

# It’s Dolly’s World, We’re Just Reading in It: The Effects of an Early Childhood Literacy Program

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## Objective

### Research Question:

How do small capital investments affect early cognitive skill development in children?

### Background:

- Investment in early childhood development is critical for later human capital development.
- Preschool programs are helpful, but we are unsure about best practices outside of daycare and formal schooling—specifically how capital inputs from parents actually impact their children
- We know labor inputs, such as more time spent between parents and their children, are effective, but are unsure about the effects of capital investments.
- Dolly Parton’s Imagination Library Mails free books monthly to children under the age of five. It began a national roll out in 2000.

Using the national roll out of Dolly Parton's Imagination Library, I investigate the effects of gaining access to an early childhood literacy program that provides educational resources to young children on third and fourth grade English Language arts and Math achievement.

## Data

### Imagination Library Data

- Panel dataset with coverage information for each zip code in the country
- January 2000 – December 2009
- Novel dataset

### Stanford Education Data Archive (SEDA)

- Panel of school-district level achievement data at the cohort level
- School year 2009/2010 through 2015/2016
- SEDA standardized state-specific achievement data to the National Assessment of Educational Progress (NAEP) exams
- Also includes demographic control variables for the school district total population
- Interpreted as an effect size

## Empirical Methods

### Identification Strategy

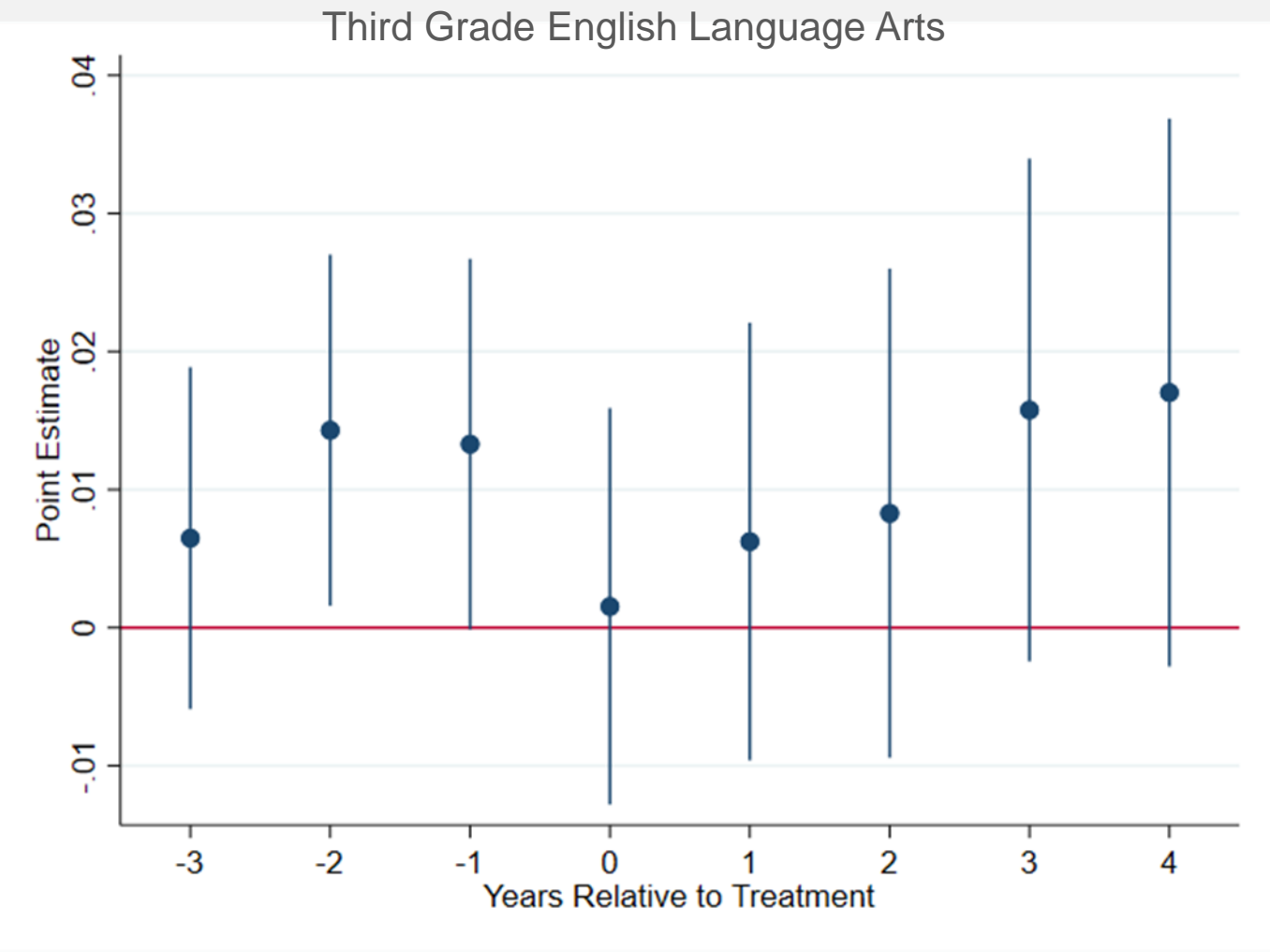
- Two way fixed effects difference-in-differences model
- Uses temporal and geographic variation to identify differences between treated and untreated cohorts.

### Necessary Assumptions

- Exogenous Program Adoption
  - Covariate balance test (placebo test)
    - Program adoption is not correlated with changes in any control variables included in the model
  - Pre-treatment characteristic test

	Index	
	(1)	(2)
Percent of population urban	0.337*** [0.0451]	0.201* [0.102]
Percent of population age < 5	-9.221*** [1.052]	-3.832* [2.093]
Percent of population age > 65	-0.608** [0.298]	0.776 [0.492]
Percent of population Black	0.376*** [0.0820]	0.679*** [0.204]
Log median income	8.367* [4.270]	11.01 [10.85]
Log population	-2.003*** [0.682]	-2.534* [1.410]
State Fixed Effect		X
R <sup>2</sup>	0.03	0.27

- Parallel Trends
  - Event Study



### Model

$$Y_{dct} = \lambda_c + \eta_d + \delta IL_{dc} + X_{dc}\beta_1 + Z_{dt}\beta_2 + t\theta_{dc} + \epsilon_{dc}$$

$Y_{dct}$  - Academic achievement outcome variable  
 $\lambda_c$  - Cohort fixed effects  
 $\eta_d$  - School district fixed effects  
 $IL_{dc}$  - Imagination Library indicator variable  
 $X_{dc}$  - Cohort-by-district controls  
 $Z_d$  - District-specific controls  
 $t\theta_{dc}$  - linear district-specific time trend  
 $\epsilon_{dc}$  - robust error term, clustered at school-district level

## Results

### Estimated Effects of Access to Imagination Library on Elementary Academic Achievement

	3 <sup>rd</sup> Grade ELA Exams (1)	3 <sup>rd</sup> Grade Math Exams (2)	4 <sup>th</sup> Grade ELA Exams (3)	4 <sup>th</sup> Grade Math Exams (4)
IL Access Indicator	-0.00970* [0.00500]	-0.00629 [0.00622]	-0.00403 [0.00542]	0.000563 [0.00553]
Observations	74571	74250	65218	65218
Population Weighted IL Indicator	-0.00811 [0.00505]	-0.00124 [0.00630]	0.0114* [0.00660]	0.0131* [0.00674]
Observations	74571	74250	64822	64822
Cohort & District FE	X	X	X	X
2000 Census Time Trends	X	X	X	X

### Heterogeneous Results

	OLS	Quantiles of Average Third Grade ELA Achievement				
		0.10	0.25	0.50(Median)	0.75	0.90
IL Access Indicator	-0.00970 * [0.00500]	-0.0185 [0.0135]	-0.0270** [0.0111]	-0.0175** [0.00720]	0.00548 [0.00843]	0.00615 [0.0116]
Observations	74571	74838	74838	74838	74838	74838
Pop. Weighted Indicator	-0.00811 [0.00505]	-0.0218* [0.0125]	-0.0252*** [0.00953]	-0.0132* [0.00748]	0.0102 [0.00872]	0.0106 [0.0111]
Observations	74571	74838	74838	74838	74838	74838

- Differential effects by ability
  - Unconditional Quantile Regression
  - Results are still small, but larger in magnitude than primary results
  - Shows slight evidence of a widening of the distribution.

- No differential effects by race or socioeconomic status.

## Conclusion

- I find no difference in elementary academic achievement between cohorts with access to Imagination Library and those without.
- This suggests that an early childhood investment that only includes capital might not be as effective as other investments that include labor.

### Policy Implications

- Capital investments alone are not strong enough to have a meaningful effect without complementary investment from parents and guardians.
- Policies that give in-kind benefits are often easier to implement than policies that subsidize parental time with their children.

## Contact Information

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