



Early childhood experiences and school achievement.

Do trajectories start earlier than we think?

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COAG Reform Policy: *Investing in the early years-* **A National Early Childhood Development Strategy**



Directions for Early Childhood Education & Care (ECEC)

- *Belonging, Being, and Becoming: the Early Years Framework for Australia* (July, 2009)
 - Principles, Pedagogy, Learning Outcomes 1 to 5
- *National Quality Standard for Early Childhood Education and Care and School Age Care* (December, 2009)
 - Ratings: Unsatisfactory, Operating, NQS, High, Excellent
- Universal access to a quality preschool program for 4-5 year olds in the year prior to entering formal schooling (by 2013)
 - 15 hours/week provided by a university qualified EC teacher
- National ECEC workforce initiatives



Vision

“by 2020 all children have the best start in life to create a better future for themselves and for the nation”



Focus of Early Childhood Education and Care policies (values and evidence)

- *“Children are important. They bring their own value and influence to the world, as well as being shaped by the world around them”*
- *“Children are also important for their future contribution to society”*
- *“Quality early childhood education and care programs make a significant difference for improving outcomes for children..(with)... particular benefits for children from disadvantaged backgrounds”*
 - U.S. Intervention studies; U.K. Effective Provision of Preschool Ed’n
- *“The quality of the workforce (qualified staff) is a key factor in achieving good outcomes for children”*

U.S. Intervention studies

The evidence base (pre-2009)



Targetted intervention programs (U.S.)

- Perry Preschool Program (Schweinhart, Barnes, & Weikart, 1993)
- Weekly home visits with parents; intensive, high quality preschool services for one to two years (N = 123; 50% C)
- 2.3 vs. 4.6 lifetime arrests by age 27; \$7 saved for \$1 spent

Universal programs (U.K.)

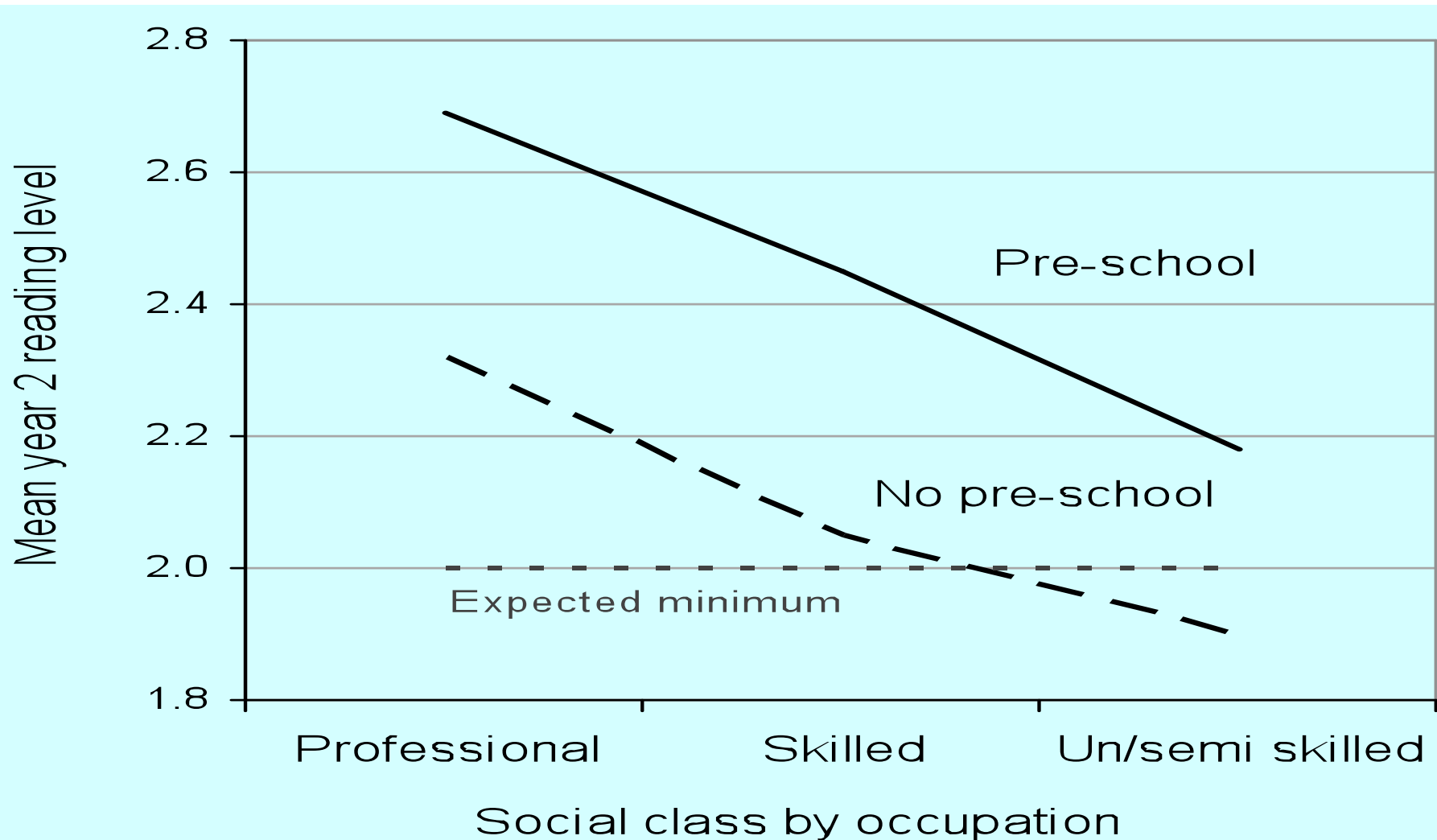
- Effective Provision of Preschool Education (EPPE) (Sylva et al., 2010)
- Normal preschool/playgroup from age 3-4 years (N = 3000; C = 300);
- School outcomes at ages 5, 7, 11 years
- Children who attended preschool had better cognitive and social behavioural outcomes than those who stayed at home.
- Beneficial effects persisted through primary school.

Preschool Quality Matters (EPPE: age 5) (Melhuish, 2006)

<i>Quality of pre-school (comparison group is no preschool)</i>	<i>Early literacy effect in months of development</i>
Duration up to 2 years	
Low quality	3.18 months
Average quality	4.14 months
High quality	4.76 months
Duration 2 - 3 years	
Low quality	4.60 months
Average quality	6.81 months
High quality	7.78 months

Preschool can reduce the effects of disadvantage (EPPE, age 7)(Melhuish, 2006)

READING AGE at age 7, effects of social class and pre-school experience



Processes? Pathways? Developmental Trajectories?



- **Focus of Early Childhood Education and Care policies (learning outcomes)**
 - to build positive attitudes and competencies in literacy and numeracy – the essential “foundation for success in all learning areas” (MCEETYA, 2008, p. 8).
 - school achievement is largely seen as being driven by children’s early literacy and numeracy abilities.
 - high expectations of educational reform agenda, including as a ‘Closing the Gap’ target (COAG, 2009, p. 24)

How does ECEC contribute to better outcomes for children’s learning?

When does ECEC make a difference?



The evidence base (Australian post-2009)



International (6 studies)

- early academic competencies at the start of school (maths / reading / attention) set the foundation for school performance in the middle and upper years of primary school (Duncan et al 2005)

Longitudinal Study of Australian Children (LSAC)

a) Claessens (2009)

- K Cohort, 4,983 4-5 year olds followed to 6-7 and 8-9 years
- School achievement outcomes (teacher ratings of literacy abilities and mathematical thinking)
- Predicted by 4-5 year old 'school readiness' tests of receptive vocabulary (PPVT) and early literacy/numeracy (Who Am I?)
- Early literacy/numeracy ability at age 4-5 was the strongest predictor of school achievement at age 6-7 and 8-9



Growing up in Australia: the longitudinal study of Australian children - an Australian Government Initiative

- 10,000 families, 5,000 babies B Cohort, 5,000 4-5 year olds K Cohort
- interviewed at home every two years from 2004 to 2010 (and more)
- 7,000 early childhood services and carers/teachers of LSAC child
- complete mail-out questionnaires; linked data to NCAC quality ratings
- 9,000 primary schools and teachers of LSAC child

What family, early childhood, school and community factors impact on child health, learning, socio-emotional development?



LSAC K Cohort

Combinations of care/education arrangements

	n	%
No centre- or school-based ECEC	245	4.9
Pre-Year 1 only or with additional care	822	16.5
Preschool in school only	798	16.0
Preschool in school plus additional ECEC	592	11.9
Preschool not in a school only	797	16.0
Preschool not in a school plus additional ECEC	535	10.7
Long day care centre only	742	14.9
Long day care plus additional ECEC	450	9.0
Total	4,982	100





Longitudinal Study of Australian Children

b) Harrison et al (2009)

Who am I? 'School Readiness'

scores at age 4-5 were primarily predicted by:

- **Child and family characteristics**

- Mothers' level of education (higher with higher scores)
- Parenting style (positive with higher scores)
- Number of children in the household (lower with >2 chn)
- Child gender (lower for boys) and age (older = higher)
- Indigenous status (lower than non-Indigenous)
- Single parent families (lower than couple families)
- Speaking a language other than English (higher than English only)

- **Early childhood education and care**

- Children who had started pre-Year 1 had significantly higher scores



Longitudinal Study of Australian Children



b) Harrison et al (2009)

Who am I? ‘School Readiness’ scores were predicted by:

- **Early childhood education and care**

- Benefits for children attending long day care, preschool/kindy in a school, preschool/kindy not in a school compared to no ECEC.
 - No difference to no ECEC group when also using additional care
- Higher scores when attending ECEC settings (including pre-Year 1) for between 9-30 hours/week
- Quality measures
 - teacher qualifications, field of study, experience
 - approaches to learning (teacher-directed, supported, child-initiated)
- Significant effect of quality for children in pre-Year 1 (5.1% variance)
 - More time in teacher-supported small group activities = higher WAI?
 - More time in child-initiated activities = lower WAI?
- Little effect of quality in prior-to-school settings (0.6% variance)
 - More time in teacher-directed large group activities = higher WAI?



Unanswered questions?



What are the ECEC predictors of children's early literacy/numeracy abilities?

Patterns of child care?

- type of care (formal vs informal)
- hours per week
- stability of / changes of care over time

Quality of early childhood programs?

- standard international measures to compare to US, UK
- what dimensions of quality contribute to literacy and numeracy outcomes?



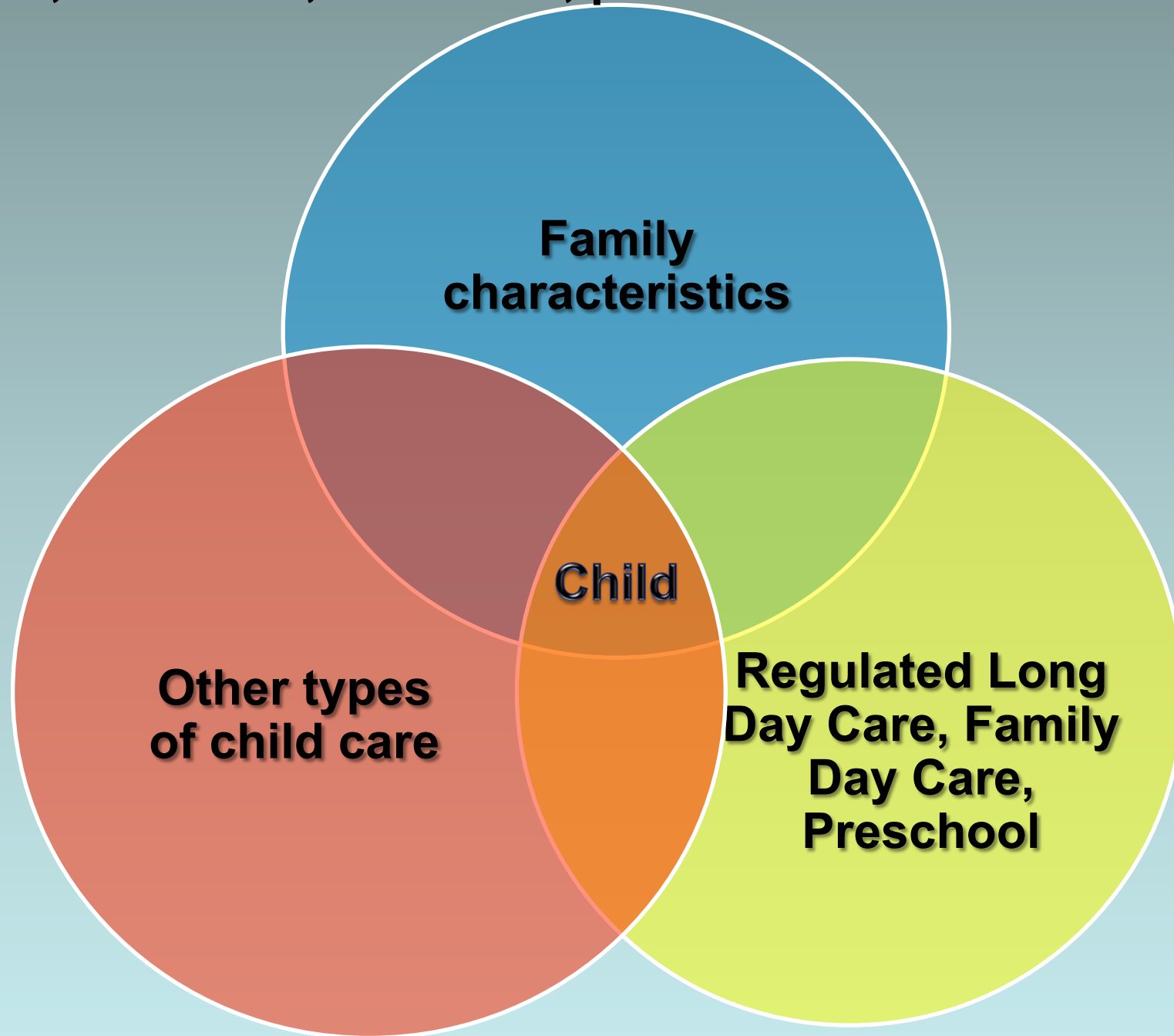
Child Care Choices:

7-year study of 677 children attending regulated child care



- Impetus for the study was an increase in the use of multiple & changeable child care (MCC)
- Aims were
 - to investigate multiple care as ‘additional’ to the use of regulated long day care and family day care service
 - to determine the effects of multiple and changeable care on children’s development, learning and wellbeing, over time
- An ecological model was employed, in order to study MCC in the context of child, family, and other child care influences

Social, structural, economic, political. cultural environment





Background

- Adjustment and achievement in the first year of school is a key marker for children's long-term academic and socio-emotional competence
- Influences on school adjustment and achievement
 - Child characteristics
 - Age, gender, temperament, behaviour problems
 - Family characteristics
 - Demographics, wellbeing, child-parent relationship
 - Non-parental child care experiences
 - Hours and type of care (formal and informal)
 - Quality of care
 - Multiple and changeable care
 - Child–carer relationship
 - School
 - Classroom environment



Research questions

1. What factors predict children's achievement and adjustment in the year before school and the first year at school?

Which factors comprise the 'best set' of predictors for achievement and adjustment outcomes?

Within these sets, what is the relative contribution of child, family, child care and school predictors?

2. What is the relative contribution of children's early child care experiences (up to age 4) vs their experience of preschool/child care in the year before starting school?



CCC - sample



- Recruitment in metropolitan and regional child care centres and family day care schemes
 - Metropolitan: services in low, middle, high income area with bias toward low income areas of Sydney
 - Regional: all centres and FDC schemes in the selected areas
- 677 children
 - mean age = 2 yrs 1 month (range: 4 months to 4 yrs 2 months)
 - most children were between 1 and 3 years of age
- Child's primary caregiver at home
- Child care directors, child's caregiver/teacher
- Preschool directors and child's teacher
- School (Kindergarten) teachers.



CCC - procedures



- Annual waves of data collection through:
 - Telephone interviews with parents (CATI)
 - Parent questionnaire (Wave 1 only)
 - Director, carer and teacher questionnaires
 - Observations:
 - long day care/preschool
 - family day care
 - first year of school (Kindergarten)
 - Child development assessments from age 3
 - Child interviews in first year of school

CCC – Measures (IVs)



- Child characteristics (4 months -4 yrs)
 - Infant/Toddler Temperament Questionnaire
 - Behavior Checklist
 - Social Skills Rating System
 - Woodcock-Johnson Applied Problems
 - Peabody Picture Vocabulary Test; Vineland Communication Interview
- Family characteristics
 - Index of Social Support
 - Depression Scale (CES-D)
 - Parent-Child Relationship Scale
 - Shared Home Activities (Kindergarten)
- Child care characteristics
 - Infant-Toddler Environment Rating Scale – Revised (ITERS)
 - Early Childhood Environmental Rating Scale– Revised (ECERS)
 - Family Day Care Rating Scale– Revised (FDCERS)
 - Student-Teacher Relationship Scale
- School characteristics
 - Classroom Observation Instrument-Kindergarten (COI-K)



CCC – Measures (DVs School-age)



- **Achievement**
 - Assessed
 - Woodcock-Johnson Psycho-Educational Battery
 - Letter-Word Identification and Spelling (Literacy)
 - Applied Problems (Numeracy)
- **Adjustment**
 - Teacher-rated
 - Classroom Behaviour Inventory
 - Approach to learning (Academic adjustment)
 - Student-Teacher Relationship Scale
 - Closeness and Conflict subscales
 - Strengths and Difficulties Questionnaire
 - Prosocial Behaviour and Problem Behaviour subscales
 - Student-reported
 - Feelings about School
 - School liking, teacher liking, and peer liking subscales



Predictor domains	Early years (< 4)	Year before school (4-5)	School-age (5-6)
Child Early development	Temperament Social skills Behaviour problems Language ability Numeracy skills		Age Literacy skills Numeracy skills School adjustment (teacher & self report)
Family	Demographics Wellbeing Parent-child relationship		Support for learning
Child care/ Preschool	Formal hours Informal hrs Multiple care Changeable care Quality Child-carer relationship	Formal hours Informal hrs Multiple care Quality	Formal hours Informal hours
School			Classroom management Social climate

Method of analysis



- Distributions and transformations
 - Distributions of dependent variables checked
 - Transformations to reduce skewness to <1
- Data imputation
 - Used to provide better data set for analyses
 - Cases used only if fewer than 10% data missing (subset of original 677 cases)
 - Multiple imputation to replace missing data (drawn randomly)
- Regression analyses (2-step procedure)
 - Step 1 each DV predicted by 30 IVs using pooled estimates for 10 imputed data sets
 - Step 2 automatic variable selection of IVs by domain ($p < .05$) to produce a reduced model for each of the dependent variables



Results: Step 1 of regression analyses using multiple imputation (30 IVs)

Achievement outcomes	Total variance explained
Year before school	
Literacy (W-J letter-word and spelling)	.419
Numeracy (W-J applied problems)	.473
First Year of School	
Literacy (W-J letter-word and spelling)	.325
Numeracy (W-J applied problems)	.334
Academic adjustment (CBI approach to learning)	.351



Results: Step 2 of regression analyses reduction to best predictor set

Predictors of achievement: Numeracy in Year before School

Domains	Significant predictors	Beta	<i>p</i>	Partial r^2
Early development	Age	.14	.01	.022
	Early ability in numeracy	.47	<.01	.233
	Fewer negative social behaviours	-.78	<.01	.039

Predictors of achievement: Numeracy in First Year of School



Domains	Significant predictors	Beta	<i>p</i>	Partial <i>r</i> ²
Early development	Early ability in numeracy	.36	<.01	.133
	Fewer negative social behaviours	-.18	<.01	.038

Predictors of academic adjustment: Literacy in Year before School



Domains	Significant predictors	Beta	<i>p</i>	Partial <i>r</i> ²
Family	Number of children in household	-.21	<.01	.062
Early development	Age	.23	.01	.065.
	Early ability in numeracy	.20	<.01	.053
	Communicative ability	.16	<.01	.037
	Fewer negative social behaviours (parent-rated)	-.15	.01	.033
	Fewer neg (carer-rated)	-.13	.01	.026
Child care history	Fewer hours of formal care	-.21	<.01	.059
	Less multiple child care	-.13	.01	.025



Predictors of achievement: Literacy in First Year of School

Domains	Significant predictors	Beta	<i>p</i>	Partial <i>r</i> ²
Family	Number of children	-.14	<.05	.022
	Wellbeing (social support)	.13	<.05	.021
Early development	Fewer negative social behaviours	-.16	<.01	.031
	Early ability in numeracy	.31	<.01	.107

Predictors of academic adjustment: Approach to learning, First Year of School



Domains	Significant predictors	Beta	<i>p</i>	Partial <i>r</i> ²
Family	Higher income	.18	<.05	.033
	Wellbeing (more social support)	.13	<.05	.019
Early development	Early ability in numeracy	.28	<.01	.086
Child care history	Fewer hours of formal care	-.18	<.01	.035

Domains	Achievement Outcomes
Child	Age
Family	Number of children in household Income Social support
Early development	Ability in numeracy Less negative social behaviour Communicative ability
Child care history	Fewer hours of centre-based care Less multiple care arrangements



CCC Conclusions and Questions?

- Children's earlier cognitive abilities (mathematical thinking at age 3) and social skills/behaviour were consistently found to be significant predictors of literacy and numeracy achievement in the year before school and in the first year of school
- Child care predictors of literacy and numeracy achievement in the year before school and first year of school were more aligned to the choices families make (for hours and types of care) than to the quality of the ECEC program attended
 - At the time of the assessment
 - In the years prior to the assessment
- Why are we not seeing an effect for the quality of the ECEC attended by the child?
- Is quality 'absorbed' by the early development measures?

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- *Investing in the Early Years - A National Early Childhood Development Strategy* [http://www.coag.gov.au/coag_meeting_outcomes/2009-07-02/docs/national_ECD_strategy.pdf]
- **Bowes et al (2009):** *From child care to school. Influences on children's adjustment and achievement in the year before school and the first year of school. Findings from the Child Care Choices Longitudinal Extension Study.* [http://www.community.nsw.gov.au/docswr/_assets/main/documents/research_childcare_school.pdf]
- **Harrison et al. (2009):** *Child care and early education in Australia. The Longitudinal Study of Australian Children. Wave 1 Thematic Paper. Social Policy Research Paper No. 40* [<http://www.fahcsia.gov.au/about/publicationsarticles/research/socialpolicy/pages/sprp40.aspx>]

Early Childhood Environment Rating Scale

(Harms, Clifford, & Cryer, 1998; Harms et al.1990)

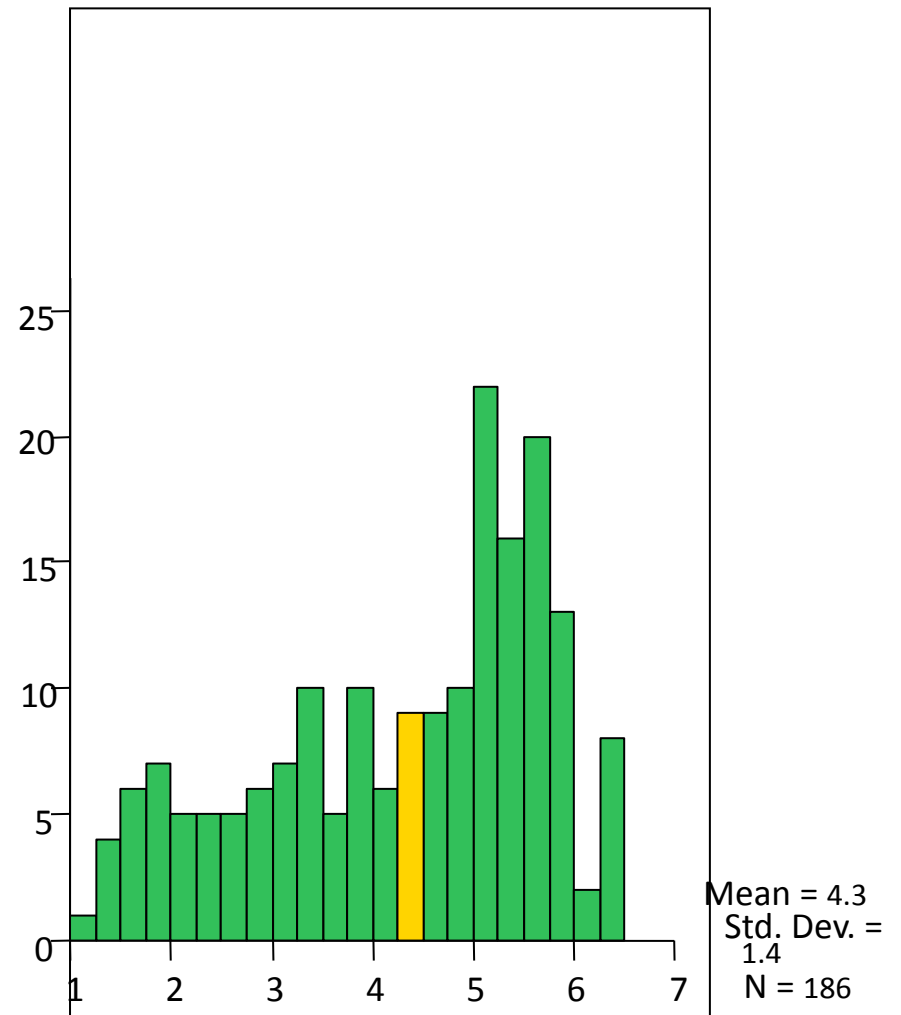
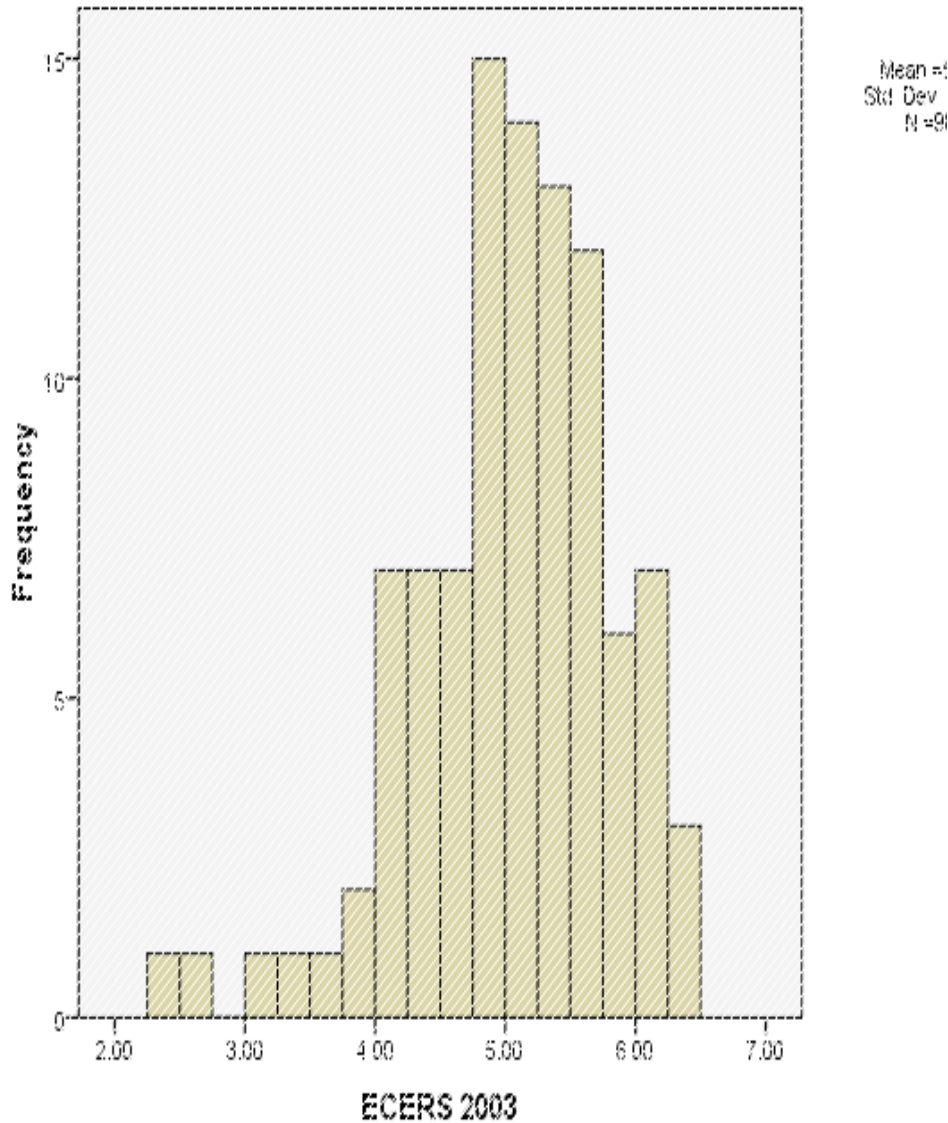
External observation measure used internationally that **assesses quality at the level of the room**, by rating provisions for learning as well as staff-child interactions

1 = inadequate; 3 = minimal; 5 = good; 7 = excellent

Comprise 7 subscales, each with 5 or more items

- Space and furnishing
- Personal care routines
- Language-reasoning
- Activities
- Interactions
- Program structure
- Parents and staff

Early Childhood Environment Rating Scale CCC U.S. (Elicker)



ECERS ratings

Early Childhood Environment Rating Scale Child Care Choices (Sylva et al. 2010)

U.K.

