VALIDATION OF A PARENTAL HEALTH LITERACY MEASURE

IN A LONGITUDINAL COHORT OF YOUNG CHILDREN

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BACKGROUND

- Low parental health literacy may be associated with worse health outcomes in children
- The validity and reliability of scales measuring health literacy and numeracy skills in parents have not been robustly examined
- Limitations to most health literacy assessments
 - Ceiling effect not optimal for younger adults
 - Not measuring the full construct of health literacy
 - Neglect oral literacy, numeracy, and navigational skills



PHLAT

- The Parental Health Literacy Activities Test (PHLAT)
 - Developed specifically to measure health literacy and numeracy in young adults
 - Validated in a cross-sectional dataset of 182 English speaking and 176 Spanish speaking parents
 - Shortened to 8-items
 - Limited by sample size and lack of longitudinal data



GREENLIGHT INTERVENTION STUDY

- NIH-funded cluster randomized trial designed to evaluate the impact of a health communication/literacy intervention on early childhood obesity
 - Subsequent Greenlight Cohort





SPECIFIC AIMS

- Examine the validity and reliability of five different measures of health literacy and/or numeracy in parents of young children
 - Internal consistency reliability
 - Test-retest reliability
 - Construct validity
 - Predictive utility



STUDY DESIGN & INCLUSION CRITERIA

Study design

- Longitudinal cohort
- 865 English- and Spanish-speaking families
- Pediatric resident clinics at four academic centers
- Followed from 2 months to 2 years
 - Additional subset followed to 5 years

Inclusion criteria

- Consent from a primary caregiver
- Infant presents for 2 month well-child visit, age >6 & <16 weeks
- Caregiver ability to speak English or Spanish
- Agrees to bring child to visits until their 2 year visit



EXCLUSION CRITERIA

Exclusion Criteria

- Child exclusions:
 - Gestational age < 34 weeks
 - Birth weight < 1500 grams
 - Weight < 3rd percentile at 2 months of age
 - Diagnosis of failure to thrive, or weight down ≥ 2 percentile curves
 - Medical problems that may affect growth or diet
- Caregiver exclusions:
 - Significant visual impairment, or mental or neurologic illness
 - Age <18 years
 - Plans to leave area during study period



STUDY INSTRUMENTS

Health Literacy or Numeracy Scales

- PHLAT-8 5-7 minutes to complete
- Short Test of Functional Health Literacy in Adults (s-TOFHLA)
- Newest Vital Sign (NVS)
- Brief Health Literacy Screen (BHLS) by Chew et al
- Wide Range Achievement Test (WRAT) Arithmetic

Baseline – 2 month old	6 month old follow up	9 month old follow up	24 month old follow up
PHLAT-8	WRAT	NVS	PHLAT-8 (retest)
s-TOFHLA			
BHLS			



OUTCOME MEASURES

- Clinic show rate
 - Calculated at 2 years
 - # of actual visits / # of expected visits
- Parent's feelings of internal locus of control over their child's health
 - Measured at baseline and 2 years
 - Higher score reflecting higher sense of control



ANALYTIC PLAN

• Examine validity and reliability of the PHLAT:

- Internal consistency reliability
 - Kuder-Richardson coefficient
- Test-retest reliability
 - Spearman Coefficient
- Construct validity
 - Spearman Coefficients with education, income, other literacy instruments
- Predictive utility
 - Well child check-up show rate (calculated at 2 years)
 - Parental feelings of internal health locus of control



STUDY FLOW



DEMOGRAPHICS

Caregiver characteristics	Combined (n= 843) Mean (SD) or n (%)	Caregiver characteristics	Combined (n= 843) Mean (SD) or n (%)
Caregiver age, years	27.97 (0.38)	Educa	ation:
Mother	806 (96.6%)	- Less than HS	215 (26.5%)
Non-US born	421 (50.1%)	- HS	276 (32.9%)
Spanish primary		graduate/equivalent	
language	292 (34.6%)	- Some college	199 (23.7%)
Race/ethnicity:		- College or greater	150 (17.9%)
- Hispanic	416 (49.4%)		
- Black, Non-Hispanic	238 (28.2%)		
- White, Non-Hispanic	154 (18.3%)		
- Other, Non-Hispanic	35 (4.2%)		



DEMOGRAPHICS

Child characteristics	Combined (n= 843) Mean (SD) or n (%)	House characteristics	Combined (n= 843) Mean (SD) or n (%)
Child age (weeks)	9.29 (0.06)	Household Income (\$):	
Female	433 (51.4%)	<10,000	258 (31.8%)
WIC enrollment	127 (15.1%)	10,000 – 19,999	223 (27.5%)
Child health insurance (Total: 840)		20,000 - 39,999	199 (24.5%)
		>= 40,000	131 (16%)
- Medicaid	726 (86.4%)	Adults at home:	
- Private	89 (10.6%)	1 adult	85 (10.1%)
- None	25 (3%)	>= 2 adults	755 (89.9%)



RESULTS – PHLAT QUESTIONS

#	Question Description	% Correct baseline (n=845)	% Correct 24 mo (n=240)
1	Demonstrate how to make a 4 oz bottle using powder-based formula	88%	84%
2	Demonstrate how to make a 4 oz bottle using concentrated formula	33%	37%
3	Determine from an Ibuprofen container and medicine cap how many milliliters are in 1/2 teaspoon of medicine	61%	72%
4	Determine if vanilla wafers are safe to feed child based on nutrition label and list of child's allergies	82%	88%
5	Read a liquid antibiotic prescription and demonstrate with a syringe how to administer a dose of the medicine	54%	59%
6	Calculate the number of 2 ounce servings in a 32-ounce can of juice	53%	51%
7	Determine by nutrition label if 100% fruit or vegetable juice, contains at least 30mg of Vitamin C per 100mL, or is 120% of the daily value	56%	55%
8	Reads and comprehends instructions regarding breastfeeding	51%	54%
	Total Percentage	59.9%	62%
	(95% Cl)	(58-62%)	(59-65%)
	English	66.1%	67%
	(n=528 at 2mo; n=159 at 24 mo)	(64.1-68%)	(63-70.8%)
	Spanish	48.3% (45.3-	52%
	(n=297 at 2 mo; n=81 at 24mo)	51.1%)	(46.9-57.1%)

RESULTS- PHLAT CHARACTERISTICS

Table 3. PHLAT at Baseline – Psychometric Characteristics			
Reliability Coefficients	Spearmans (p-value)		
Internal Consistency (KR-20):	0.66		
Test-retest Reliability (n=233)	0.57(<0.001)		
Validity Coefficients			
S-TOFHLA (n=843)	0.49 (<0.001)		
NVS (n=541)	0.55 (<0.001)		
WRAT (n=684)	0.43 (<0.001)		
Parent Education (n=845)	0.40 (<0.001)		
Household Income (n=812)	0.32 (<0.001)		
Parent Age (n=839)	0.01 (0.688)		
Predictive Utility			
WCC Show rate (over first 2 years)	0.09 (0.013)		
Parental internal locus of control beliefs			
- 2 months (n=841)	0.41 (<0.001)*		
- 24 months (n=515)	0.29 (<0.001)*		

*Higher internal LOC associated with higher performance on PHLAT



RESULTS- PHLAT CHARACTERISTICS

Table 3. PHLAT at Baseline – Psychometric Characteristics			
Reliability Coefficients	Spearmans (p-value <0.001 unless noted)	English Subset	Spanish Subset
Internal Consistency (KR-20):	0.66 <i>(KR-20)</i>	0.61	0.66
Test-retest Reliability (n=233)	0.57	0.50	0.59
Validity Coefficients			
S-TOFHLA (n=843)	0.49	0.45	0.46
NVS (n=541)	0.55	0.51	0.45
WRAT (n=684)	0.43	0.39	0.32
Parent Education (n=845)	0.40	0.37	0.20
Household Income (n=812)	0.32	0.23	0.21 (p=0.003)
Predictive Utility			
WCC Show rate	0.09 (p=0.013)	0.14	not significant
Parental feelings of IHLOC			
- 2 months (n=841)	0.41	0.39	0.24
- 24 months (n=515)	0.29	not significant	not significant

CONCLUSIONS

- Poor health literacy is common in parents of young children
- PHLAT demonstrates good reliability and validity in parents of young children
 - Fair predictive utility when predicting well child check-up show rates and parental feelings of internal health locus of control
 - Valid in both English and Spanish
 - Preferable content and face validity in pediatric research



LIMITATIONS

- Respondents are mostly mothers with lower socioeconomic status, which may limit the generalizability
- Caregiver skills tested in a clinical setting, may not reflect everyday behaviors
- Potential confounding not addressed in these results



FUTURE DIRECTIONS

- The PHLAT could be useful as a marker to predict families with children at risk of poor health outcomes
- Additional sub-set of families followed through five years
 - Further analysis of predictive utility for the PHLAT
 - Could add to the predictive utility of the PHLAT, and strengthen utility as a tool to identify low-literacy families at risk of poorer outcomes
- Examine the validity, reliability, predictive utility of the other health literacy or numeracy instruments collected in this cohort (s-TOFHLA, NVS, BHLS, WRAT)



ACKNOWLEDGEMENTS



- Funding:
- NIH/NICHD R01 HD059794 (Perrin, Rothman, Sanders, Delamater, Yin)
- NIH UL1TR001111
- NIH (NICHD and OBSSR), CDC supplements to (R01HD059794-04S1, R01HD059794-04S2) (Perrin)
- NIH/NCRR U54 RR023499
- RWJF PFSP (Yin)
- HRSA 5T32HP014001
- NIH 5T32CA154267-05 (Watson)



ACKNOWLEDGEMENTS

Vanderbilt

Russell Rothman MD, MS (PI) Debra Friedman, MD Ken Wallston, PhD Shari Barkin MD, MHs Barron Patterson MD Seth Scholer MD, MPH Sunil Kripalani MD Jonathan Schildcrout PhD Aihua Bian MS Jeremy Stephens BS Ayumi Shintani PhD Svetlana Eden MPH Bettina Beach PhD (Wake Forest) Richard White MD (Meharry) Alexandra Arriaga BS Marina Margolin BA Phil Ciampa MD Disha Kumar MD

NYU

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UNC

Eliana Perrin MD, MPH (PI) Sophie Ravanbakht BA Charles Wood MD, MPH Asheley Skinner PhD (Duke) Callie Brown MD Kori Flower MD, MPH Kaitlin Rawluk MD Kristen Rogers MD Carol Runyan PhD (Denver) Michael Steiner MD Arlene Chung MD, MHA Tamera Coyne Beasley MD, MPH Maureen Ben-Davies MD Marianna Garretson PhD Brenda Calderon BA Joann Propst-Finkle JD, RN Beth Throop BA Camilla Peterson BS

Miami

Alan Delamater PhD (PI) Daisy Ramirez Ortiz MPH Anna Maria Fernandez PhD Lourdes Forster MD Randi Sperling MD Sarah Messiah PhD Sheah Rarback RD Stephanie White MD Shereen Alavian MD Lucila Bloise MPH Daniela Quesada MPH Carolina Rios MS Yaray Agosto BS Erika Givens BA

Stanford

Lee Sanders MD, MPH (PI) Tom Robinson MD, MPH Nathan Shaw BA

THANK YOU

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