The Impact of Family Income on Child Outcomes in Parent-Implemented Language Intervention

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Introduction

- Children from low-income backgrounds score lower on tests of early language development (Walker, Greenwood, Hart, & Carta, 1994).
- This early delay is closely tied to long-term academic outcomes and suggests that the achievement gap begins well before the start of school.
- The oral language environment of children from low-income backgrounds differs substantially compared to children from middle- and upper-income background.
- By the age of 3, children from low-income backgrounds hear an average of 30 million words fewer than children from high-income families (Hart & Risley, 1995).
- Understanding how participation in an early language intervention affects children from low-income backgrounds may inform future research and practice in this area.

Research Questions

Question 1: Does income predict language outcomes and growth during a parent-implemented communication intervention?

Question 2: What is the effect of the home language environment on children's response to response to a parent-implemented intervention?

More Information

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Methods

Participants

Data were selected from an RCT examining the effects of Enhanced Milieu Teaching (EMT) for children with language delay (Roberts & Kaiser, 2015)

Participant Characteristics	
Number of participants	97
Expressive Language (PLS-5 standard score)	75.2 (sd=8.11)
Receptive Language (PLS-5 standard score)	75.7 (sd=16.7)
Age	30.3 months (sd=5.0)
Percent male	81%
Race African American White Other	 15% 82% 3%
Cognitive level	90 (sd=8.0)

Intervention

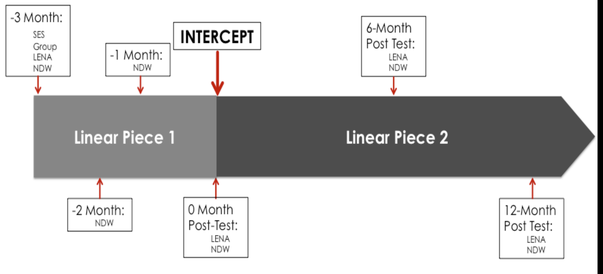
- EMT focused on teaching parents four key language support strategies to promote early language interactions in everyday routines and activities
- 28 total sessions over 12 weeks
  - 24 child intervention sessions
  - 4 individual parent workshops

Measures

Construct	Variable Type	Construct
Expressive Language	Dependent variable	Number of different words (NDW) on a 20-minute naturalistic language sample
Group	Independent variable	Intervention or control
Income	Time invariant covariate	Income to needs ratio based on persons residing in the household
Home language input	Time varying covariate	Conversational turns during one full weekday LENA recording

Analysis

- Latent growth curve analysis
  - Two group piecewise model (knot point at the end of intervention)
  - Intercept at the end of intervention to analyze the main effects of intervention

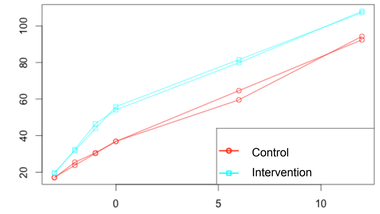


Results

Question 1: Income as a Predictor of Intercept and Growth

	Intervention			Control		
	Estimate	S.E	P-Value	Estimate	S.E	P-Value
Intercept	58.00	10.23	0.00	36.46	6.15	0.00
Slope of Intervention	11.57	2.54	0.00	6.18	6.15	0.00
Slope of Post Intervention	4.28	0.42	0.00	4.63	0.45	0.00
Income on Intercept	-0.66	2.85	0.81	0.12	1.61	0.93
Income on Slope of Intervention	0.14	0.71	0.83	0.12	0.36	0.72
Chi Square	47.70 (p=0.16, df=41)					
RMSEA	0.068 (CI: 0.00 0.12)					

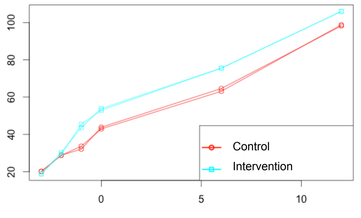
- Chi-square difference test indicates no significant difference of income (p=0.92) between intervention and control groups
- Income alone was not a significant predictor of NDW immediately following the intervention period, or of growth during the intervention period.



Question 2: Conversational turns as a time-varying covariate, and income as a predictor of intercept and slope

	Intervention			Control		
	Estimate	S.E	P-Value	Estimate	S.E	P-Value
Intercept	53.94	10.94	0.00	26.02	11.81	0.02
Slope of Intervention	12.13	3.28	0.00	-0.09	2.39	0.96
Slope of Post Intervention	1.32	0.92	0.15	2.11	1.15	0.06
Income on Intercept	0.88	2.89	0.76	3.78	4.18	0.36
Income on Slope of Intervention	0.34	0.81	0.67	1.37	0.73	0.06
Conversational Turns Pre Test Post Test 6-Month 12-Month	 0.02 -0.03 0.12 0.39	 0.03 0.03 0.06 0.12	 0.51 0.34 0.04 0.00	 -0.07 0.10 0.18 0.46	 0.03 0.03 0.06 0.15	 0.01 0.00 0.00 0.00
Chi-square	134.08 (p=0.00, df=81)					
RMSEA	0.148 (CI: 0.10 0.19)					

- Chi-square difference test indicates no significant difference of conversational turns (p=0.08) between intervention and control groups
- When including conversational turns in the model, the income had a larger effect on NDW in the control group than the intervention group, but this difference was not significant.



Discussion

- In this sample, income alone was not a significant predictor of the child's expressive language (NDW) in response to intervention.
- On average, income had a larger impact on language growth during the intervention period for the control group compared to the intervention group when accounting for the quantity of conversational turns in the home environment, but this difference was not statistically significant.
- Improving the quality of parent-child interaction may reduce the effects of income when controlling for quantity of interaction.
- Future research should examine this further given the small sample size and high variability in this study.

Conclusions

- Early language interventions that train parents in high-quality language input may reduce the relationship between income and language outcomes more than the quantity of language input alone.

References

- Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. *American Educator*, *27*(1), 4–9.
- Roberts, M., & Kaiser, A. (2015). Early intervention for toddlers with language delays: A randomized controlled trial. *Pediatrics,* 135(4).
- Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development*, *65*(2), 606–621.

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