Measuring Nutrition Literacy

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Audience Participation!

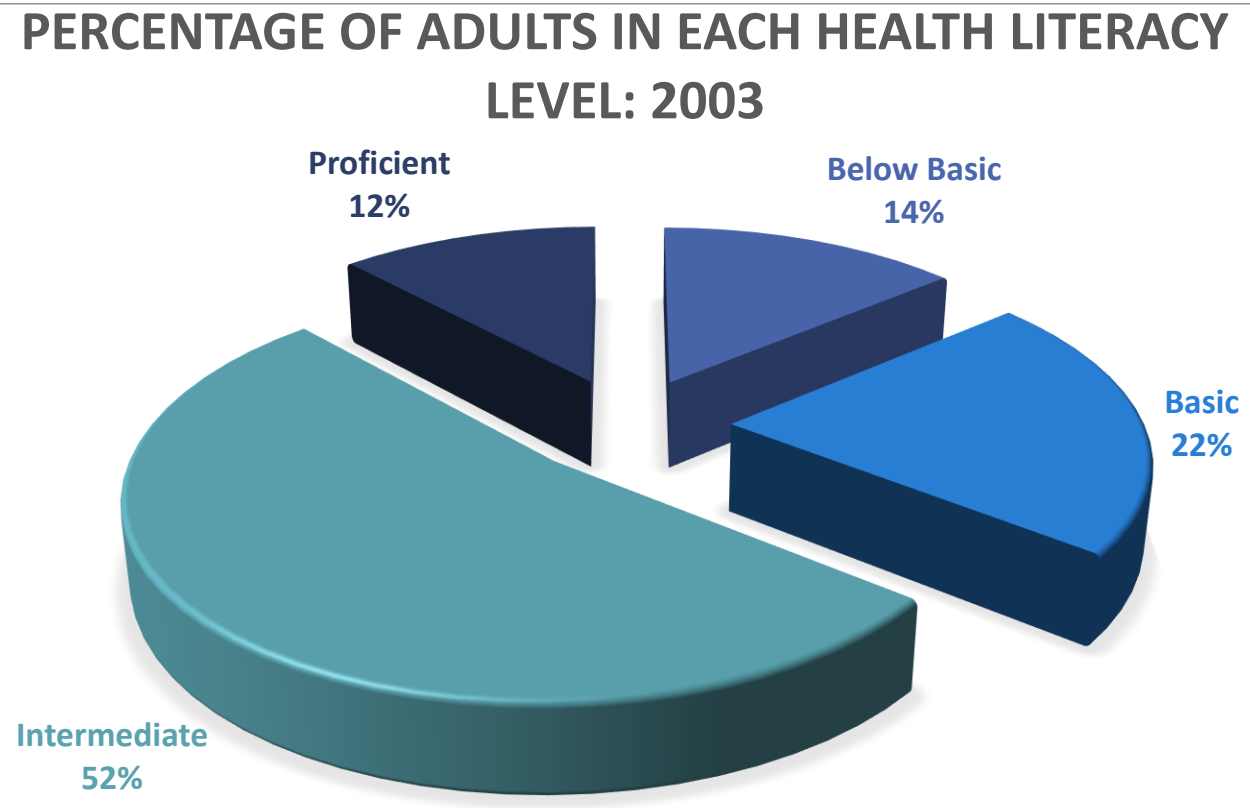
Using 2-3 words, describe “health literacy”

To participate:

1. Text ‘heathergibbs494’ to ‘37607’ (to join)
2. Text your answer

https://www.polleverywhere.com/free_text_polls/7xFXYdTly7hknGs

Prevalence of Low Health Literacy



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US Department of Education, 2006

Associations of Low Health Literacy

Decreased knowledge of illness and management

Increased hospitalization rates

Decreased use of preventive care services

Increased cost of health care

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Neilson-Bowman, Institute of Medicine, 2004

Outcomes in Patients With Low Health Literacy

Good Evidence
Higher all-cause mortality rates of elderly persons
Moderate Evidence
Increased use of emergency care and hospitalizations
Lower probability of mammogram screening and flu vaccinations
Poorer skills associated with taking medications
Poorer interpretation of medication or nutrition labels
Poorer health status among elderly persons

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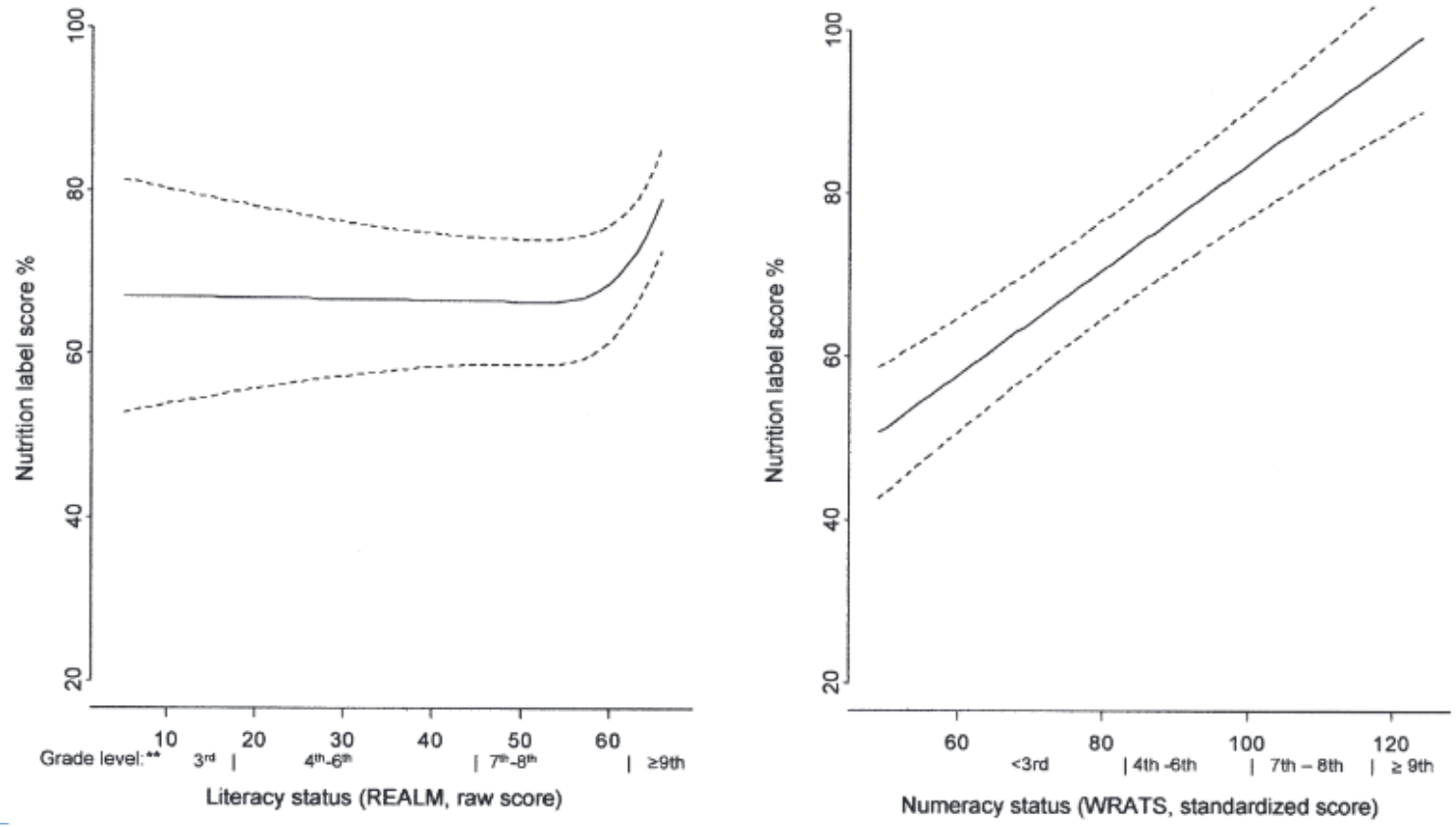
Note: Emerging evidence that health literacy may mediate racial disparities in health outcomes

Berkman et al. 2011

Health Literacy and Food Label Reading



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Rothman, 2006

Health Literacy and Portion Sizing

½ cup cranberry juice

1 cup cooked pasta

½ cup pineapple

3 oz cooked ground beef

Overestimation of a single food serving was more likely in those with low health literacy ($p<0.001$) or numeracy ($p=0.008$)

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Huizinga, 2009; public domain photos

Health Literacy and Eating Habits

Table 2. Healthy Eating Index (HEI) scores and sugar-sweetened beverage (SSB) intake in relation to health literacy categories (n=376)

Score	Maximum Score	Overall (n=376)	Category 1[a]: High likelihood of limited health literacy (n=195)	Category 2[a]: Possibility of limited health literacy (n=83)	Category 3[a]: Adequate health literacy (n=98)	*P* value
		← *mean±standard error* →				
Total HEI score	100	52.5±10.5	51.4±10.4	51.5±10.6	55.5±10.3	1<3**; 2<3*
Total fruit (includes 100% juice)	5	2.9±1.6	2.9±1.6	2.7±1.6	2.9±1.6	NS[b]
Whole fruit (not juice)	5	2.3±1.7	2.2±1.6	2.0±1.5	2.6±1.8	2<3*
Total vegetables	5	2.8±1.2	2.6±1.2	2.7±1.1	3.1±1.1	1<3**
Dark-green and orange vegetables and legumes	5	1.4±1.2	1.4±1.2	1.4±1.2	1.6±1.1	NS
Total grains	5	4.1±1.0	4.1±1.0	4.0±1.0	4.2±0.9	NS
Whole grains	5	1.5±1.4	1.4±1.4	1.4±1.4	1.7±1.3	NS
Milk	10	4.7±2.8	4.5±2.8	4.6±2.7	5.3±2.8	NS
Meat and beans	10	9.3±1.5	9.3±1.5	8.9±1.8	9.5±1.2	2<3*
Oils	10	5.9±2.5	5.4±2.4	6.3±2.8	6.5±2.3	1<3**; 1<2*
Saturated fat	10	5.3±3.2	6.0±3.0	5.1±3.5	4.3±3.2	1>3
Sodium	10	3.2±2.7	3.2±2.8	3.7±2.8	2.7±2.3	NS
Solid fat, alcohol, and added sugar	20	9.2±5.4	8.4±5.4	8.8±5.5	11.1±4.9	1,2<3**
SSBs (kcal/d)	N/A	192±357	230±426	197±315	111±195	1>3**

[a]Assessed using the Newest Vital Sign: 0-1 correct answers=high likelihood of limited literacy, 2-3 correct answers=possibility of limited literacy, and 4-6 correct answers=adequate literacy skills.
[b]NS=not significant.
*$P<0.05$.
**$P<0.01$.

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Zoellner, 2011

What is “nutrition literacy”?

“the degree to which individuals have the capacity to obtain, process, and understand nutrition information and skills needed in order to make appropriate nutrition decisions”

- Conceptual nutrition knowledge
- Functional capabilities (skill)

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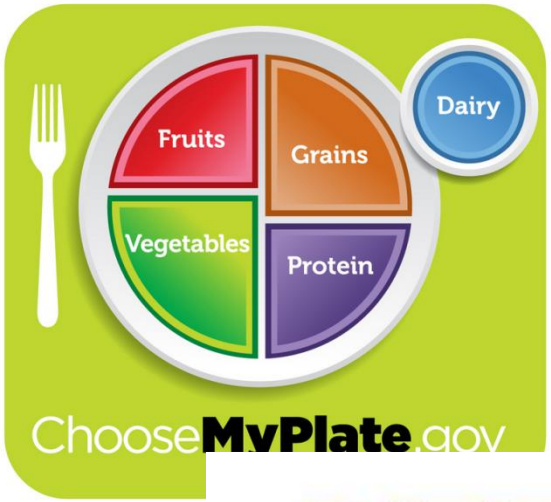
Silk, 2007




The 1/3lb. Thickburger® Shown

DIETARY GUIDELINES FOR AMERICANS 2015-2020

EIGHTH EDITION

Nutrition Facts	
Serving Size 8 g	
Serving Per Container 1	
Amount Per Serving	
Calories 0	
	% Daily Values*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Potassium 34mg	**1%**
Sodium 1mg	**0%**
Total Carbohydrate 6g	**2%**
Dietary Fiber 4g	**16%**
Sugars 0g	
Protein 0g	**0%**
Vitamin A 0% •	Vitamin C 1%
Calcium 8% •	Iron 4%
Vitamin E 1% •	Vitamin K 3%
Niacin 1% •	Phosphorus 1%
Magnesium 1% •	Zinc 1%
Manganese 70%	

Assessment Tools

GENERAL HEALTH LITERACY

Rapid Estimate of Adult Literacy in Medicine[1] (REALM)

Test of Functional Health Literacy in Adults[2] (TOFHLA)

Shortened-TOFHLA[3]

NUTRITION RELATED

Newest Vital Sign[4] (NVS)

Diabetes Numeracy Test[5] (DNT)

Nutrition Literacy Scale[6] (NLS)

Critical Nutrition Literacy[7]

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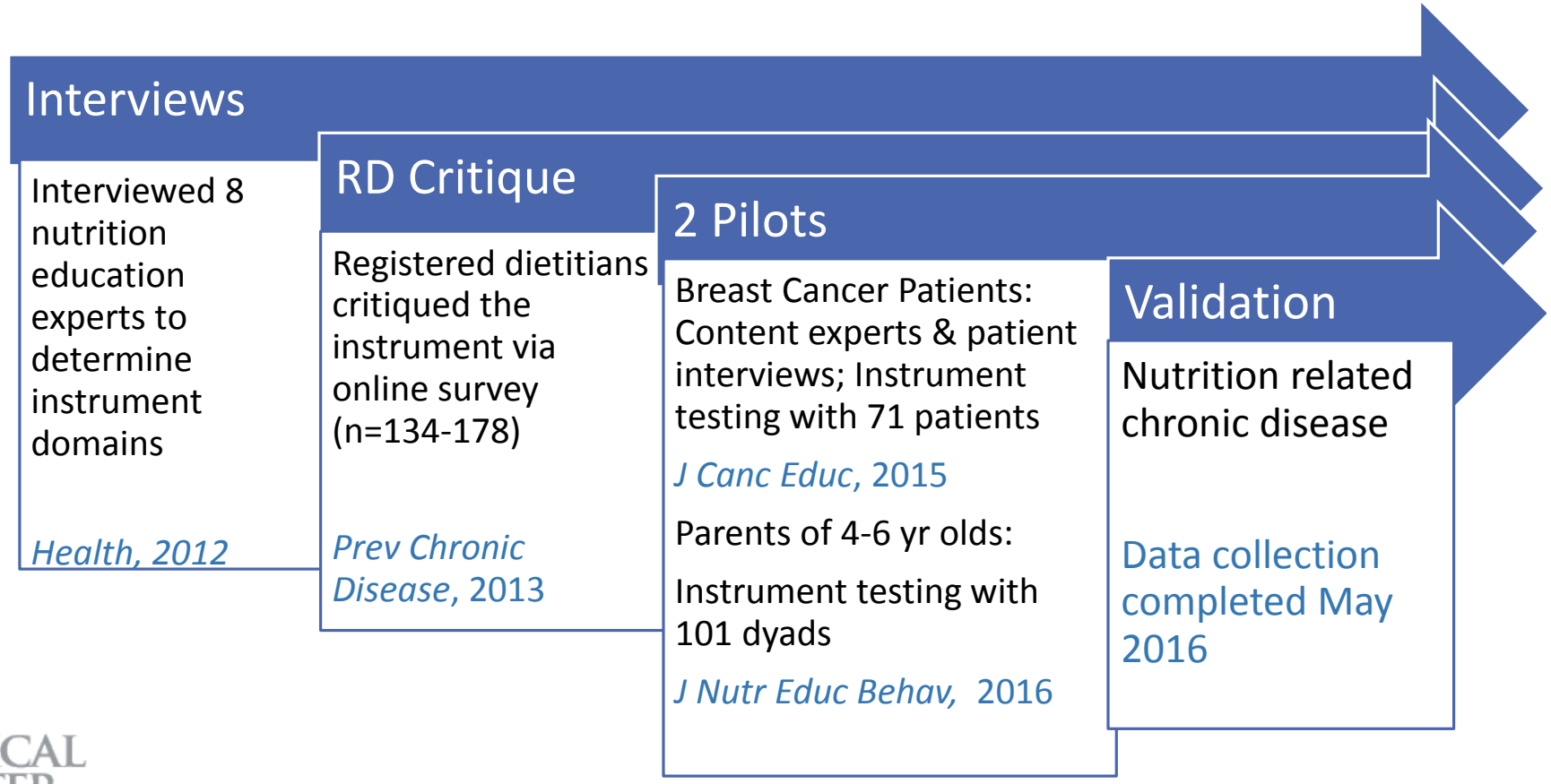
[1]Davis, 1993; [2]Parker, 1995; [3]Baker, 1999; [4]Weiss, 2005; [5]Huizinga, 2008; [6]Diamond, 2007; [7]Guttersrud, 2014

Development of a Measure of Nutrition Literacy (NLit)



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Domains of Nutrition Literacy

NUTRITION KNOWLEDGE

Nutrition and Health

Energy Sources in Food

Food Groups

NUTRITION SKILL

Household Food Measurement

Food Label and Numeracy

Consumer Skills

Goal Length: 6 items per domain (36 items total)
Administered online or in print

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NLit Example:
Household Food Measurement Domain

Chicken thigh (3 ounces meat) Chicken quarter (5 ounces meat) Chicken half (10 ounces meat)

2. Using the photos above, choose the right portion for chicken:
A. thigh (3 ounces)
B. quarter (5 ounces)
C. half (10 ounces)

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NLit Example: Food Label & Numeracy Domain

This Nutrition Facts Panel at right is taken from the back of a container of macaroni and cheese.

1. How many calories will you eat if you eat the whole container?
   - A. 250 calories
   - B. 500 calories
   - C. 700 calories
   - D. 750 calories

2. If you are trying to eat fewer than 500 mg of sodium per meal, how many cups of this food can you eat if you eat nothing else at the meal?
   - A. 1 cup
   - B. 2 cups
   - C. 3 cups
   - D. 4 cups

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container about 2

Amount Per Serving

Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	**18%**
Saturated Fat 3g	**15%**
Trans Fat 3g	
Cholesterol 30mg	**10%**
Sodium 470mg	**20%**
Total Carbohydrate 31g	**10%**
Dietary Fiber 0g	**0%**
Sugars 5g	
Proteins 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

For educational purposes only. This label does not meet the labeling requirements described in 21 CFR 101.9.

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NLit Example:
Consumer Skills Domain

1. If calories are equal for one serving of each food, which provides the most healthful nutrients overall?

A. Applesauce with no sugar added
B. Apple
C. Applesauce with no sugar added is equal to an apple in nutrition.

Applesauce with no sugar added


Apple

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NLit Validation Study Aims

1. Revise the NLit based upon feedback from nutrition experts and members of the target audience (patients).
2. Evaluate the validity and reliability of the revised NLit.

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Revision Process

- Breast Ca Pilot Content Validity Index = 0.93
- Chronic Disease Content Validity Index = 0.90

- ‘Energy density’ and ‘nutrient density’ are difficult terms
- Actual portions consumed may be a reference if people do not know recommended portions
- Calculating % (food label application) was not attempted by some

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Strength of relationships between instrument domains and diet quality

NLit-BCa Domain	General linear model		Education and race controlled	
	Estimate	*P* value	Estimate	*P* value
Nutrition & Health	3.289	0.124	2.988	0.223
Macronutrients	2.481	0.040*	2.356	0.108
Household Food Measurements	2.724	0.025*	2.486	0.066
Food Label & Numeracy	2.795	0.003*	3.562	0.004*
Food Groups	1.607	0.018*	1.645	0.021*
Consumer Skills	2.870	0.007*	2.838	0.009*

*$P<0.05$

Data for 71 breast cancer patients (17 primary prevention, 54 survivors)

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Gibbs, J Canc Educ, 2015

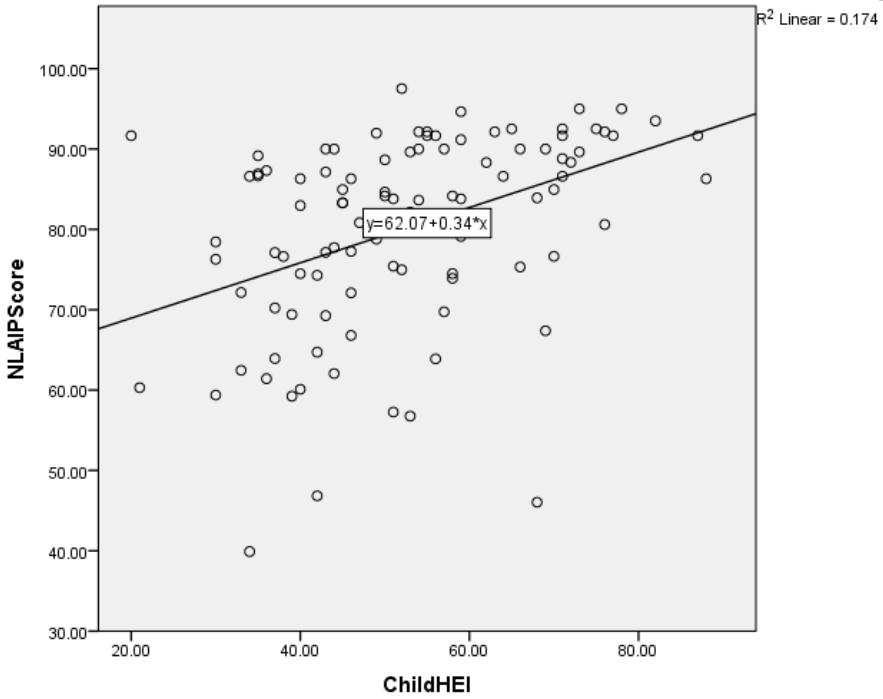
Nutrition Literacy is Related to Diet Quality

101 parent-child dyads

Parent nutrition literacy assessed by NLit-P

- 42 items
- 5 domains

Child (4.9 ± .7 yrs) diet quality assessed by Healthy Eating Index-2010 score from 2, 24-hour recalls



Every 1% increase in parental nutrition literacy = 0.51 increase in child Healthy Eating Index (R^2=0.174, p<0.001)

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Gibbs, et al. *JNEB,* 2016

NLit Validation Initial Findings

Closing Thoughts

Uses for nutrition literacy assessment:

- Research: tool for nutrition literacy identification
- Practice: identify deficits and determine educational messages
- Outcome measure for targeting improved nutrition literacy

Efforts to improve diet quality may include improving nutrition literacy

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Acknowledgements

KUMC Research Team: Debra Sullivan, PhD, RD; Edward Ellerbeck, MD, MPH; Byron Gajewski, PhD; Christie Befort, PhD; Susan Harvey, PhD, CHES; Amy Kennett, MS, RD: Beth Kerling, MS, RD; Jocelyn Thodosoff, MS, RD; Sarah Owens, MS, RD; Katie George, MS, RD; Juliana Camargo, MPH; Jolyn Mortenson, MS, RD; Shelby Courtright, MS, RD

University of Illinois: Karen Chapman-Novakofski, PhD, RD

Research efforts supported in part by:

- Eunice Kennedy Shriver National Institute of Child Health and Human Development (1R03 HD081730)
- American Cancer Society grant (IRG-09-062-04), awarded to the University of Kansas Medical Center
- Frontiers: The Heartland Institute for Clinical and Translational Research which is supported by a CTSA grant to the University of Kansas Medical Center from the NIH National Center for Advancing Translational Science (NCATS; grant # UL1TR000001)