

# Nebraska Early Childhood Study

*Children and Families Birth to Five in  
Lincoln and Omaha*

*CYFS Research Summit 2022*

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Abbie Raikes [abbie.raikes@unmc.edu]

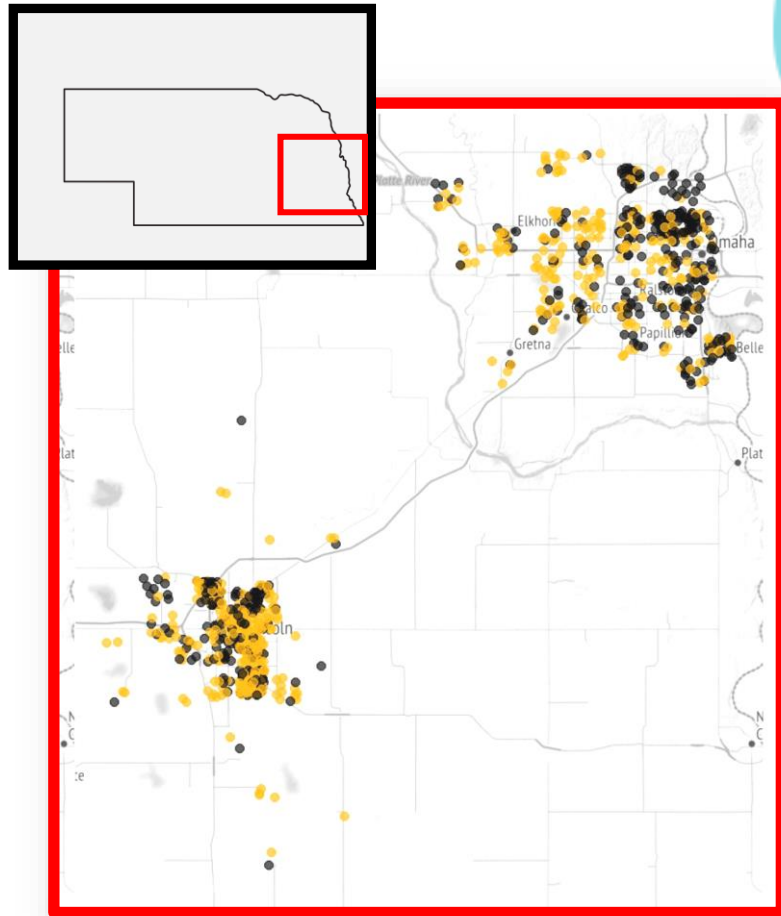
Marcus Waldman [marcus.waldman@unmc.edu]

Katelyn Hepworth [khepworth@huskers.unl.edu]

Discussion led by

Gladys Haynes

Buffett Early Childhood Fund



Buffett Early  
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investing in the early years

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Acknowledgments  
*Thank you to our funders!*

PRITZKER  

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Children's Initiative

# Study Aims

## *What was the Nebraska Early Childhood Study?*

***Can we trust conclusions inferred from proposed “population measures” of early childhood development?***



Assess psychometrics of population measures currently underdevelopment

- Global Scales of Early Development
  - Short form
  - Psychosocial form
- KidPop 0-5



Generate vertically equatable scores from items on the National Outcomes Measures (“zippering”)



Provide an initial look into child development and family characteristics for Lincoln and Omaha

# What is “Population Measurement”?



## **Traditional ECD Measurement**

- Individual child’s developmental status
  - Often direct observation
  - Lengthy assessments
  - Precise scores
  - Granular information across subdomains to capture nuances
- Validated instruments:
  - Ages and Stages, Bayley Scale of Infant Development, Child Behavioral Checklist, DECA

## **Population-level ECD Measurement**

- High-level information on populations to inform policies and large-scale programs
  - Inexpensive to administer (caregiver report)
  - Faster data collection
  - Large scale, representative studies
  - Broad brushstrokes
- Validated Instruments:
  - Caregiver Reported Early Development Instrument (CREDI), Early Development Instrument (EDI)

# Survey Content

- Survey questions covered key constructs to describe families and validate tools:
  - Family environment and demographic characteristics
- We used as many items as possible from the National Survey of Children's Health
- Home learning environments and child development outcome questions are in earlier stages of validation

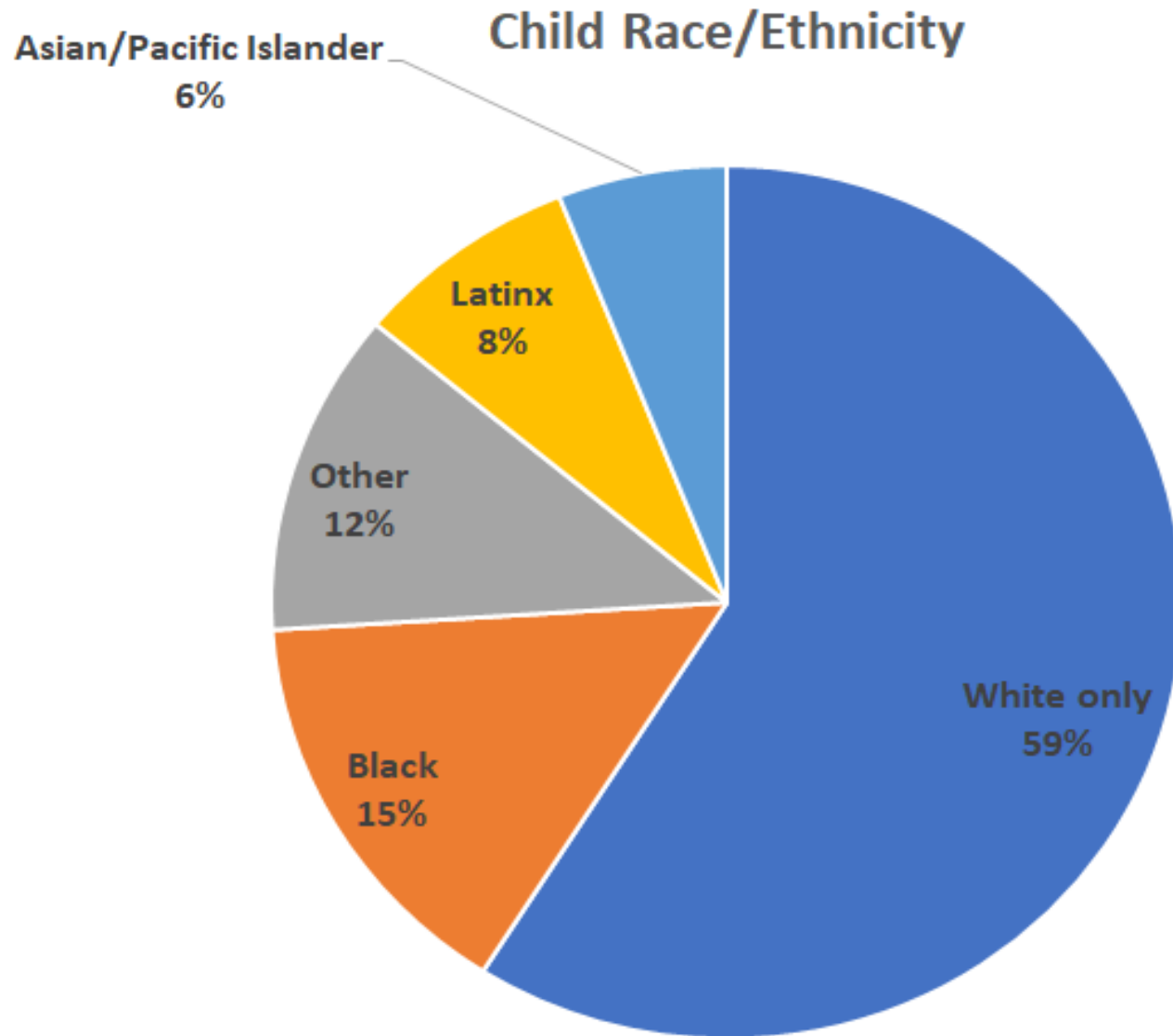
I. Developmental Environments

Measure	Source	Notes
Child race/ethnicity Caregiver education Household income Caregiver support Child Adverse Childhood Experiences (ACEs) Community Support Special Healthcare Needs	National Survey of Children’s Health (NSCH)	Validated

II. ECD Measures

Caregiver anxiety and depression	Patient Health Questionnaire-2 and General Anxiety Disorder-2	Validated
Home Learning Environment	Family Care Indicators (FCI)	Partially validated
Child Development, Birth to 36 months	Global Scale for Early Development (GSED)- Short Form	Preliminary
Child Development, 12 to 60 months	12m5 Scale- New scale	Preliminary
Psychosocial Scale	Global Scale for Early Development (GSED)- Psychosocial Form	Preliminary

# I. Sample Description & Children's Environments

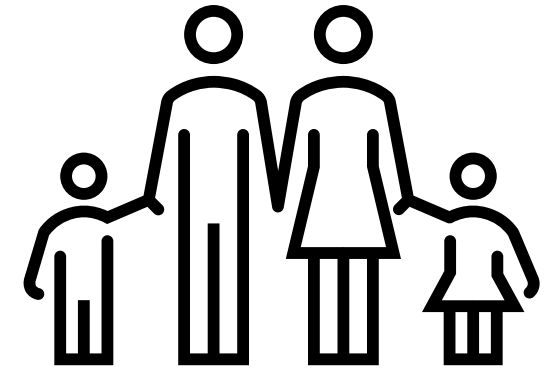


# 982 Children

- Average age: 2 years 5 months
- 52% male
- Exposure to 1 or more ACEs: 23.7%
- Special healthcare needs: 24%
- 50% Lincoln, 50% Omaha



# Family Characteristics



- We intentionally oversampled in low-income communities relative to American Community Survey (“ACS”)
- 13% of caregivers met cutoff for clinical levels of depression and/or anxiety
- 40% report some level of food insecurity

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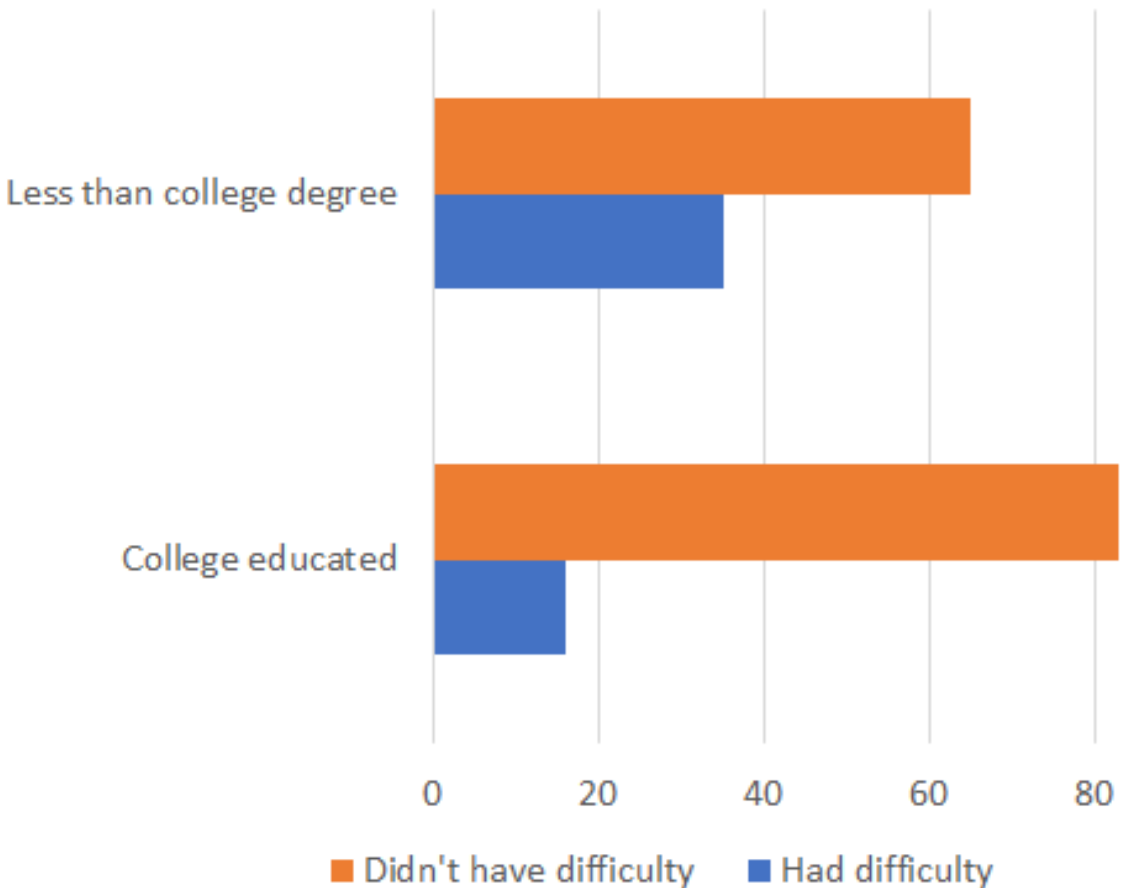
	<u>ACS</u>	<u>GSED</u>
Female (%)		47.9
Med. Income (x1000, 1999 USD)	57.8	38.8
SNAP Benefits	14.8	18.0
Medicaid	9.3	39.0
Hispanic	10.9	12.1
White	83.8	71.8
Black	6.1	9.5
HS diploma or higher	91.9	94.6
BS/BA or higher	50.7	55.0

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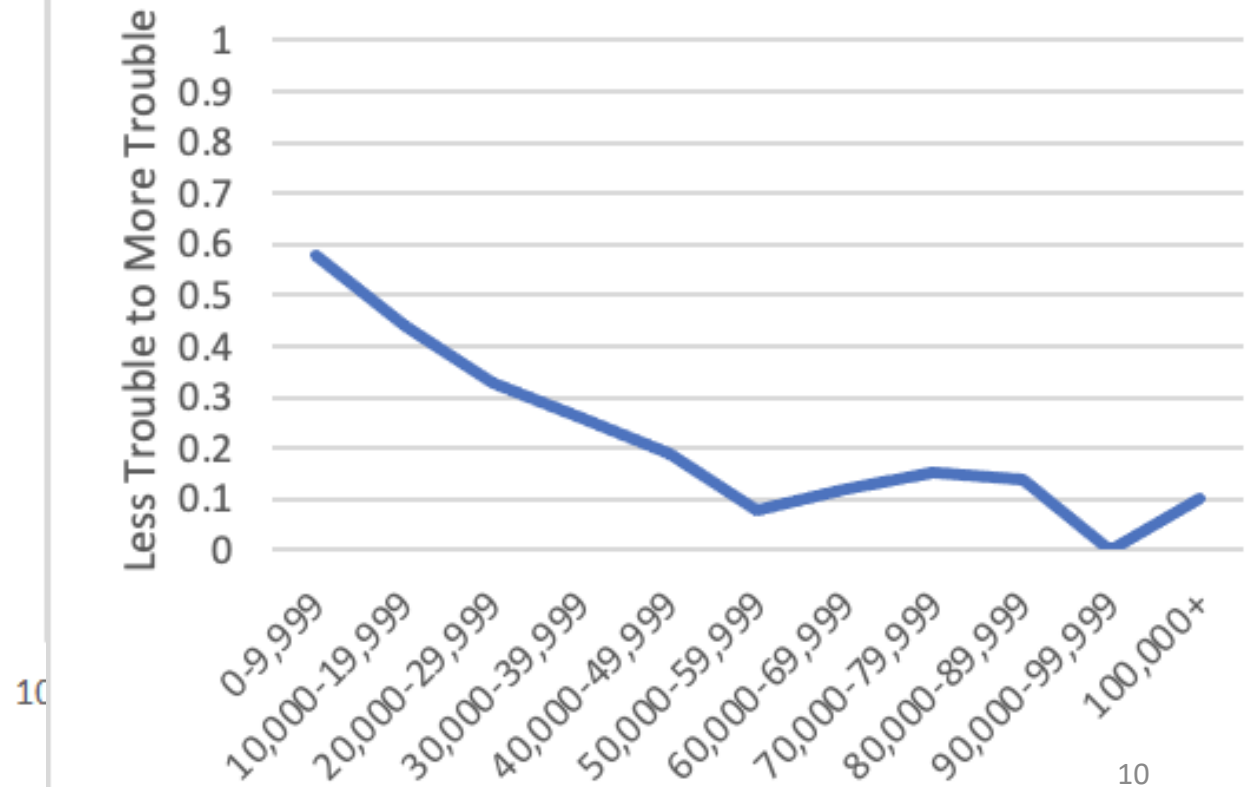
# Child Care Access

*During the past 12 months, did you or anyone in the family have to quit a job, not take a job, or greatly change your job because of problems with childcare for this child?*

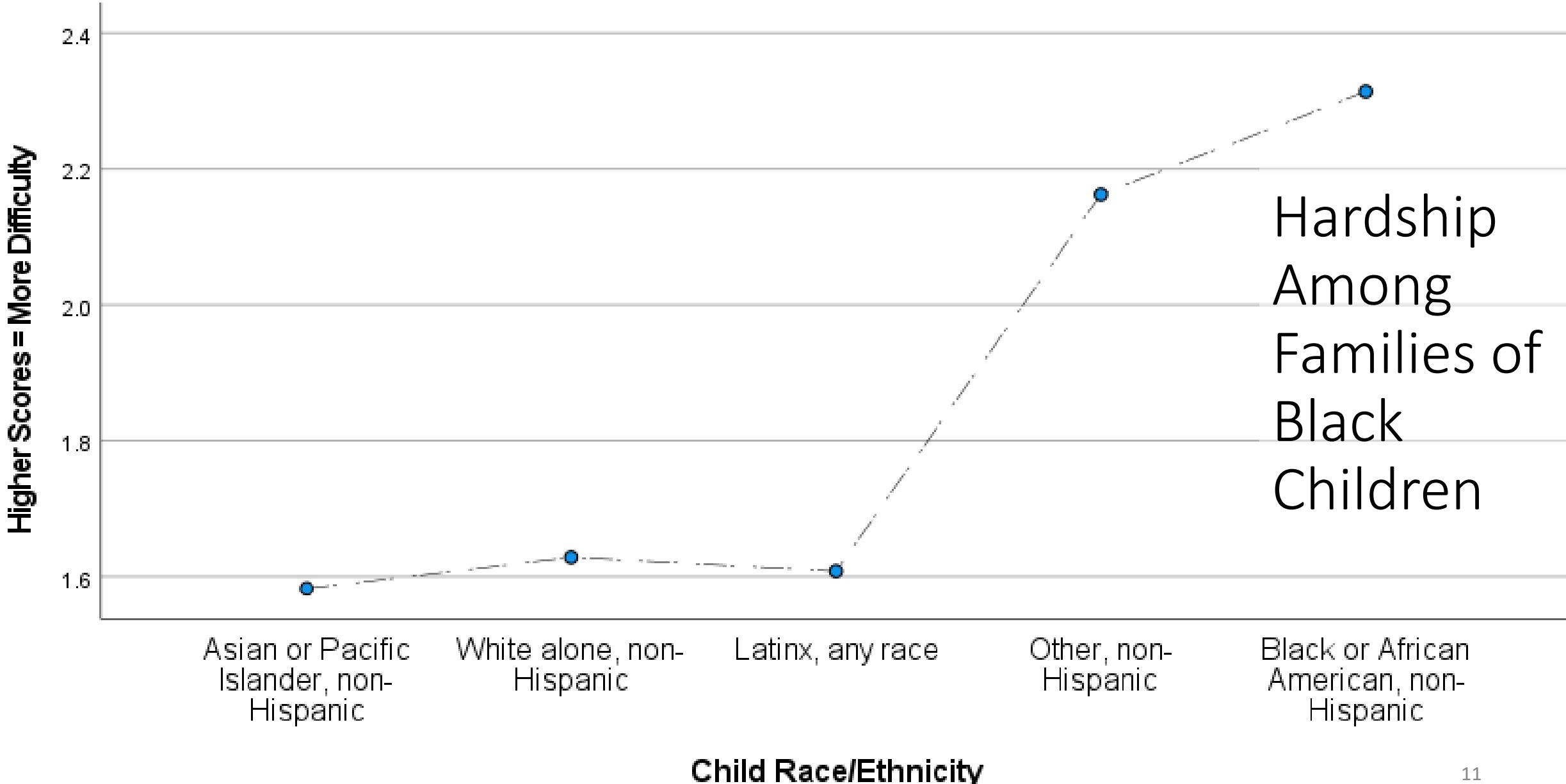
## Lack of Childcare Hurts Less Educated Workers More



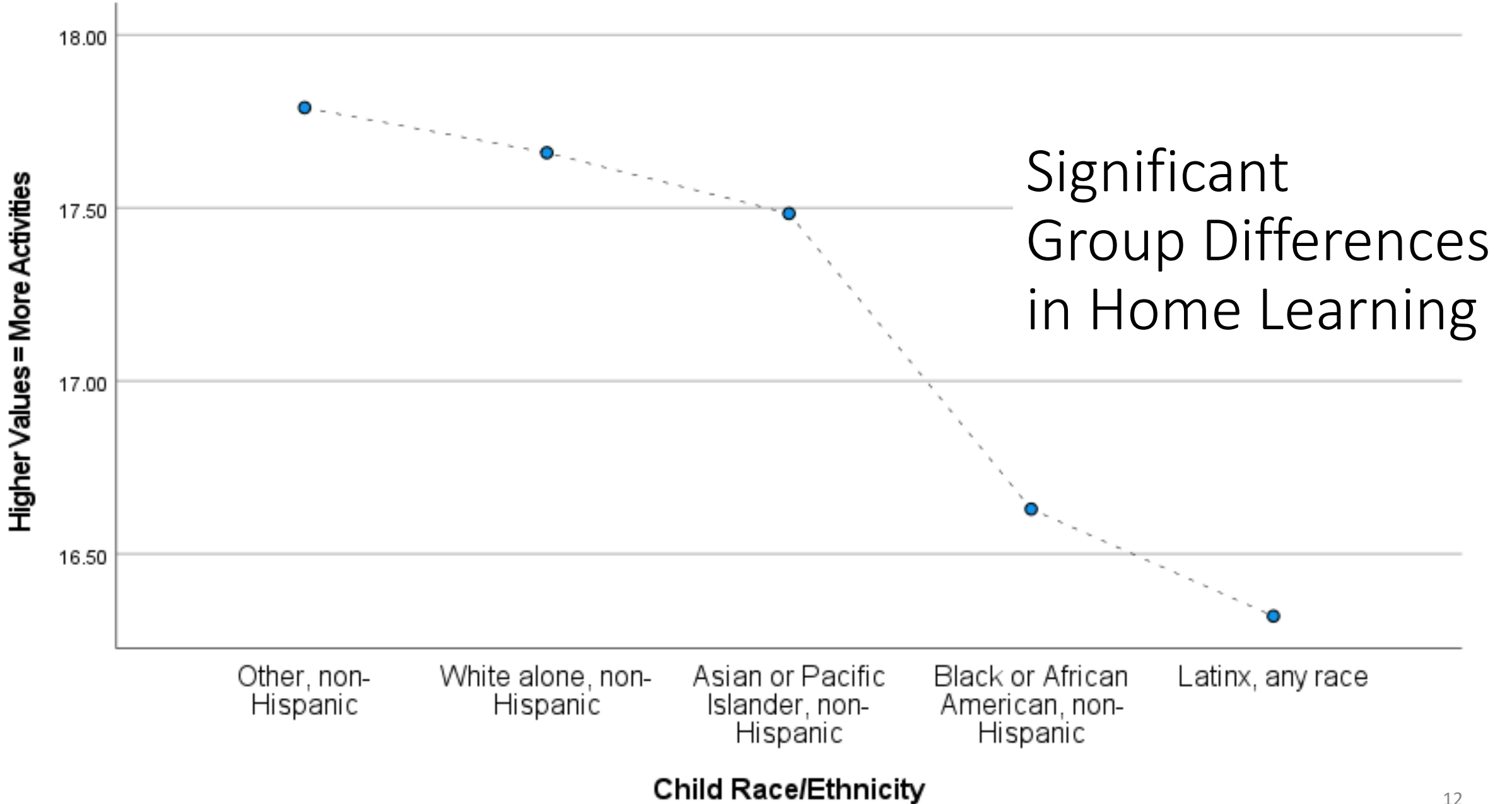
## Average Trouble with Childcare by Income Category



Estimated means of Difficulty Covering Basics Since Child's Birth, By Race/Ethnicity



## Estimated Means of Home Learning Activities



# Nebraska Child Development Study: Preliminary Results, *Child Development*

Variable	B	SE B	$\beta$	R <sup>2</sup>	$\Delta R^2$
<b>Step 1</b>				.850	.850***
(Constant)	-2.082***	.089			
Child age in days	.006***	.000	.921***		
Caregiver has college degree	.067	.104	.009		
Family 2020 Income	1.24E-6*	.000	.030*		
Child sex (female=1)	.101	.090	.014		
Child Race (Child Race (White, Non-Hispanic =1)	.077	.105	.011		
<b>Step 2</b>				.885	.035***
(Constant)	7.800***	.350			
Child age in days	.005***	.000	.829***		
Caregiver has college degree	-.123	.092	-.017		
Family 2020 Income	4.538E-7	.000	.011		
Child sex (female=1)	.190*	.079	.027*		
Child Race (Child Race (White, Non-Hispanic =1)	-.092	.093	-.013		
Home Learning Activities	.201***	.020	.147***		
Home Learning Materials	.062***	.010	.093***		
<b>Step 3</b>				.893	.008***
(Constant)	-6.914***	.355			
Child age in days	.005***	.000	.826***		
Caregiver has college degree	-.017	.090	-.002		
Family 2020 Income	5.727E-8	.000	.001		
Child sex (female=1)	.212**	.076	.030**		
Child Race (Child Race (White, Non-Hispanic =1)	-.066	.090	-.009		
Home Learning Activities	.186***	.019	.136***		
Home Learning Materials	.048***	.010	.072***		
Interaction of Income and Age	3.931E-9***	.000	.047***		
Interaction of Age and Home Learning Environment <sup>b</sup>	.000***	.000	-.090***		

\*p<.05; \*\*p<0.01; \*\*\*p<0.001

a. Dependent Variable: 12m5 Child Development Score

b. Home Learning Environments is a sum scores created from the Home Learning Activities and Home Learning Materials variables

# Unequal early lives in Omaha and Lincoln

- Many families facing tough conditions
  - Significant hardship
  - Inequities in home environments and family characteristics by education and racial/ethnic background
- Possible to hear from families using an online survey format
  - Important to tell the story!

## II. Measuring ECD

# What types of ECD items were asked?

**Motor** Can your child reach for AND HOLD an object, at least for a few seconds?

**Cognitive** Can (name) count 10 objects, for example, 10 fingers or blocks without mistakes?

**Language** Can your child say five or more separate words (e.g., names like "Mama" or objects like "ball")?

**Socioemotional competencies** Does (name) offer to help someone who seems to need help?

**Problem Behaviors** Does your child lose their temper?

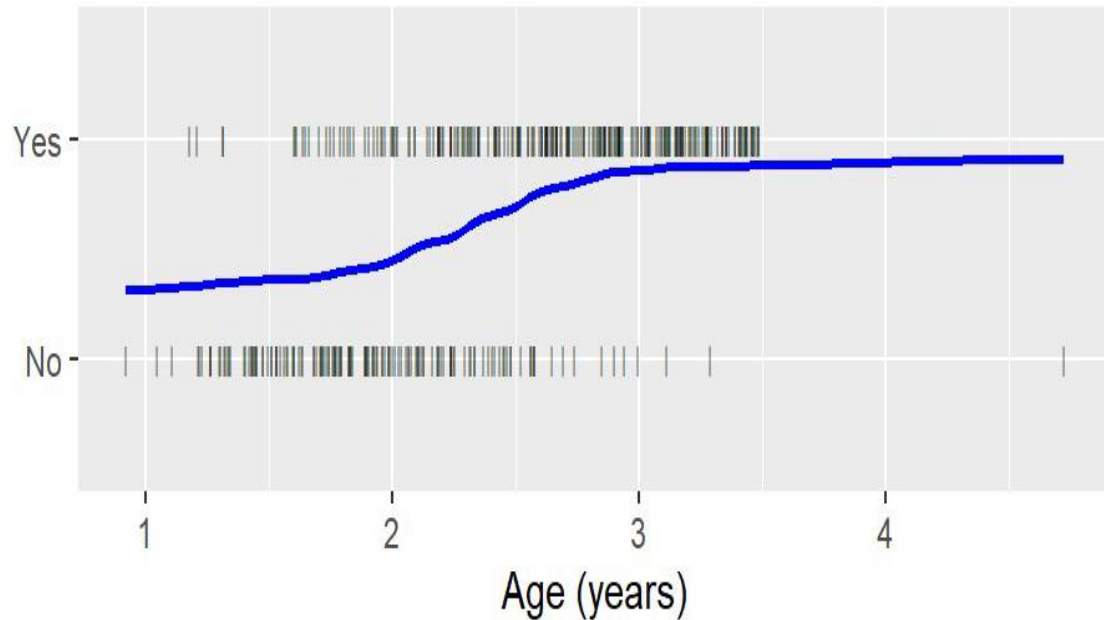
Does your child become afraid around strangers, even when you are with him/her?

Does your child have difficulty staying asleep?



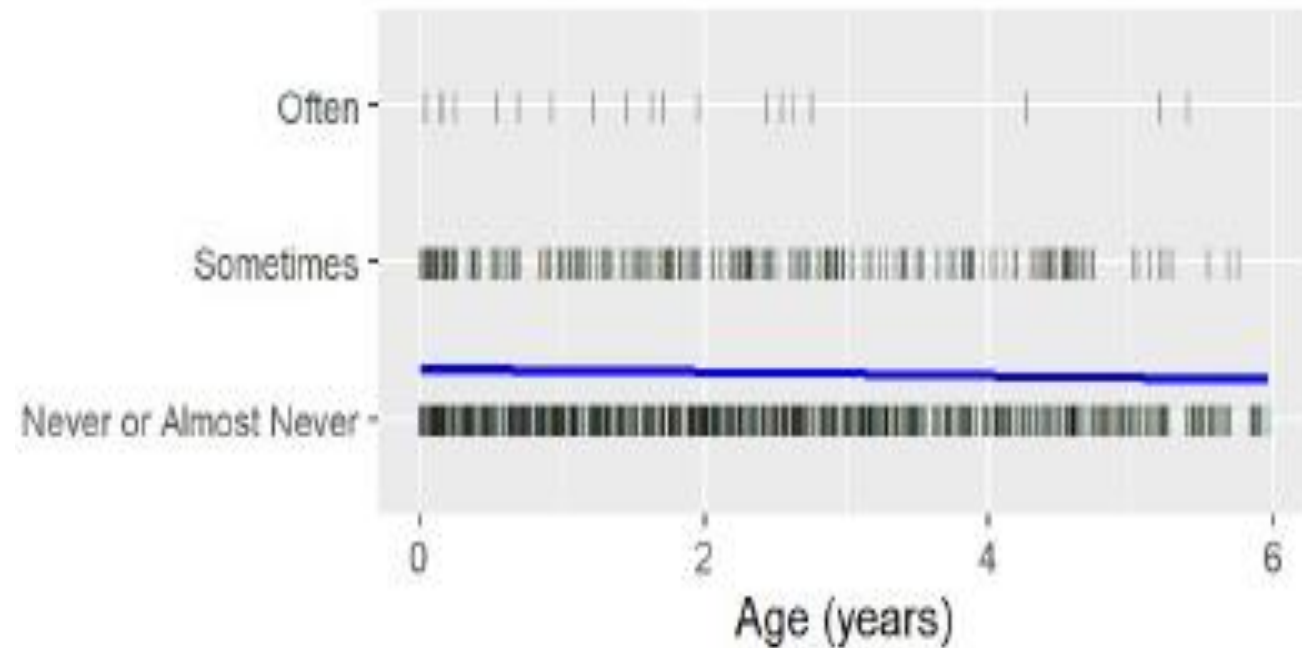
## “Milestone Item”

*Can the child put at least one piece of clothing on?*



## *vs.* “Functioning/Wellbeing Item”

*Does your child seem fussy or cry, and are you not able to console him/her?*



# Approaches to Child Development Scales

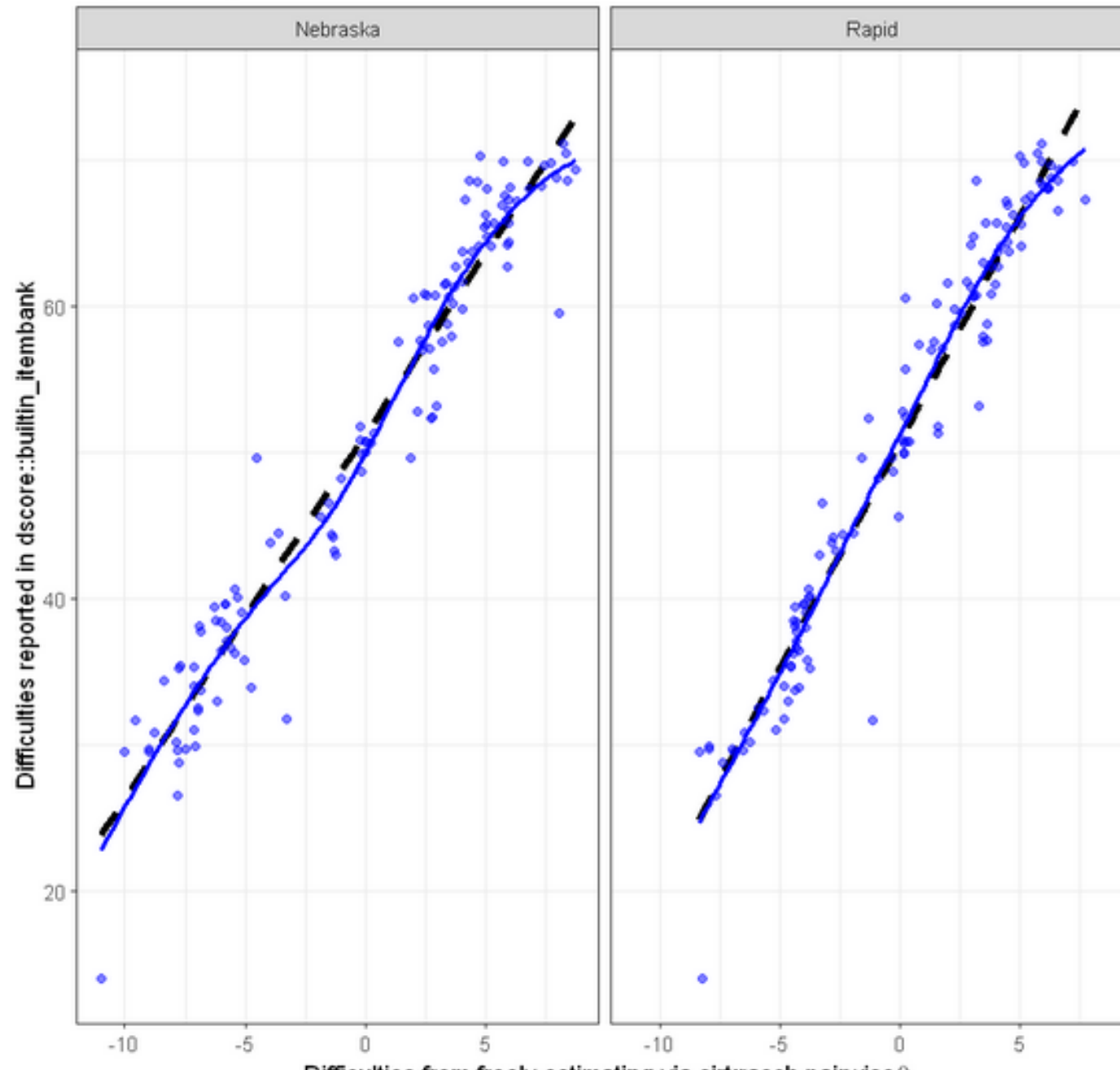
	Orientation	Instrument	Age range	Domains	Methodology
A	Developmental milestones	1. GSED Short Form	0 to 36 mo.	1. Motor 2. Cognition 3. Language 4. Socioemotional	IRT (Rasch)
B		1. GSED Short Form 2. ECDI (by UNICEF) 3. NSCH (by HUHS)	12 to 60 mo.		IRT (Mixed Format Graded Response)
C	Functioning / Wellbeing	1. GSED Psychosocial Form	<6mo to 60 mo.	1. Internalizing 2. Externalizing 3. Social competency issues 4. Feeding problems 5. Sleeping trouble	Factor analysis

# A. D-score

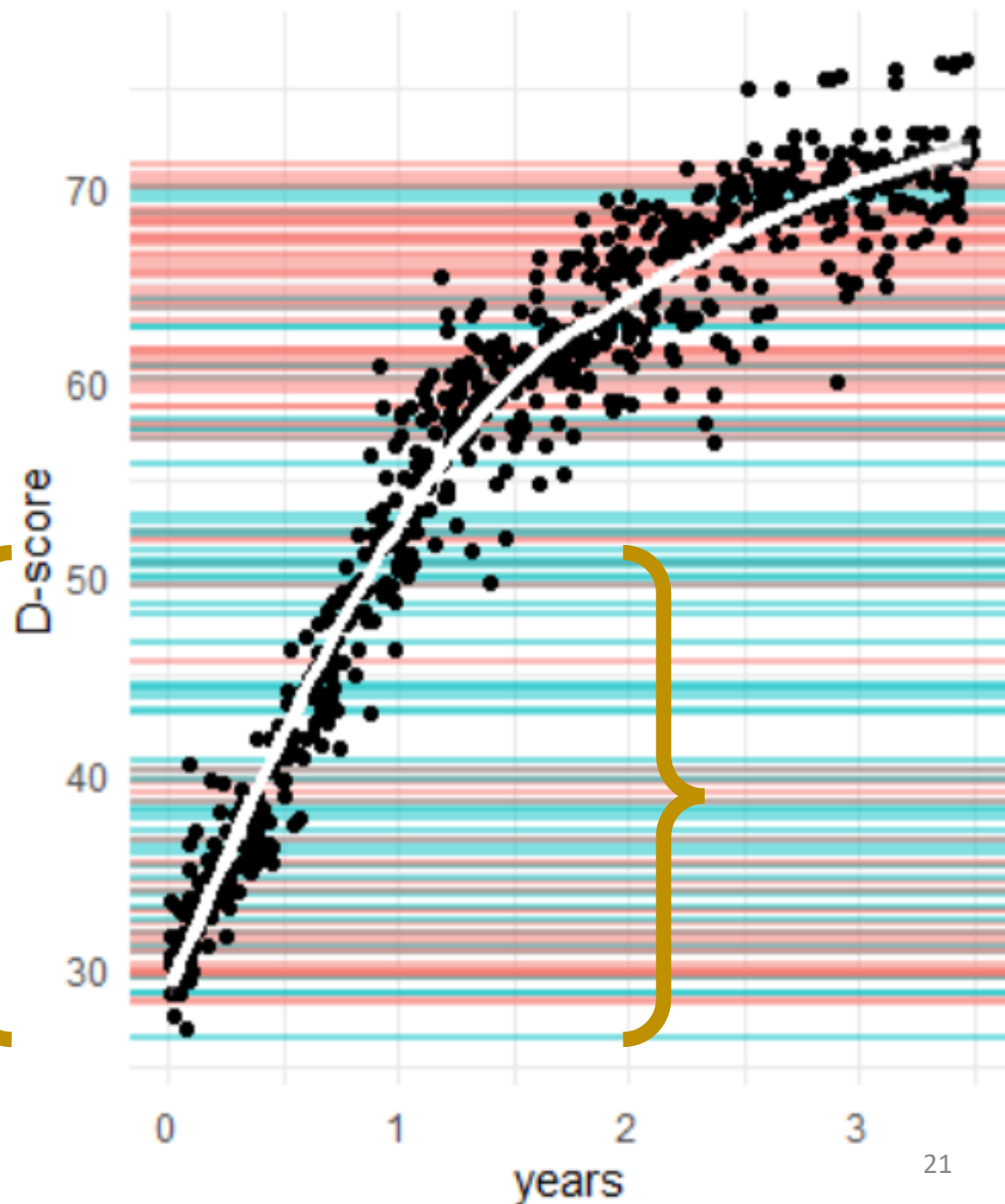
- Age range: 0-36 months (possibly 42 months)
- Originally calibrated on 73,222 children assessed on over 2275 items over 51 cohorts and 31 countries
- Framework (Measurement Tradition):
  - Rasch measurement (“Objective measurement”; “Invariant measurement”)
  - Items selected based on fit to Rasch model (i.e., *infit* and *outfit*)

Rasch model replicates!

Fig. 1: Comparison of Difficulties



# Motor Item Locations



motor  
— FALSE  
— TRUE

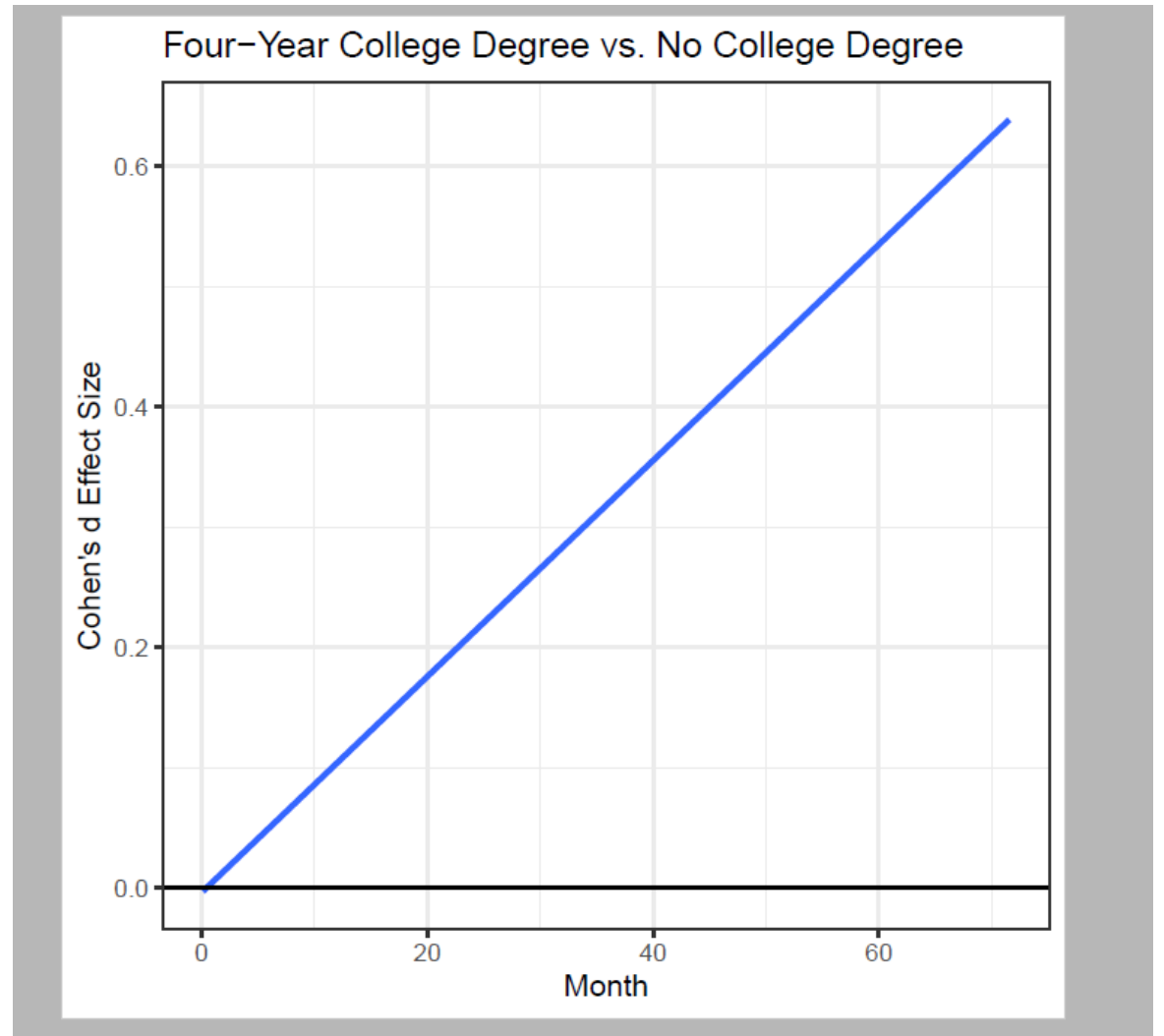
Rasch measurement heavily prioritizes motor development for youngest ages

## B. New Measure: KidPop 12m5

- Developed outside of Rasch framework to add flexibility in two areas:
  - Vertically equatable scores all the way up to 72 months using items from:
    - National Outcome Measure (NOM)
    - Early Childhood Development Index (ECDI)
  - Ability to add more non-motor items (esp. socio-emotional items) targeting youngest children
- Measurement framework: 2-PL IRT

# Criterion associations with 12m5 scale scores

- Differences in scores by caregiver education grows over time, after accounting for gender, race, income
  - Gap grows by an average of  $d = .1$  SD per year ( $p < .001$ )



- Also see positive associations between scores and positive home learning environments:
  - Home learning activities ( $\beta = .10, p < .001$ )
  - Home learning materials ( $\beta = .08, p < .001$ )

# C. GSED Psychosocial Form

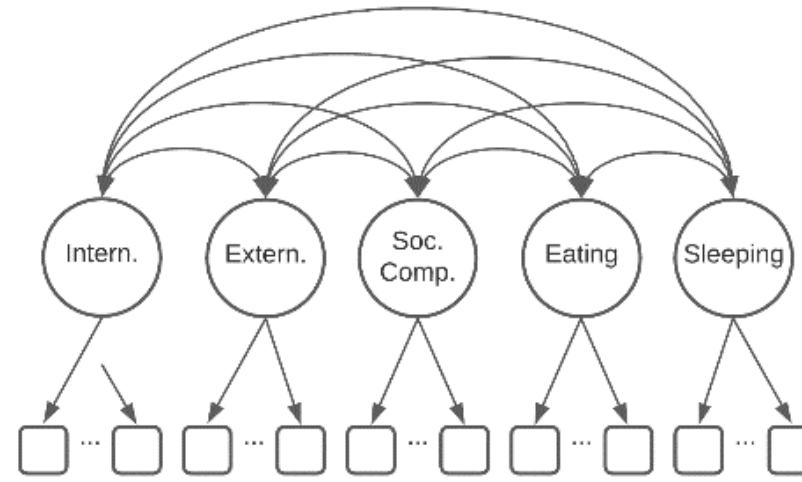
- 47 items
  - Addresses problematic behaviors and dysregulation – such as trouble sleeping, eating, regulating emotions and in social competence
- All but one negatively worded
- Nebraska is the first set of empirical response data available



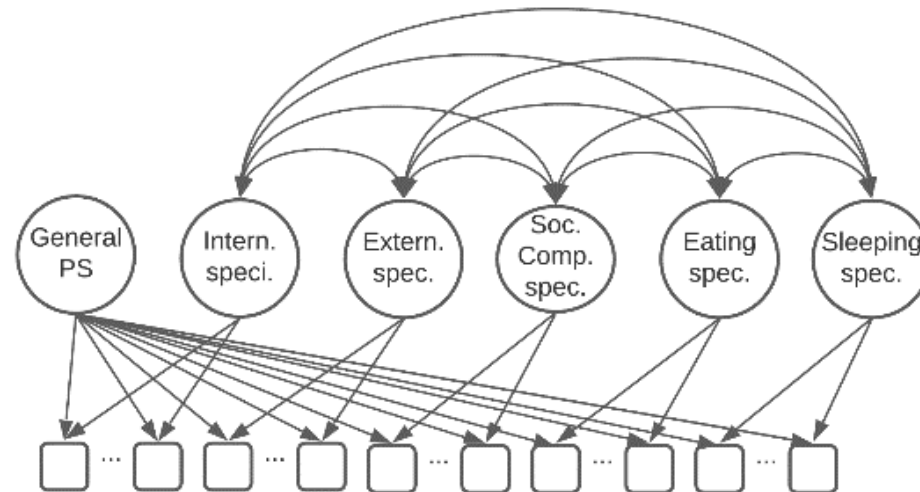
# Factor Structure

- Alternative models
- Chi-squared difference tests
- Global fit criteria

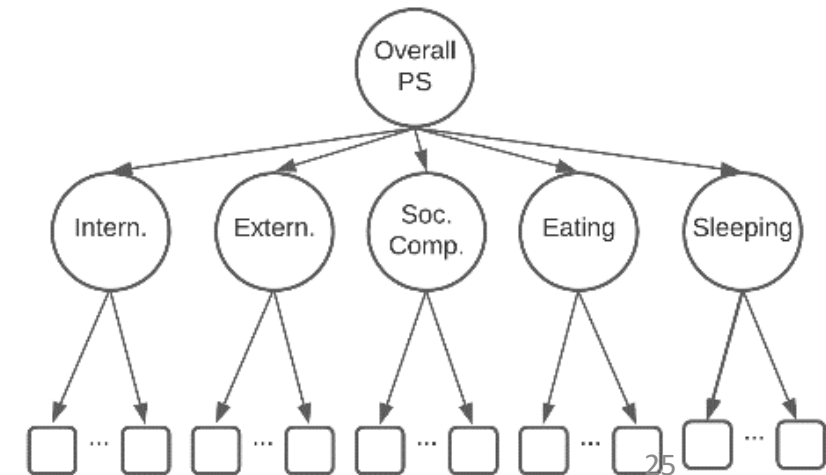
## A. 5 Factor



## B. Bifactor

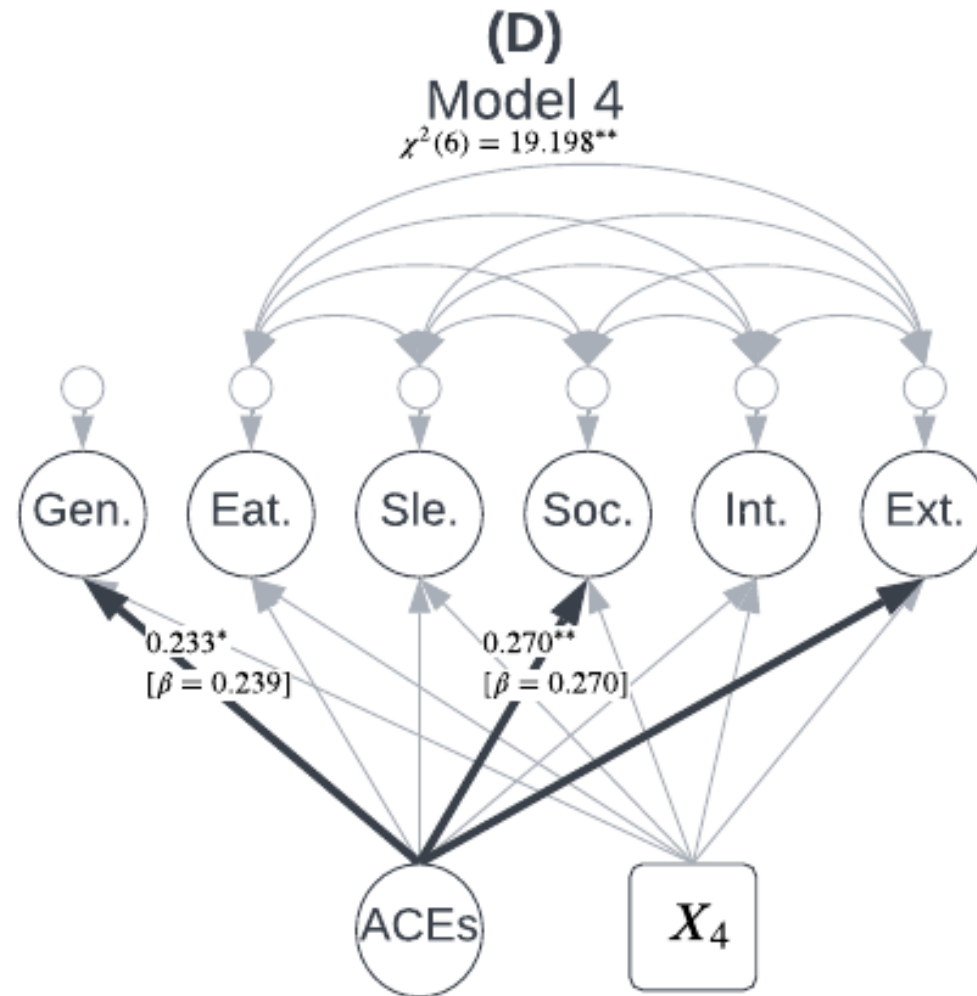


## C. Higher-order



# Psychosocial Criterion Evidence

- Expected associations with:
  - Caregiver anxiety and depression (i.e., PHQ-2/GAD-2 items)
  - Child ACEs



# Pandemic & Psychosocial Problems

Has your family had difficulty getting access to any of the following because of COVID-19?  
(Check all that apply)

- A. We did not have difficulty getting access to any of the above because of COVID-19
  - B. We had difficulty getting other essentials
  - C. We had difficulty getting health care when we needed it; We had difficulty getting medicine
  - D. We had difficulty getting food
- “0”
- “1”

Child control variables:

- ACEs,
- Age
- Sex

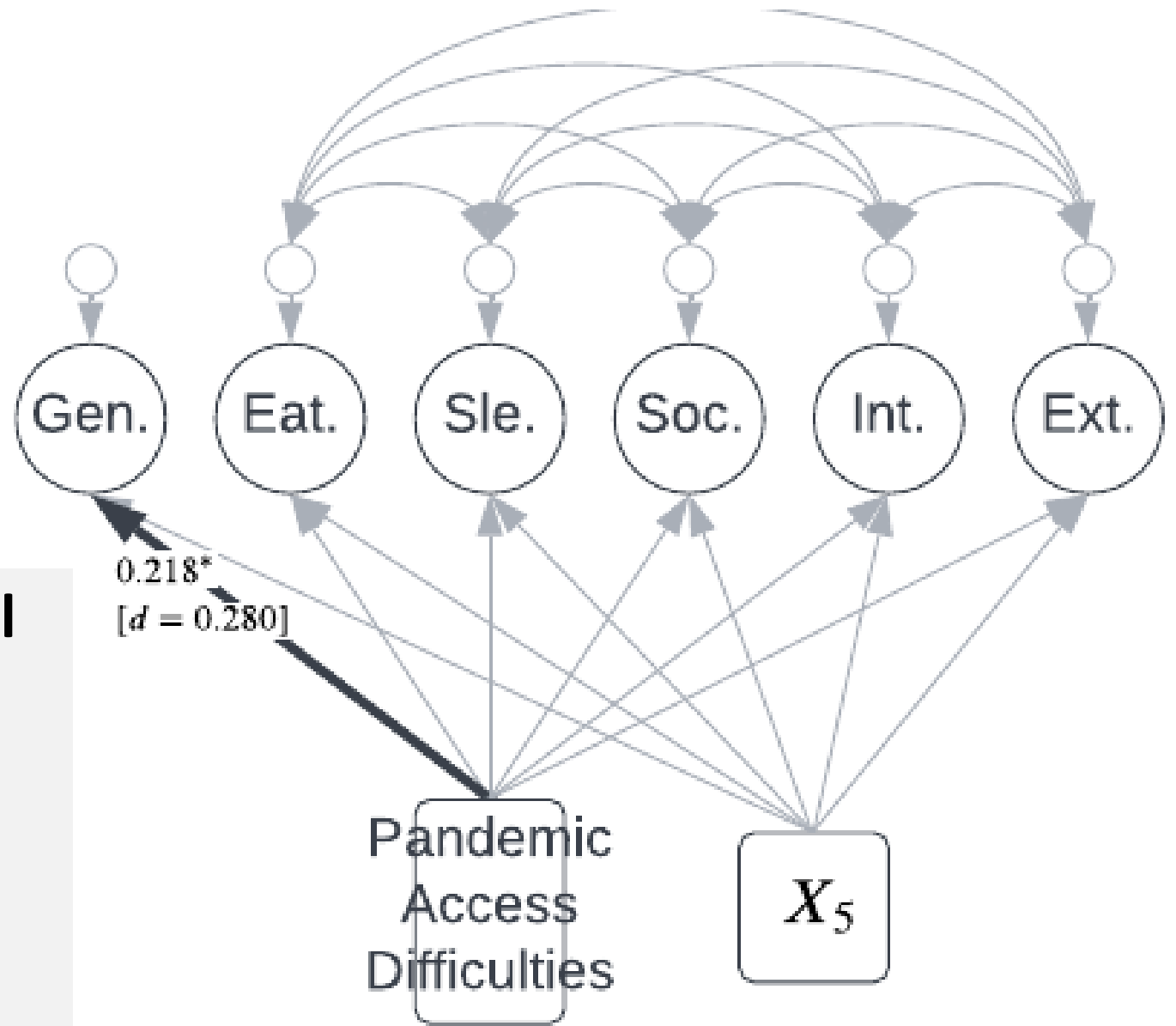
Caregiver control variables:

- Anxiety/depression
- Race/ethnicity
- Education
- Enrollment in governmental services (e.g., Medicaid, SNAP, etc.)
- Age at childbirth
- Gender

Other control variables:

- Residential location
- Month survey administered,

**On average, general psychosocial problem scores were .28 SD ( $p = .018$ ) greater for children in families that reported the pandemic lead to difficulties in access meeting basic needs.**



# Conclusions

- Feasible and inexpensive to collect detailed data on family characteristics and child development using online survey
  - Reveal patterns in equity that will likely have long-term implications for children's development
- Unequal starts in Omaha and Lincoln, especially during COVID
  - But home learning environments are powerful and predictive

# How can these data change the conversation?

- Population-level data provide insights on investments:
  - Interventions to improve home learning environments
  - Addressing food security and material hardship
- How can we use these tools to better understand policies and programs in Nebraska?

# Thank you!

We are grateful for your support

# Next Steps

Phase 2: Longitudinal Study



# Follow-Up Study: Concurrent and Predictive Validity



Time 1, *October 2020- February 2021*

## Caregiver Online Survey

- Family Characteristics
- Child Characteristics
- Experience with COVID
- Child Development
  - Global Scale for Early Development, Short Form and Psychosocial Form
  - Early Childhood Development Index
  - National Outcomes Measure
- Home Learning Environment



Time 2, *October 2021- Spring 2022*

## Caregiver Online Survey

- Items from Time 1 Survey
- **Family Functioning**
- Experiences with childcare
- Devereaux Early Childhood Assessment

## Child Direct Observation

- Bayley Scale for Infant Development IV OR Woodcock-Johnson IV Tests of Early Cognitive and Academic Development

# Significant Group Differences in Home Learning

