Child care experiences, cognitive, and language development. UK evidence
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Interventions for vulnerable children

- There is strong evidence of the beneficial impact on cognitive development and behaviour of structured group experiences (e.g. Perry Preschool Study, Abecedarian)

- Some start in infancy, others at age 2 or 3

- Less clear about the impact of ‘routine’ care, especially for the general population
Is child care detrimental?

- Evidence of adverse effects of early group experiences for behavioural outcomes

- BUT - (in line with experimental interventions) there may be positive associations between group care on cognitive/linguistic outcomes

- Review (Melhuish, 2004) concluded that high quality group care may facilitate language development while low quality care may be detrimental
Child Care factors to consider

- **Type** – Group-based or Home-based; home based by informal carers (relatives, friends) or formal carers (childminder, nanny)

- **Quantity**
  - Hours per week

- **Quality of the care experienced**
  - Adult responsivity, may be lower in group contexts
  - Extent of stimulating experiences, possibly lower in informal home-care
Type of CC and Language Development

**US NICHD SECC**
- Concurrent home-based care associated with better language at age 2, but not 3, except for formal home-based (non-relative).
- No impact after 3 years of home-based care.
- More group care, better language development as early as 15 months, and evident up to school entry.

**UK Millennium Cohort Study**
- Grandparent care in first year, better vocabulary at 36 months than other home care, similar to nursery.
Quantity and Cognitive/Language Development

- **US NICHD SECC**
  - No overall relation between amount of non-maternal care and language from 15 to 54 months
  - More group care in infancy (0 to 17 months), lower pre-academic skills at 54 months
  - More group care in the toddler period (18 to 35 months) better language at 54 months

- **UK EPPE study**
  - More group care before 30 months, higher cognitive functioning at school entry
Quality of Child Care and Language

- Review (Melhuish, 2004), higher process quality (supportive caregivers, positive peers, opportunities for stimulating play) associated with higher language scores

- Higher staff qualifications and training & smaller group size associated with better language comprehension at 3 years

- FCCC (Sylva et al., 2011) better quality, higher cognitive but not language development at 18 months
UK Families Children & Child Care (FCCC) Study

Taking relevant factors into account:

- Is there any impact on non-maternal child care on cognitive and language development up to school entry?

- The dominant type? The amount per type? The quality?

- Are effects the same for disadvantaged and non-disadvantaged families?
FCCC RESEARCH TEAM

- Dr. Penelope Leach, London
- Professor Jacqueline Barnes, London
- Dr. Suna Eryigit-Madzwamuse, London
- Professor Kathy Sylva, Oxford
- Professor Alan Stein, Oxford
- Dr. Lars-Erik Malmberg, Oxford
Design of the FCCC study
1997 - 2004

Antenatal Recruitment

Postnatal Recruitment

HOME VISIT

HOME VISIT care observation

HOME VISIT child assessment care observations

HOME VISIT child assessment care observations

HOME VISIT child assessment care observations

2 months
3 months
10 months
18 months
36 months
51 months
FCCC Participants, N = 1,201

- Mean maternal age at birth, 31 (range 16 to 46; only 2% teenage)
- Ethnic background mother:
  - white 81%
  - black 9%
  - Asian 4%
  - mixed/other 6%
- English not mother’s first language 14%
- 2+ of 4 adverse home conditions 26%
## Social Class and Education Composite

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Family</td>
<td>23%</td>
<td>19%</td>
<td>58%</td>
</tr>
<tr>
<td>Mother</td>
<td>40%</td>
<td>18%</td>
<td>42%</td>
</tr>
</tbody>
</table>

### Maternal education

1. Low (up to school leaver 18 vocational)  32%
2. School leaver (18) academic               22%
3. Degree or higher                           46%

### Composite: Maternal education & Maternal social class

- Low (total score 2 or 3)  37%
- High/medium (total score 4, 5 or 6)  63%
Non-Maternal Child Care

Questions at each contact:

- Month by month since the previous contact, each type and average hours per type

Observations of quality at 10, 18 and 36 months in dominant type (grandparents and childminders under-represented, no observations of fathers)
Ways to characterise child care

- **Mean hours**
  - group based
  - home based
  - Per type (childminder, nanny, father, grandparent, relative, friend)

- **Identify dominant type**
  - per month
  - per developmental phase
  - from birth to 51 months
Dominant Type per month

- Home-based - one specific caregiver (father, grandparent, nanny, childminder, relative, friend) for 12+ per week on average for month

- Group-based (nursery, playgroup, preschool) for 12+ hours per week on average for month

- If both types for 12+ hours, one with more hours

- If neither, characterise as maternal dominant
Dominant Type per developmental phase

- **Infancy** (0 to 17 months)
- **Toddlerhood** (18 to 35 months)
- **Preschool** (36 to 51 months)

- Same type for 3+ consecutive months in phase identified as the dominant type
- If home and group based each dominant for 3+ months, the one with the most months
- Maternal care, no type dominant for 3 consecutive months
# Frequency of Dominant Types

<table>
<thead>
<tr>
<th></th>
<th>Infancy</th>
<th>Toddlerhood</th>
<th>Preschool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home care</td>
<td>46%</td>
<td>44%</td>
<td>24%</td>
</tr>
<tr>
<td>Group care</td>
<td>12%</td>
<td>28%</td>
<td>57%</td>
</tr>
<tr>
<td>Maternal care</td>
<td>43%</td>
<td>28%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Dominant type, 0 to 51 months

- Home care 18%
- Group care 33%
- Mixed, maternal, home & group 36%
- Maternal care only 13%
Child Outcomes to be discussed

18 months
- Bayley Mental Development Index (MDI)
- MacArthur Communicative Developmental Inventory (CDI) Vocabulary and Language Structure

36 months
- Reynell Development Language Scales, Language comprehension and Language Expression

51 months
- British Ability Scales (BAS; total of 4 subscales)
- Reading readiness (alphabet recognition, Clay)
- Phonemic awareness (rhyming and alliteration, Bryant et al.)
Infancy (18 months)
Outcomes
Existing Findings at 18 months
(Sylva et al., 2011)

- More hours in group care and higher quality non-maternal care predicted higher Bayley MDI

- More hours of home care, lower orientation and engagement, Bayley

- Neither quantity or quality of child care predicted language development (CDI vocabulary)
## Mean Scores & Dominant Care Type

<table>
<thead>
<tr>
<th>Dominant infancy care</th>
<th>Bayley MDI</th>
<th>CDI Vocabulary</th>
<th>CDI structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home care</td>
<td>91.3</td>
<td>81.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Group care</td>
<td>98.0**</td>
<td>80.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Maternal care</td>
<td>92.1</td>
<td>75.6</td>
<td>7.2</td>
</tr>
</tbody>
</table>
Bayley MDI: significant individual & family predictors

Higher, when

- Girl
- Higher maternal social class
- More maternal positive interactions (10m), provision of play materials (10m), responsivity (18m)

Lower, when

- Mother non-white
- Area deprivation higher
Relevance of Dominant Care
(vs. maternal care dominant)

- All families
  - Home care dominant - lower MDI (p<.01)
  - Group care dominant - n.s.

- Mother low SES/Education
  - Home care dominant - lower MDI (p<.05)
  - Group care dominant - n.s.

- Mother high SES/Education
  - Home care dominant - n.s.
  - Group care dominant - higher MDI (p<.05)
Dominant group care primarily for advantaged mothers

<table>
<thead>
<tr>
<th>Maternal education + social class</th>
<th>Home care dominant</th>
<th>Group care dominant</th>
<th>Maternal care dominant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>162 (41%)</td>
<td>6 (2%)</td>
<td>223 (57%)</td>
</tr>
<tr>
<td>High</td>
<td>329 (48%)</td>
<td>120 (18%)</td>
<td>236 (34%)</td>
</tr>
</tbody>
</table>
Effect of non-maternal care type taking quality into account

- Compared to home care dominant, if group care is dominant in infancy, mean MDI likely to be higher
  - For whole group (N=321)
  - For more advantaged group (N=270)

- MDI higher if dominant care quality higher (emotional and verbal responsivity)

- Maternal 10m responsivity not significant, 18m responsivity still predictor
CDI and Child Care

- Positively associated ONLY with mean hours of grandparent care ($r=0.08$, $p<0.01$)
  - but not with dominant type of care, mean hours in group and total home care.

- More grandparent hours predicted higher vocabulary and language structure for whole group and for more advantaged, not for less advantaged.

- Effect remains taking quality into account, but quality not a predictor
Other Factors

- **PREDICTORS**
  - for Vocabulary & Language Structure
    - Girl
    - Maternal responsivity at 18m

- **NOT PREDICTORS**
  - Maternal education
  - English not mother’s first language
  - Area deprivation
  - Provision of play materials
  - Maternal discipline
Conclusions: 18 month Language

- CDI weak measure?
- Great individual variability in CDI scores
- Bayley MDI more strongly associated with 36 month language than CDI (.58 vs. .27)
- Maternal report (may discuss child more with grandparent?)
- Mean hours grandparent only boosts language for more advantaged
- Less advantaged may have less choice to ask grandparent?
Toddlerhood (36 Months) Outcomes
Language at 3 years

- Reynell Development Language Scales, Language comprehension & Language Expression
- Researcher administered measure
- Strongly related to Bayley MDI
  - Expression .54
  - Comprehension .58
- Significantly higher for higher maternal education + social class group families
### Mean Scores & Dominant Care Type

**uncontrolled comparisons**

<table>
<thead>
<tr>
<th>Dominant care</th>
<th>N</th>
<th>Reynell Comprehension</th>
<th>Reynell Expressive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home care</td>
<td>448</td>
<td>46.1</td>
<td>44.5</td>
</tr>
<tr>
<td>Group care</td>
<td>122</td>
<td>51.8 ( h ) m</td>
<td>49.9 ( h ) m</td>
</tr>
<tr>
<td>Maternal care</td>
<td>408</td>
<td>45.5</td>
<td>43.3</td>
</tr>
<tr>
<td><strong>Toddlerhood</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home care</td>
<td>396</td>
<td>46.5</td>
<td>45.2</td>
</tr>
<tr>
<td>Group care</td>
<td>249</td>
<td>48.8</td>
<td>46.2</td>
</tr>
<tr>
<td>Maternal care</td>
<td>242</td>
<td>46.3</td>
<td>43.9</td>
</tr>
</tbody>
</table>
Reynell COMPREHENSION scores: Regression Results

- Controlling for individual and family factors, dominant care types in infancy or toddlerhood were NOT predictors.

- Scores higher, when:
  - Girl, mother white, more maternal educational qualifications, more maternal responsivity 10m, 18m, 36m, more home language stimulation 36m, trend Home Learning Environment (p = .06)

- Scores lower, when:
  - More adverse home conditions, more neighbourhood deprivation, maternal first language not English
Reynell EXPRESSION Scores: Regression Results

- Controlling for individual and family factors, dominant care types in infancy and toddlerhood were NOT predictors

- Scores higher, when
  - Girl, mother white, older mother, maternal high SES, more maternal responsivity 18m, 36m

- Scores lower, when
  - Maternal first language not English
  - Trend ($p = .08$) adverse home conditions
Next Step

- Look at possible impact of hours in different types of care
- Some suggestions from Millennium Cohort Study that grandparent care may have a positive impact on language
- No relationship found in this study but hours of other types were significantly associated with language at 36 months
Reynell and Hours in Different Types of Care:

Significant (uncontrolled) associations

- Comprehension and Expression +ve with:
  - More hours in nursery in infancy
  - More hours in nursery in toddlerhood
  - More hours with nanny infancy
  - More hours with nanny in toddlerhood

- Comprehension and Expression -ve with:
  - More hours with father in toddlerhood

- Comprehension –ve with:
  - More hours with other relative (not father or grandparent) in toddlerhood
Effects sustained in multiple regressions

- **Whole group**
  - More father hours in toddlerhood, *lower* comprehension and expressive language
  - More nanny hours in toddlerhood, *higher* expressive language

- **Higher maternal education & social class**
  - Results replicated

- **Lower maternal education & social class**
  - No effects of father or nanny hours
Conclusions: Language Development at 36 months

- Gross division by dominant care type not related to language development
- For both advantaged and disadvantaged families major factors are within the family
- Some insight comes from looking at hours by type
- Specifically if there is more father care in toddlerhood, in more advantaged families, children’s language may tend to lag (possibly not father’s choice to be carer?)
- May need encouragement to attend preschool so children can have more varied experiences
- (More nanny hours only type associated with more preschool hours 18 to 35 months)
Preschool (51 Months) Outcomes
Mean BAS scores and Dominant Care Types by Developmental Phase: uncontrolled comparisons

- 3 types: maternal care, home care and group care
- 3 phases: infancy, toddlerhood and preschool
  - Higher BAS scores for group care versus maternal or home care during infancy
  - Higher BAS scores for group care versus maternal or home care during toddlerhood
  - No differences among maternal, home and group care during preschool phase
Analysis strategy

- No uncontrolled differences based on dominant type
- Examine associations between hours in each type and BAS
Mean BAS scores and Mean Child Care Hours from birth to 51 months:

Uncontrolled associations

- **BAS total**
  - Higher with more nursery hours ***
  - Lower with more father hours **

- **BAS verbal**
  - Higher with more nursery hours ***
  - Lower with more father hours *

- **BAS non-verbal**
  - Higher with more nursery hours ***
  - Lower with more father hours **
BAS and Mean Hours from birth to 51 months by child care type: Regression Results

- **BAS total**
  - Higher, More nursery hours **
  - Higher, More preschool hours *
  - Lower, More father hours (*)

- **BAS verbal**
  - Higher, More nursery hours *
  - Higher, More preschool hours *
  - Higher, More grandparent hours (*)

- **BAS non-verbal**
  - Higher, More nursery hours **
  - Higher, More preschool hours (*)
  - Lower, More father hours (*)
Provisional Conclusions

- More hours in nursery beneficial, for language and (non-verbal) puzzle type activities.
- Preschool from 18 months also beneficial, especially for language.
- Home care by childminders neither positive nor negative.
- Home care predominantly by father may not be beneficial, especially for puzzle type (non-verbal) activities.
BAS with Type and Hours by Developmental Phase:

Regression Results

- BAS NOT related to dominant type of care in any phase
- Higher BAS total score with more nursery hours in toddler phase (18 to 35 months)
  - in Whole group
  - in High SES/Education group
- Greater proportion of high education/SES families used nursery 18-35 months (43% vs. 21%) and for more hours on average (7.2 vs. 1.9)
- Adding quality, not relevant predictor
## Dominant Care: Frequency and Continuity

<table>
<thead>
<tr>
<th></th>
<th>0 to 17 Months</th>
<th>18 to 35 Months</th>
<th>Same 0-17 &amp; 18-35</th>
<th>36 to 51 Months</th>
<th>Same 18-35 &amp; 36-51</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Care</td>
<td>46%</td>
<td>44%</td>
<td>77%</td>
<td>24%</td>
<td>87%</td>
</tr>
<tr>
<td>Group Care</td>
<td>12%</td>
<td>28%</td>
<td>92%</td>
<td>57%</td>
<td>43%</td>
</tr>
<tr>
<td>Maternal Care</td>
<td>43%</td>
<td>28%</td>
<td>64%</td>
<td>20%</td>
<td>60%</td>
</tr>
</tbody>
</table>
### Care type from birth to 51 months: longitudinal patterns for the whole time period

<table>
<thead>
<tr>
<th>Care Type</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous maternal care</td>
<td>134</td>
<td>13%</td>
</tr>
<tr>
<td>Continuous home care</td>
<td>187</td>
<td>18%</td>
</tr>
<tr>
<td>Continuous group care</td>
<td>96</td>
<td>9%</td>
</tr>
<tr>
<td>Home to group care</td>
<td>230</td>
<td>22%</td>
</tr>
<tr>
<td>Maternal to group care</td>
<td>248</td>
<td>24%</td>
</tr>
<tr>
<td>Mixed pattern</td>
<td>144</td>
<td>14%</td>
</tr>
</tbody>
</table>
Mean BAS and 6 Dominant Types over time: uncontrolled comparisons

- **BAS total**
  - Continuous group care highest, significantly greater than all others

- **BAS verbal scales**
  - Continuous group care highest, higher than three of 5 other groups

- **BAS non-verbal**
  - Continuous group care highest, higher than continuous maternal care
BAS and Continuous Group Care versus all others:  
Regression results

- **BAS total score higher**
  - No - Whole group
  - Yes - High SES/Education group
  - No - Low SES/Education group

- **BAS verbal score higher**
  - No - Whole group
  - No - High SES/Education group
  - No - Low SES/Education group

- **BAS non-verbal score higher**
  - No - Whole group
  - Yes - High SES/Education
  - No - Low SES/Education
BAS and Continuous Maternal Care versus all others: Regression results

- **BAS total score lower**
  - Yes - Whole group
  - Yes - High SES/Education group
  - No - Low SES/Education group

- **BAS verbal score lower**
  - No - Whole group
  - No - High SES/Education group
  - No - Low SES/Education group

- **BAS non-verbal score lower**
  - Yes - Whole Group
  - Yes - High SES/Education group
  - No - Low SES/Education group
Other Significant Predictors of BAS

Higher BAS
- Girl
- Maternal higher SES
- Maternal higher qualifications
- More maternal responsivity 18m, stimulation 36m
- Higher Home Learning Environment 36m
- Older mother (only in high SES/education group)

Lower BAS
- More home adverse living conditions
- More area deprivation
- Mother non white
- English not mother’s first language
Conclusions: BAS Outcomes at 51 Months

- Beneficial effect of group care over whole time for cognitive development can only be assumed for higher social class, too few in lower group.

- Some group care, especially 18 to 35, is beneficial for wider range of families.

- Exclusive maternal care with no substantial amount of home or group care puts more middle class children at a disadvantage, especially with more school related non-verbal puzzles.
Characteristics of Mothers: 
*Continuous Maternal Care vs. Others*

- Not related to: age, personality, stress, mental health, behaviour with child or HLE
- Smaller percentage of High SES/Education than low SES/Education group (8% vs. 16%)
- Differences in attitudes at 3 months:
  - Lower belief in benefits of maternal employment for child (continuous group care highest)
  - Higher belief in costs of maternal employment to child (continuous group care lowest)
BAS Conclusions (continued)

- Children gain some cognitive advantage with the experience of group care, particularly in their second and third year.
- Subsequently no obvious cognitive gain from group care.
- Remaining exclusively with mother (or father) may be a disadvantage.
- Can identify by attitudes expressed in postnatal period.
- Families not positive about maternal employment before formal schooling (especially with higher SES and education) should be encouraged to get some group experience for children before age 5.
- Less likely to occur now, free offer for all from age 3, 40% to be offered from age 2.
51 month
School readiness outcomes
Letter recognition and Dominant Type by Phase:  
*Regression results*

- Higher if dominant type is group care in toddler phase for
  - Whole group
  - Higher SES/education group

- Lower if dominant type is home care in preschool phase for
  - Higher SES/education group only

- Dominant care effects gone when quality entered, no effect of quality (reduced N, only home and group based)
Letter recognition and Care Type from birth to 51 m:
Uncontrolled comparisons

- Mean (out of 26)
  - Continuous maternal care: 7.8
  - Continuous home care: 8.3
  - Continuous group care: 13.8
  - Home to group care: 10.6
  - Maternal to group care: 8.5
  - Mixed pattern: 8.8

- Continuous group care higher than all other groups (p<0.000)

- No significant group effect controlling for other variables
Letter Recognition and Hours per type

Uncontrolled associations with total hours by care type over entire time from birth to 51 months:

- More nursery hours, higher ***
- More preschool hours, higher *
- More playgroup hours, lower *
- More father hours, lower *
Letter Recognition and Hours by Type: Regression results

Higher scores:
- More nursery hours from birth to 51 m***
  - High SES/Ed group***, low SES/Ed group(*)
- More preschool hours from 18 to 51 m***
  - High SES/Ed group only
- Higher Home Learning Environment ***
- Higher maternal social class ***
- Higher maternal education **
- Girl *
- Older mother* (high SES/Ed group only)

Lower score:
- Mother non white* (high SES/Ed group only)
Phonemic awareness and dominant type

- Higher when dominant type is group in infancy, with trend for group in toddlerhood
  - in Whole group
  - in Higher SES/Education group

- Effect of group care (versus home care) during infancy (and toddlerhood) sustained when quality added

- Quality also significant predictor

- Groups too small to analyse based on maternal education/class but quality higher for higher SES/Ed group.
Phonemic awareness and hours per type

- Uncontrolled: Higher score with more nursery hours birth to 51 months (small effect, r .06, p .05)
- Not associated significantly with hours in any other type of care
- Regression: no effect of child care hours, any type
- Significantly higher if:
  - older mother, maternal education higher, mothers first language English, mother more responsive at 18 and 36 m., HLE higher at 36 m.
Conclusions: School Readiness and Child Care

- Dominant group care in toddler phase and more nursery and preschool (not playgroup) experiences throughout boost letter knowledge
- No impact on phonemic awareness
- Dividing by disadvantage no impact for lower education and social class group
- Maternal factors (especially HLE and responsivity) important for both groups
- Mean HLE significantly different (p<.001, out of 42)
  - Low SES/Ed 19.3
  - High SES/Ed 22.5
Final points

- Complexity of identifying child care effects
  - Total hours
  - Hours by phase
  - Dominant by phase
  - Dominant from birth to starting school

- Some evidence of ways to enhance child development though high quality group experiences

- These are available more often to more advantaged families, though possible improvements since the study took place
Home based and maternal care

- Many hours of father care after infancy may be a disadvantage for language development.
- Fathers with primary care of young children may need more support and encouragement to mix with other families and to attend ‘female focussed’ groups, playgrounds etc.
- Exclusive maternal care may also leave children at a disadvantage.
- Home care generally not positive or negative, but potential for more impact with more training and support for childminders.
Suggestions, for less advantaged

- Group care more focussed on child development may be needed for lower SES/education families to make an impact on language and school readiness
- Primary influences are within the home
- Home visiting could boost HLE
- Attention needed to providing more high quality but affordable child care in disadvantaged areas
All data are available for any interested researcher, details on website

http://www.familieschildrenchildcare.org