

WHICH CHILDREN BENEFIT FROM NON-PARENTAL CARE?

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Motivation

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- Our basic question is: ‘What is the impact of non-parental care care on children’s behavioural outcomes at age 2/3?’
 - Vast empirical literature on this issue
 - Correlation \neq causation. Parents’ decision to use day care may be correlated with factors we cannot measure (eg. quality of parental relationship, parents’ ambition in their job)
 - We devote a lot of energy to addressing this selection problem.

Differential Effects of Care

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Caveats

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1. Our study does not look at cognitive outcomes
2. Our study does not look at parental outcomes (eg. wages, career trajectory, mental health)
3. We will not be making moral judgments about parental choices to use (or not use) day care.



Data

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- We use the birth cohort of the Longitudinal Survey of Australian Children (LSAC), which contains data on children:
 - At age 0 or 1 (surveyed in 2004)
 - At age 2 or 3 (surveyed in 2006)
 - We do not use the age 4/5 data because it is also affected by pre-school attendance.

Methodology – Child Outcomes

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- We use the ‘Short Temperament Scale for Infants’ (STSI), which is based on a survey of parents.
- There are three component indices: approach scale, persistence scale, reactivity scale

Methodology – Child Outcomes

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- **Approach scale** – eg. laughs when arriving at unfamiliar places, smiles when playing with unfamiliar adult, outgoing with strangers
- **Persistence scale** – eg. plays consistently with a toy for more than 10 minutes, returns to the same activity after a break
- **Reactivity scale** – eg. screams/yells in response to frustration, has moody days, stomps feet when upset

Methodology – Child Outcomes

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- We code all scales so that higher scores indicate better behaviour, and adjust them to a mean of zero and a standard deviation of 1.
- Eg. a standardized score of -0.5 indicates that the child is at the 31st percentile, while a score of -1.0 indicates that the child is at the 16th percentile.
- We also create a composite STSI measure, which is the mean of the three STSI scales.
- An effect of 0.2 for the composite or persistence indices is equivalent to one year's development.

Methodology – Child Care

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□ We use three measures of child care:

1. Share of time in non-parental care from first interview (when child aged 0/1) to second interview (when child aged 2/3).
 - Never in non-parental care=0% (mean=7%)
 - Always in full time care=100%
2. Child in non-parental care at age 2/3 (mean=73%)
3. Child in *full-time* non-parental care at age 2/3 (mean=24%)

Methodology – Controls

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- **Child controls:** Indigenous, born in a non-English speaking country, gender, age (2 month bands).
- **Parental controls:** Indigenous, non-English speaking, born in a non-English speaking country, age, age², education (6 categories), present at interview.
- **Household controls:** household income (6 categories), number of siblings, family size, parents' relationship (married/defacto/single)
- **Parenting style controls:** self-assessment of parenting quality and style, parents' mental wellbeing (all measured when children were aged 0/1)
- **Lagged temperament score controls:** standardized scores for three STSI indices based on a parental questionnaire administered at age 0/1 (this makes our approach akin to a value-added model).

Regression Analysis

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- Estimating equation is:

$$Y = \alpha + \beta(\text{Non-parental care}) + \lambda(\text{Controls}) + \varepsilon$$

- We also explore:

- Matching estimators
- Bias from observables
- Instrumental variables results
- Capacity constraints
- Heterogeneous treatment effects

Table 1: Current non-parental care

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Currently using any non-parental care	-0.012 [0.042]	0.095** [0.044]	-0.056 [0.043]	-0.056 [0.043]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14
<u>Panel B</u>				
Currently using centre-based care	-0.044 [0.039]	0.075* [0.040]	-0.053 [0.040]	-0.100** [0.040]
Currently using family day care	-0.045 [0.070]	0.123* [0.072]	-0.121* [0.070]	-0.081 [0.069]
Currently using informal care	-0.02 [0.041]	0.039 [0.042]	-0.032 [0.042]	-0.042 [0.044]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 2: Current full-time non-parental care

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Currently using any FT non-parental care	-0.082* [0.044]	-0.076* [0.044]	-0.027 [0.044]	-0.050 [0.044]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.13	0.14
<u>Panel B</u>				
Currently using FT centre-based care	-0.103** [0.052]	-0.085 [0.052]	-0.049 [0.051]	-0.060 [0.051]
Currently using FT family day care	-0.071 [0.106]	-0.209** [0.104]	-0.003 [0.106]	0.084 [0.095]
Currently using FT informal care	-0.038 [0.076]	-0.012 [0.076]	-0.004 [0.083]	-0.053 [0.078]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 3: Exposure to non-parental care over the previous 2 years

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
Panel A				
Exposure to non-parental care	-0.430** [0.201]	-0.122 [0.200]	-0.046 [0.204]	-0.626*** [0.207]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.13	0.14
Panel B				
Exposure to centre-based care	-0.549** [0.267]	-0.276 [0.277]	-0.188 [0.272]	-0.556** [0.270]
Exposure to family day care	-0.932** [0.452]	0.149 [0.465]	-0.969** [0.452]	-0.916** [0.459]
Exposure to informal care	-0.394 [0.378]	-0.147 [0.330]	0.116 [0.375]	-0.703** [0.342]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

For the exposure to non-parental care measure,
Mean=7%, SD=10%

Addressing Selection

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- Although we have a plethora of demographic controls in these specifications, we are concerned about selection on unobservables.
 - ▣ Eg. quality of relationship between parents, parents' own cognitive and non-cognitive skills.
- We use four strategies to address this:
 - ▣ Matching
 - ▣ Bias from observables (Altonji, Elder & Todd)
 - ▣ Instrumental variables
 - ▣ Capacity constraints

Table 4: Matching estimates for current care

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Currently using any non-parental care	-0.057 [0.054]	0.096 [0.080]	-0.073 [0.064]	-0.131** [0.063]
Observations	2300	2300	2300	2300
<u>Panel B</u>				
Currently using any full-time non-parental care	-0.080 [0.058]	-0.017 [0.085]	-0.044 [0.065]	-0.091 [0.071]
Observations	1067	1067	1067	1067

Table 5: Selection on Observables

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Currently using any non-parental care	-0.012 [0.042]	0.095** [0.044]	-0.056 [0.043]	-0.056 [0.043]
Bias from observables	0.222	0.431	-0.249	0.410
Ratio $ \beta/\text{Bias} $	5%	22%	22%	14%
<u>Panel B</u>				
Currently using any FT non-parental care	-0.082* [0.044]	-0.076* [0.044]	-0.027 [0.044]	-0.050 [0.044]
Bias from observables	-0.079	0.050	-0.278	0.012
Ratio $ \beta/\text{Bias} $	104%	152%	10%	417%
<u>Panel C</u>				
Exposure to non-parental care	-0.430** [0.201]	-0.122 [0.200]	-0.046 [0.204]	-0.626*** [0.207]
Bias from observables	0.303	0.805	-0.983	0.975
Ratio $ \beta/\text{Bias} $	142%	15%	5%	64%

Note: The higher the ratio, the less likely it is that selection on unobservables is driving the results.

Instrumental Variables

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- Another approach is to use a source of variation that affects the use of centre-based care. An ideal instrument does not have a direct impact on child outcomes (except via its effect on care use).
 - ▣ IV 1: Demand-side shocks: A sudden rise in births reduces the chance of centre-care usage.
 - ▣ IV 2: Supply-side shocks: New centre openings increase the chance of centre-care usage.
- Limitations: People can move house. Overcrowding might affect quality as well as access (potential negative bias).

Table 6: Instrumenting centre-based care usage

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A: Instrument is ‘surprise births’</u>				
Currently using centre-based care (instrumented)	-1.621 [1.348]	-2.766* [1.680]	-0.275 [0.952]	0.05 [1.024]
Currently using family day care	-0.822 [0.672]	-1.277 [0.834]	-0.229 [0.474]	-0.007 [0.509]
Currently using informal care	-0.086 [0.075]	-0.079 [0.098]	-0.042 [0.059]	-0.035 [0.061]
Observations	2646	2651	2655	2651
F-statistic on excluded instrument	4.25**	4.44**	4.49**	4.32**
<u>Panel B: Instrument is new centre openings</u>				
Currently using centre-based care (instrumented)	0.483 [0.747]	0.415 [0.922]	-0.333 [0.707]	0.827 [0.728]
Currently using family day care	0.212 [0.376]	0.289 [0.461]	-0.258 [0.350]	0.373 [0.364]
Currently using informal care	0 [0.052]	0.051 [0.057]	-0.045 [0.050]	-0.003 [0.056]
Observations	2642	2647	2651	2647
F-statistic on excluded instrument	8.02***	7.89***	7.95***	8.02***
<u>Panel C: Both Instruments</u>				
Currently using centre-based care (instrumented)	-0.347 [0.520]	-0.926 [0.574]	-0.302 [0.515]	0.562 [0.543]
Currently using family day care	-0.195 [0.268]	-0.37 [0.293]	-0.243 [0.262]	0.243 [0.276]
Currently using informal care	-0.034 [0.046]	-0.003 [0.051]	-0.044 [0.047]	-0.014 [0.050]
Observations	2642	2647	2651	2647
F-statistic on excluded instrument	7.62***	7.68***	7.74***	7.67***

Table 7: Comparing with children who were unable to get a place

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
Currently using centre-based care	-0.103 [0.069]	0.055 [0.068]	-0.083 [0.070]	-0.163** [0.073]
Currently using family day care	-0.095 [0.090]	0.105 [0.089]	-0.138 [0.091]	-0.144 [0.093]
Currently using informal care	-0.056 [0.052]	0.02 [0.052]	-0.05 [0.052]	-0.076 [0.055]
Observations	1941	1943	1946	1946
Number of non-users whose could not get a place	12	12	12	12

Comparison group are non-users who say that their reason for not using day care was “problems with getting child care places”

Differential Effects of Care

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Differential Effects of Care

- There is no reason to think that the impact of centre-based care should be the same for all children.
- High-SES parents tend to spend more time with their children, are more likely to read books, less likely to watch television, less likely to use corporal punishment, and tend to address more words to their children (Hart & Risley 1995; Bianchi and Robinson 1997; Evans 2004; Guryan, Hurst, and Kearney 2008; Yamauchi 2010)

Differential Effects of Care

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- To test this, we split the sample into:
 - ▣ household income tertiles
 - <\$42k
 - \$42-78k
 - >\$78K
 - ▣ maternal education tertiles
 - <year 12
 - year 12
 - university

Table 8: Exposure to non-parental care over the previous 2 years, interacted with parental income

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Exposure to non-parental care × Low SES	-0.524 [0.451]	0.22 [0.432]	-0.672 [0.525]	-0.489 [0.456]
Exposure to non-parental care × Mid SES	-0.34 [0.299]	-0.241 [0.330]	0.173 [0.311]	-0.562* [0.332]
Exposure to non-parental care × High SES	-0.467 [0.319]	-0.159 [0.297]	0.024 [0.305]	-0.735** [0.315]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 9: Exposure to non-parental care over the previous 2 years, interacted with parental education

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Exposure to non-parental care × Low SES	0.052 [0.410]	0.556 [0.439]	-0.473 [0.452]	0.005 [0.471]
Exposure to non-parental care × Mid SES	-0.36 [0.358]	-0.222 [0.322]	0.302 [0.323]	-0.745** [0.353]
Exposure to non-parental care × High SES	-0.691** [0.275]	-0.317 [0.291]	-0.175 [0.309]	-0.783*** [0.291]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Differential Effects of Care

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- Effects of care might also differ across child care centres. We therefore test for differences according to:
 - ▣ Carer/child ratios
 - ▣ Share of staff with early childhood qualifications
 - ▣ Accreditation status
 - ▣ Expert quality rating

Table 10: Exposure to non-parental care over the previous 2 years, interacted with carer/child ratio

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Exposure to non-parental care	-0.876*** [0.299]	-0.245 [0.303]	-0.388 [0.301]	-0.999*** [0.351]
Exposure to non-parental care × Carer/child ratio	1.467** [0.703]	0.405 [0.733]	1.126 [0.714]	1.228 [0.966]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14
<u>Panel B</u>				
Exposure to centre-based care	-1.146** [0.451]	-0.819* [0.447]	-0.205 [0.469]	-1.122** [0.522]
Exposure to family day care	-2.003 [1.257]	0.612 [1.465]	-1.681 [1.335]	-2.648* [1.555]
Exposure to informal care	-0.449 [0.381]	-0.187 [0.333]	0.109 [0.378]	-0.761** [0.342]
Exposure to centre-based care × Carer/child ratio	2.778* [1.670]	2.497 [1.659]	0.094 [1.902]	2.648 [1.921]
Exposure to family day care × Carer/child ratio	3.416 [3.885]	-1.514 [4.517]	2.29 [3.969]	5.542 [4.574]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 11: Exposure to non-parental care over the previous 2 years, interacted with share of staff who have early childhood qualifications

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
<u>Panel A</u>				
Exposure to non-parental care	-0.373 [0.265]	-0.13 [0.255]	0.021 [0.268]	-0.579** [0.260]
Exposure to non-parental care × Share of staff with EC quals	-0.218 [0.565]	0.031 [0.555]	-0.255 [0.607]	-0.177 [0.614]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.13	0.14
<u>Panel B</u>				
Exposure to centre-based care	-0.365 [0.387]	-0.067 [0.398]	-0.17 [0.388]	-0.446 [0.360]
Exposure to family day care	-0.878 [0.606]	-0.304 [0.627]	-0.653 [0.597]	-0.686 [0.584]
Exposure to informal care	-0.392 [0.378]	-0.151 [0.330]	0.12 [0.376]	-0.699** [0.342]
Exposure to centre-based care × Share of staff with EC quals	-0.6 [0.857]	-0.677 [0.866]	-0.061 [0.909]	-0.357 [0.886]
Exposure to family day care × Share of staff with EC quals	-0.255 [1.754]	2.053 [1.782]	-1.446 [1.856]	-1.054 [1.970]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 12: Exposure to non-parental care over the previous 2 years, interacted with accreditation status

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
Exposure to centre-based care	-0.088 [0.550]	-0.294 [0.612]	0.301 [0.616]	-0.163 [0.564]
Exposure to family day care	-0.086 [0.982]	0.921 [0.841]	-0.283 [1.071]	-0.765 [0.905]
Exposure to informal care	-0.398 [0.378]	-0.148 [0.330]	0.111 [0.375]	-0.706** [0.342]
Exposure to centre-based care × Accredited centre	-0.536 [0.581]	0.026 [0.638]	-0.569 [0.646]	-0.46 [0.597]
Exposure to family day care × Accredited centre	-1.126 [1.079]	-1.033 [0.981]	-0.91 [1.154]	-0.193 [1.025]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Table 13: Exposure to non-parental care over the previous 2 years, interacted with quality rating

Dependent variable:	Composite index	Approachability index	Persistence index	Reactivity index
Exposure to centre-based care	-0.347 [0.275]	-0.176 [0.291]	0.002 [0.279]	-0.468 [0.285]
Exposure to family day care	-1.017** [0.454]	0.098 [0.469]	-1.052** [0.447]	-0.932** [0.455]
Exposure to informal care	-0.386 [0.381]	-0.143 [0.330]	0.119 [0.377]	-0.695** [0.343]
Exposure to centre-based care × Quality assessment	-0.118 [0.096]	-0.064 [0.114]	-0.011 [0.098]	-0.145 [0.136]
Exposure to family day care × Quality assessment	-0.191 [0.206]	-0.168 [0.239]	-0.174 [0.217]	-0.002 [0.236]
Observations	2648	2653	2657	2653
R-squared	0.18	0.13	0.14	0.14

Conclusions

- For the most part, there are only small differences in temperament between children who attend non-parental care and those who do not.
- While children in non-parental care score slightly lower, the average differences could readily be explained by unobservables bias.
- Moreover, we need to also think about positive impacts of child care on *parents* (who are able to stay connected with the paid workforce).

Conclusions

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- Evidence of differential impacts:
 - ▣ negative association between behaviour and non-parental care is strongest for high-SES children
 - ▣ negative association between behaviour and non-parental care is weaker in centres with smaller groups
- This accords with US research, and suggests that randomised studies (eg. Perry, Abecedarian) have little relevance for middle-class Australian children.
- We should think of *multiple* child care effects, not just one.

Further details

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- Andrew Leigh's details:
 - Web: <http://andrewleigh.org>
 - Blog: <http://andrewleigh.com>
 - Email: andrew.leigh@anu.edu.au
- Relevant research:
 - This study is available at <http://andrewleigh.org>
 - See also other research on child care by Chikako Yamauchi, at <http://econrsss.anu.edu.au/Staff/yamauchi/>