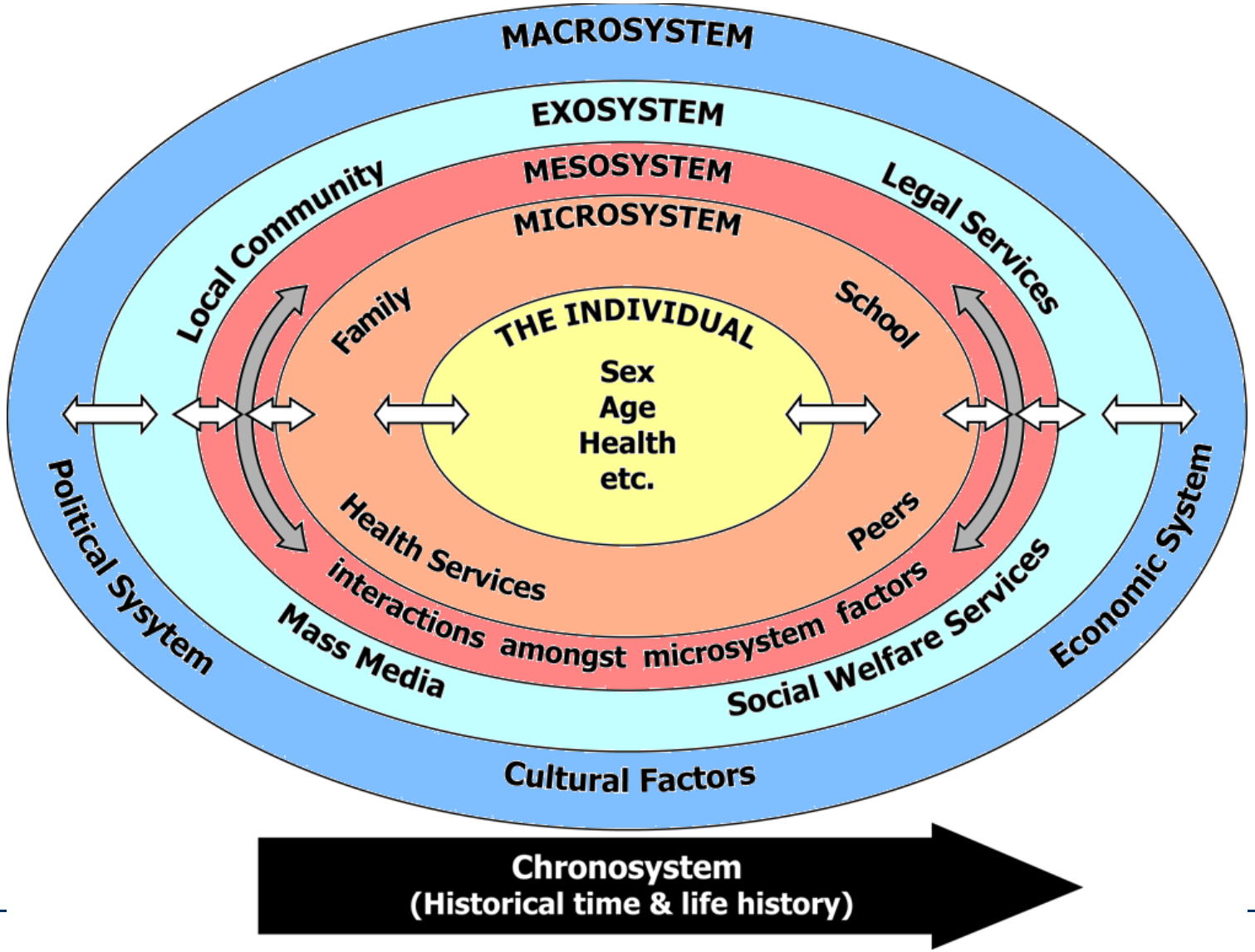
The Longitudinal Study of Australian Children (LSAC)

- National coverage
- 10,000 children
- 2 age cohorts (0-1 and 4-5 yrs)
- Data waves every 2 years
- Close link between researchers, policy-makers and service-providers
- Multi-disciplinary
- Ecological model
- Holistic view of children
- Extensive multi-source data
- Data accessible to researchers

www.aifs.gov.au/growingup



Bronfenbrenner ‘s bio-psycho-social ecological model



Common drivers of multiple outcomes? – Analysis of 3 waves of LSAC data

Questions:

- Do the same factors (measured at 4-5 and 6-7 years) underlie physical, social-emotional and learning outcomes (measured at 8-9 years)?
- Does each ‘layer’ in Bronfenbrenner’s ecological model predict each outcome?
- Do inner (more proximal) layers mediate the impact of outer (more distal) layers?
- Is the power of prediction from 4-5 years similar to prediction from 6-7 years?
- What predictors are common to all outcomes, and which are specific to one outcome?
- Implications?

Common drivers?

Current evidence base:

- High co-occurrence of problems
- Evidence of ‘multifinality’: same risk and protective factors/processes underlie multiple problems
- Durlak (1998): identified common factors addressed in prevention programs for a wide range of adolescent problems.

LSAC provides opportunity to examine assertions in earlier childhood, within one study, and with longitudinal data

LSAC's Conceptual Framework

- Ecological and holistic model of children's development:

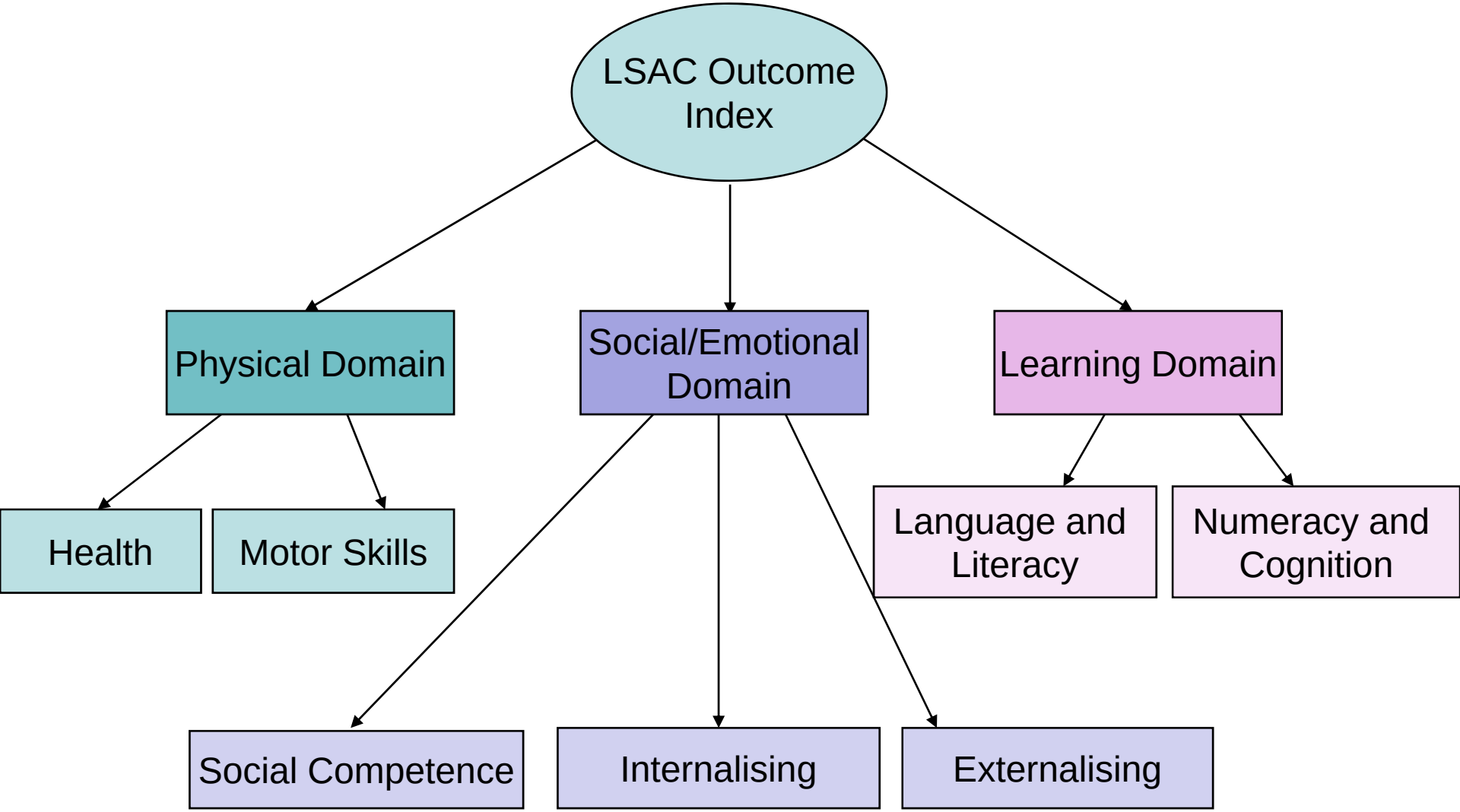
  'the acquisition and growth of the physical, cognitive, social and emotional competencies required to engage fully in family and society' (Aber et al. 1997)

- Child's current developmental status on:
  - Health
  - Physical development
  - Emotional wellbeing
  - Social development
  - Learning and academic competency

LSAC Outcome Index: Rationale and Purpose

- LSAC has complex data on multiple aspects of children's development
- LSAC has multiple data users, not all experts
- Outcome Index designed to be simple, user-friendly summary of children's development
- A tool for communicating otherwise complex findings for policy-makers, the media and general public
- Criteria for measures included in Outcome Index:
    - High response rate
    - Reliable
    - Provide a good coverage of domain of interest
    - Distribution giving good discrimination

Outcome Index - Broad Structure



Calculation of the Outcome Index

1. **Outcome variables standardised**

2. **Sub-domain scores calculated (mean of contributing variables) and standardised**

3. **Domain scores calculated (mean of contributing sub-domains) and standardised (*X*=100, *SD*=10)**

4. **Overall Outcome Index calculated (mean of domain scores)**

Also available:
Cut-off scores to identify those doing well (top 15%) and poorly (bottom 15%)
Categorical Positive and Negative Outcome Indices – number of domains in which child scores above positive cut-off (0-3) or below negative cut-off (0-3)

See Sanson, et al. (2010) The development and validation of Australian indices of child development – Parts I and II *Child Indicators Research, Vol 3,* 275-292 and 293-312

Analytic approach

- Dependent variables : Physical, Social-Emotional and Learning Outcome Indices at Wave 3 (age 8-9 yrs).
- 3 hierarchical multiple regression analyses– 5 steps:
  1. Community (macro-level)
  2. Education and childcare (exo/meso level)
  3. Family structure and demographics (meso/micro-level)
  4. Family functioning (micro-level)
  5. Child characteristics
- Predictors measured at Wave 1 (4-5 yrs) and 2 (6-7 yrs)
- Each predictor standardised (X=0, SD=1)
- Used SAS surveyreg procedure to account for study design.
- Weighted to adjust for non-response.

W1 and W2 predictors at community (macro) level; & childcare and school (exo/meso) level)

Community

- Community advantage/ disadvantage (SEIFA index)
- Australian Remoteness Indicator for Areas, at postcode level (ARIA index)
- Neighbourhood belonging: civic engagement and positive feelings about neighbours (4 items)

Childcare & school

- Age started childcare
- Child's year level at school
- Additional formal care (besides preschool/school)
- Informal care - other types of care (e.g. grandparents)
- Teacher communication scale: teacher communicates with parent about child's education (6 items)

W1 and W2 family demographic and structure predictors

- Equivalised family income
- Highest educational attainment of either parent
- Highest occupational prestige of either parent
- Paternal presence/absence and work status
- Maternal work status
- Two parent family
- Number of siblings in the home
- Maternal age
- Housing costs per week
- Length of time in current home
- Number of homes since birth
- Non-Australian born parent

W1 and W2 family process predictors

- Hostile parenting (shouting, anger)
- Warm parenting (enjoy, show affection)
- Consistent parenting (following through)
- Inductive reasoning (explain, talk it over)
- Argumentative relationship between parents
- Contact with grandparents
- Home activities index: Frequency of engaging in activities with child (drawing, singing)
- Out of home activities: e.g. visiting libraries, attending sporting events
- Mother's psychological distress
- Mother's alcohol consumption

W1 and W2 Child–level predictors

- Healthy diet: Frequency of consuming healthy (e.g., fresh fruit) and unhealthy (e.g., cordial) foods
- Temperament
  - Approach/sociability
  - Persistence
  - Reactivity
- Gender
- Birth weight
- Gestational age
- Child speaks a language other than English at home
- Child is of Aboriginal or Torres Strait Islander descent

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Amount of variance (%) accounted by each level of predictors (i.e., each step)

Step \ Domain	Physical		Soc/Emot		Learning	
	W1	W2	W1	W2	W1	W2
1 Community (Macro)	3	2	5	3	4	3
2 Childcare & school (Exo/meso)	4 (+1)	3 (+1)	6 (+1)	4 (+1)	5 (+1)	4 (+1)
3 Family structure/ demographics	6 (+2)	6 (+3)	11 (+5)	9 (+5)	13 (+8)	13 (+9)
4 Family process (Micro)	10 (+4)	10 (+4)	24 (+13)	26 (+17)	15 (+2)	14 (+1)
5 Child	12 (+2)	13 (+3)	30 (+6)	38 (+12)	20 (+5)	22 (+8)

W1 and W2 Macro-level predictors of 3 domains in Wave 3 – beta coefficients

Domain	Physical		Soc/Emot		Learning	
Step 1	W1	W2	W1	W2	W1	W2
SEIFA	.05*	.06**	.10***	.06*	.19***	.16***
N'hood belong	.15***	.13***	.20***	.16***	.04*	-
Remote-ness		-	-	-	-	-
Final step						
SEIFA	-	-	.06*	-	.07**	-
N'hood belong	.08***	.07***	.07***	.07***	.-	-
Remote-ness	-	-	-	-	-	-

W1 and W2 Childcare and School predictors of 3 domains in Wave 3 – beta coefficients

Domain / Step	Physical		Soc/Emot		Learning	
Step 2	W1	W2	W1	W2	W1	W2
Age start childcare	-.05**	-	-	-	-.07***	-.04*
Sch year level	-.07**	-	-	-	-	.08***
Add'l formal care	-.07*	-	-.07**	-	-.07***	-
Teacher communication	-	-.05*	-	.11***	-	-
Final step						
Age start CC	-	-	-	-	-	-
Sch year level	-.06*	-	-	-	-	.08***
Add'l formal care	-.06**	-	-.05**	-	-.06**	-
Teacher communication	-	-	-	-.04*	-	-

W1 and W2 Family structure and demographics predictors of 3 domains in Wave 3 – beta coeffts

Domain	Physical		Soc/Emot		Learning	
Step 3	W1	W2	W1	W2	W1	W2
Income from govt		-.10** F		-.18*** F		
Housing costs	-.10*** F		-.12*** F		-.05*	
P education	.06* F	--	.08*** F	-	.21*** **F**	.20*** **F**
P occupation	-	.06*	-	.05*	.06*	.13*** **F**
Father not present	-	-	-.39** F	-	-	-.06**
Father present/not work		-.06** F				
Mother not working			.04*			
Mother working P/T			.07*			
Mother working F/T				-.08** F		
2 parents			-.33** F			-.16*
No. of siblings	07** **F**	.11*** **F**	.05* F	.07** F	-.06** **F**	-
Mother age	-	-	-	-	.	-.04* F
Time in home	-	-	-	-	-.04*	-
# house moves	-	-	.06*	-	-	-

F = significant in final model

W1 and W2 Family process predictors of 3 domains in Wave 3 – beta coefficients

Domain	Physical		Soc/Emot		Learning	
Step 4	W1	W2	W1	W2	W1	W2
Hostile parenting	-	-.06*	-.21*** **F**	-.27*** **F**	-.07***	-
Warm parenting	-	-	-	.04*	-.07*** **F**	- .05** **F**
Consistent par'g	.05*	.07**	.10*** **F**	.12***F	.06**	.06*
Inductive parenting	-	-	-	-.07 F	-	-
Grandparent	-	-	-	-	-	--.06*** F
Parents arguing	-.05* **F**	-	-.09*** **F**	-.04*	-	-
Home activities	--.04* F	- F	--	- F	-	-.05* **F**
Out-of-home activities	-	-	.05** **F**	.06** **F**	.06** **F**	.06** **F**
Mother's depress'n	.14*** **F**	.14*** **F**	.15*** **F**	.15*** **F**	-	-
Mother alcohol use	.06*** F	.06*** **F**	-	-	-	-

F = significant in final model

W1 and W2 Child predictors of 3 domains in Wave 3 – beta coefficients

Domain / Step	Physical		Soc/Emot		Learning	
Step 5	W1	W2	W1	W2	W1	W2
Diet	-	.05*	-	-	-	-
Gender (m)	-	-	.13***	.14***	-	-
Sociable	.04*	-	-	.04*	-	-
Persistent	.11***	.14***	.12***	.21***	.22***	.26***
Reactive	-	-.10***	-.15***	-.22***	-	-.05**
Gestation age	-	.08**	-	-	-	.05*

SO : Common drivers? – Yes and No

Yes: Variables contributing to at least 2 outcomes

Macro-level (community)

- Community (dis)advantage (largely mediated by later steps) (S/E, L)
- Neighbourhood belonging (partially mediated by steps 4 and 5) (S/E, P)

Exo/meso-level (childcare and school)

- Additional formal child care (all)

Meso/micro- level (family structure and demographics)

- Parental education (all, partially mediated by steps 4 and 5)
- Income (govt benefits, unemployed resident fathers, high mortgage costs)

Micro-level (family process)

- Argumentative inter-parent relationship (S/E, P)
- Maternal mental health (S/E, P)
- Out-of-home activities (S/E, L)

Child level

- Temperament: persistence (all)
- Temperament: reactivity (all)
- ~~Gestational age (P, L)~~

SO : Common drivers? – Yes and No

No: Specific drivers of specific outcomes

Exo-level (childcare and school)

- Teacher-parent communication (6-7 years) – Social-Emotional
- Grade level (6-7 years) - -ve for Physical, +ve for Learning

Meso/micro- level (family structure and demographics)

- Mother working F/T– Social-Emotional (-ve)
- Measures of parental income - Physical
- Parental occupation – Learning
- Parental education – much stronger for Learning
- Maternal age - Learning
- Number of siblings – positive for Physical, negative for Learning

Micro-level (family process)

- Hostile parenting – Social-Emotional (strong effect)
- Consistent parenting – Social-Emotional
- Warm parenting – Learning (-ve)
- Contact with grandparents - Learning (-ve)
- Maternal depression – strongest for Physical and Social-Emotional
- Within-home activities - +ve for Social-Emot, -ve for Phys and Learning

Child level

- Diet – Physical
- Male – Social-Emotional

Prediction from Wave 1 versus Wave 2

Whether 'exposure' was at 4 years or 6 years generally made little difference:

- Similar amount of variance explained by steps 1-4 at each age
- Step 5: prediction of Social-Emotional is stronger from W2 (12%) than from W1 (6%)

For some variables, early exposure appeared to matter most:

- Additional formal childcare
- Housing costs for Social-Emotional and Physical

For some variables, later exposure appeared to matter most:

- Teacher communication for Social-Emotional
- Grandparent contact for Learning (-ve)

Limitations and areas for further investigation

Prediction was modest to moderate:

- only 12-13% of variance on Physical
- 30-38% of variance on Social-Emotional
- 20-22% of variance on Learning

- Selection of predictor variables – many others could be included
- Outcome Indices are composite measures – more differentiation may be possible with more fine-grained outcomes

For the future :

Explicit testing of mediational hypotheses

- e.g. is impact of poor neighbourhood and low income mediated through parenting and maternal depression?

Testing for non-linear and interactional effects

- e.g. do parental hostility and consistency interact with child reactivity, with synergistic effects on Social-Emotional?

Different predictors and pathways for different subgroups?

- E.g. ‘comorbid’ groups; Indigenous and recent migrant groups; children with specific conditions

Implications for prevention

- Set of factors that should be taken into consideration in *any* preventive or treatment intervention
  - From every level of the ecology of children's lives
  - Multi-level, multi-component, multi-modal interventions
- Others which may be particularly salient for specific outcomes
  - Careful tailoring to specific needs
  - But co-occurrence of problems -> not *too* specific
- 'Outer' layers are partially mediated by 'inner' layers
  - Rigorous testing needed to determine where intervention has greater benefits relative to costs
- Need to build the 'science' of prevention
  - Multi-disciplinary, given that multiple layers need to be addressed
  - Multi-sectoral collaboration, to ensure policy and practice change

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Thank you!

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