

Measurement Issues of Health Literacy in the Context of Chronic Disease Management : examples of linguistically isolated immigrant populations :

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Conflict of Interest

- None

Objectives

- Briefly review the major HL measurement issue related with intervention research and practice
- Discuss the process of developing and validating disease specific health literacy measurement tool using real study examples

Health literacy ! What's really about ?

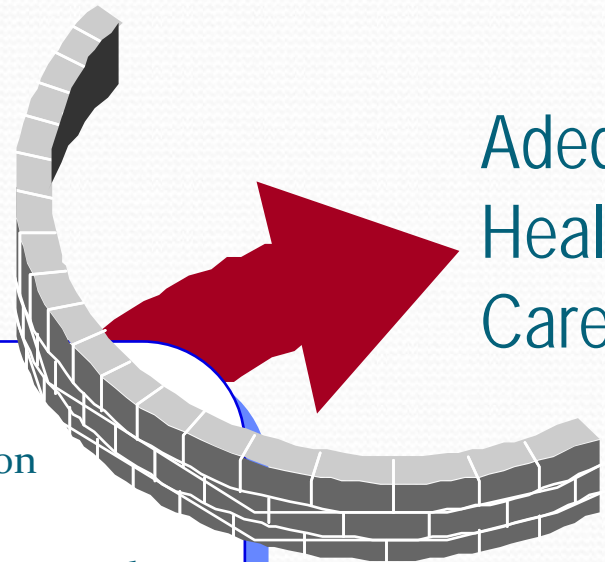
Individual

- Language
- Transportation
- Fear or being intimidated
- by main health care system



Psychological

- Feeling of marginalization
- Loss of self-confidence
- Role conflict /dependency on others
- “Do not want to be a burden to family”
- Depression



Adequate
Health
Care

Environmental/financial

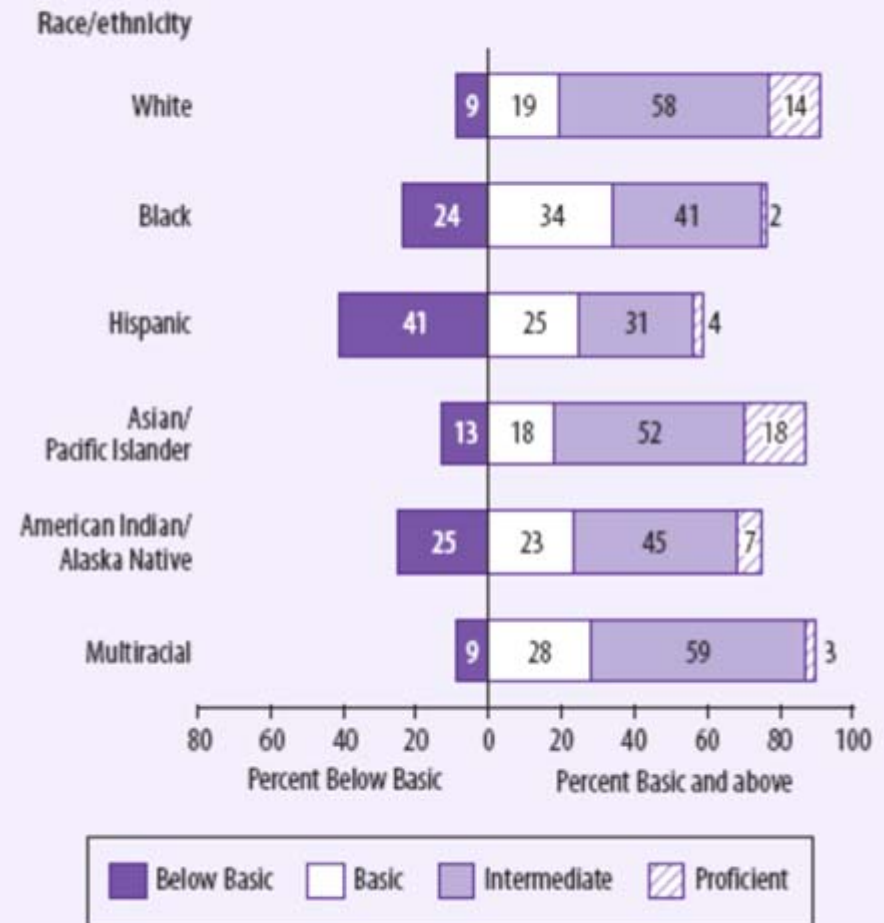
- Safety
- Cost of medication
- Access to health care

Sources: Lee HB, et al. Psychiatry Investig. 2008;5:14-20.
Kang JH, et al. Ethn Dis. 2006;16(1):145-51.

Extent of Limited Health Literacy by Race/Ethnicity

- Ethnic minorities have a higher percentage of below basic health literacy than Whites
- Hispanics, American Indians/Alaskan Natives and Blacks most affected

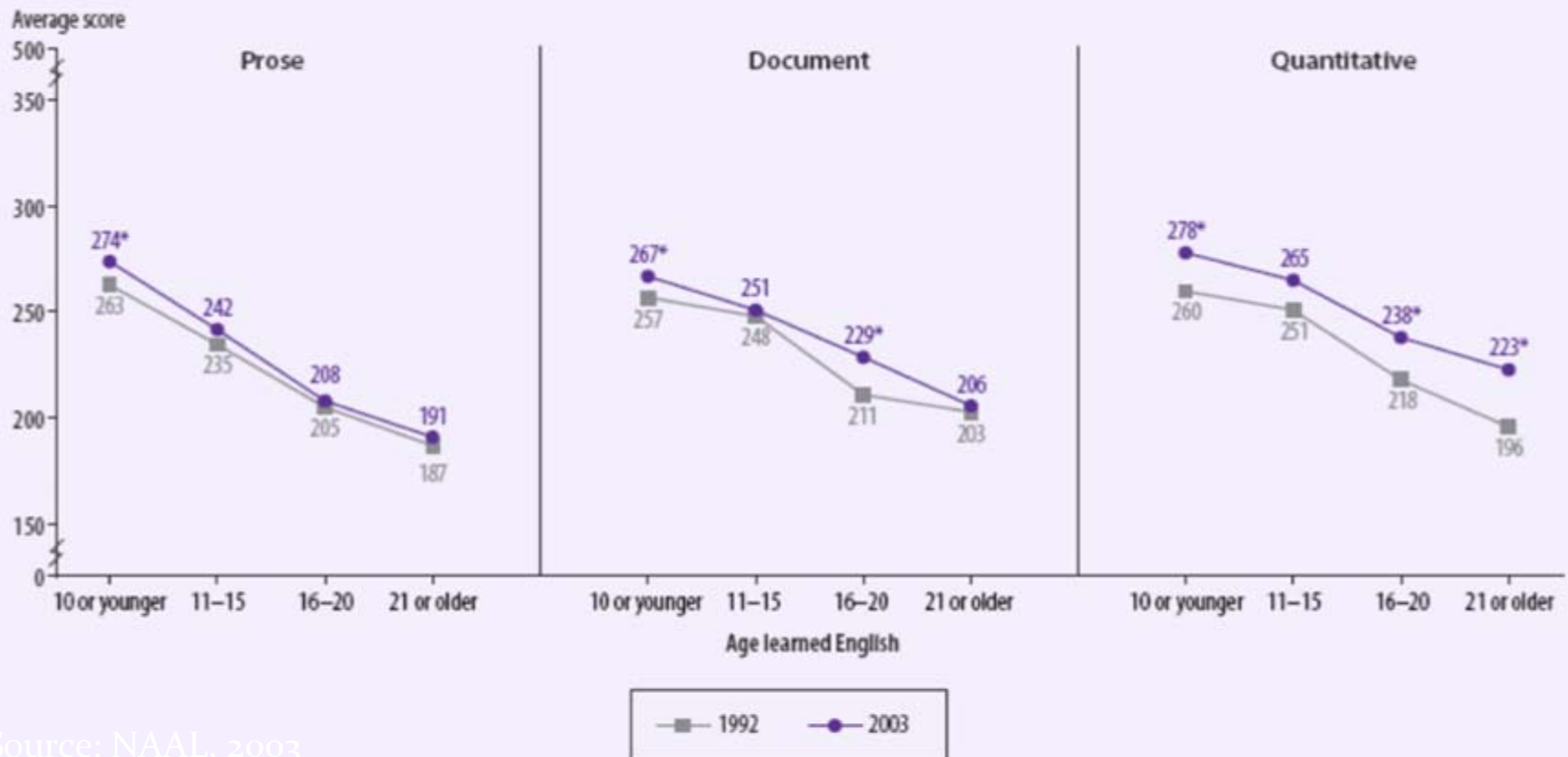
Figure 2-5. Percentage of adults in each health literacy level, by race/ethnicity: 2003



Source: NAAL, 2003

Health Literacy in ESL

Figure 2-11. Average prose, document, and quantitative literacy scores of adults who spoke a language other than or in addition to English before starting school, by age learned English: 1992 and 2003



Source: NAAL, 2003

- Adults who learn English at a later age, have lower literacy scores than those who learn English at an earlier age

Major Barriers to Adequate Health Care for Immigrant populations in US (Korean and Vietnamese Americans)

Individual

- Language
- Transportation
- Fear or being intimidated
- by main health care system

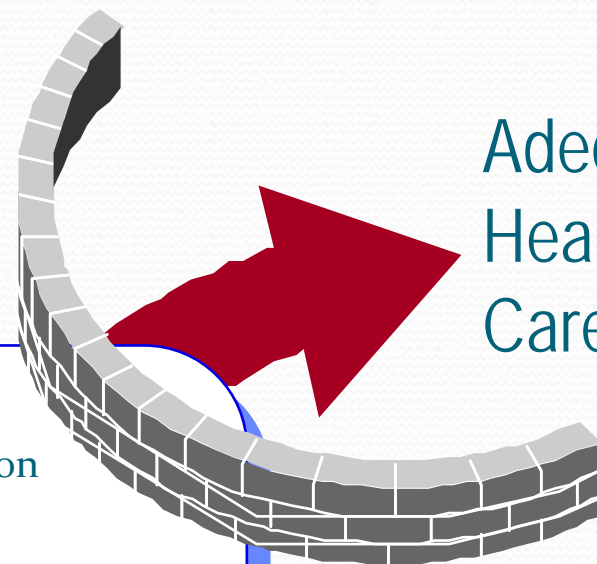


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Adequate
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Care

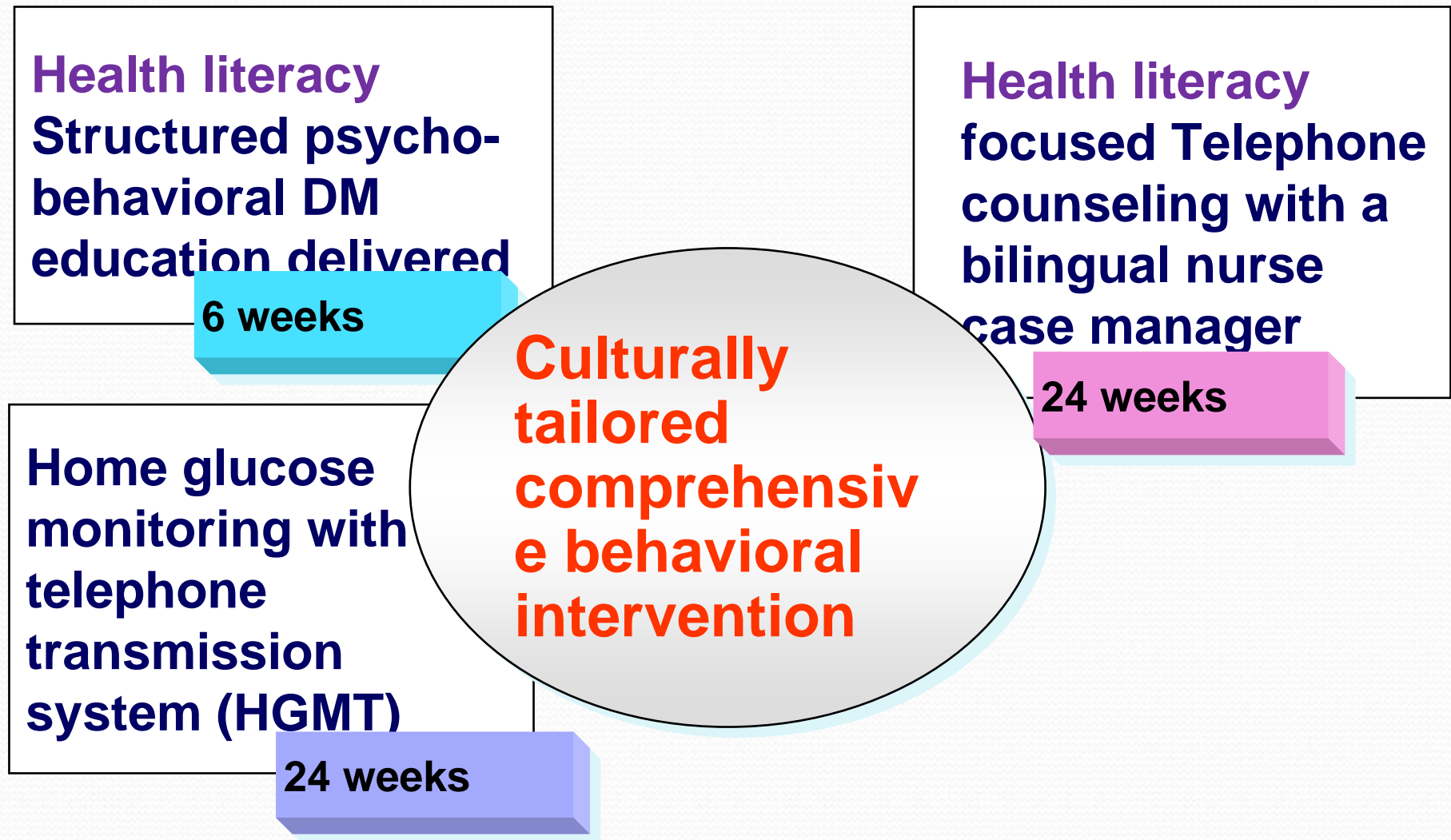


Environmental/financial

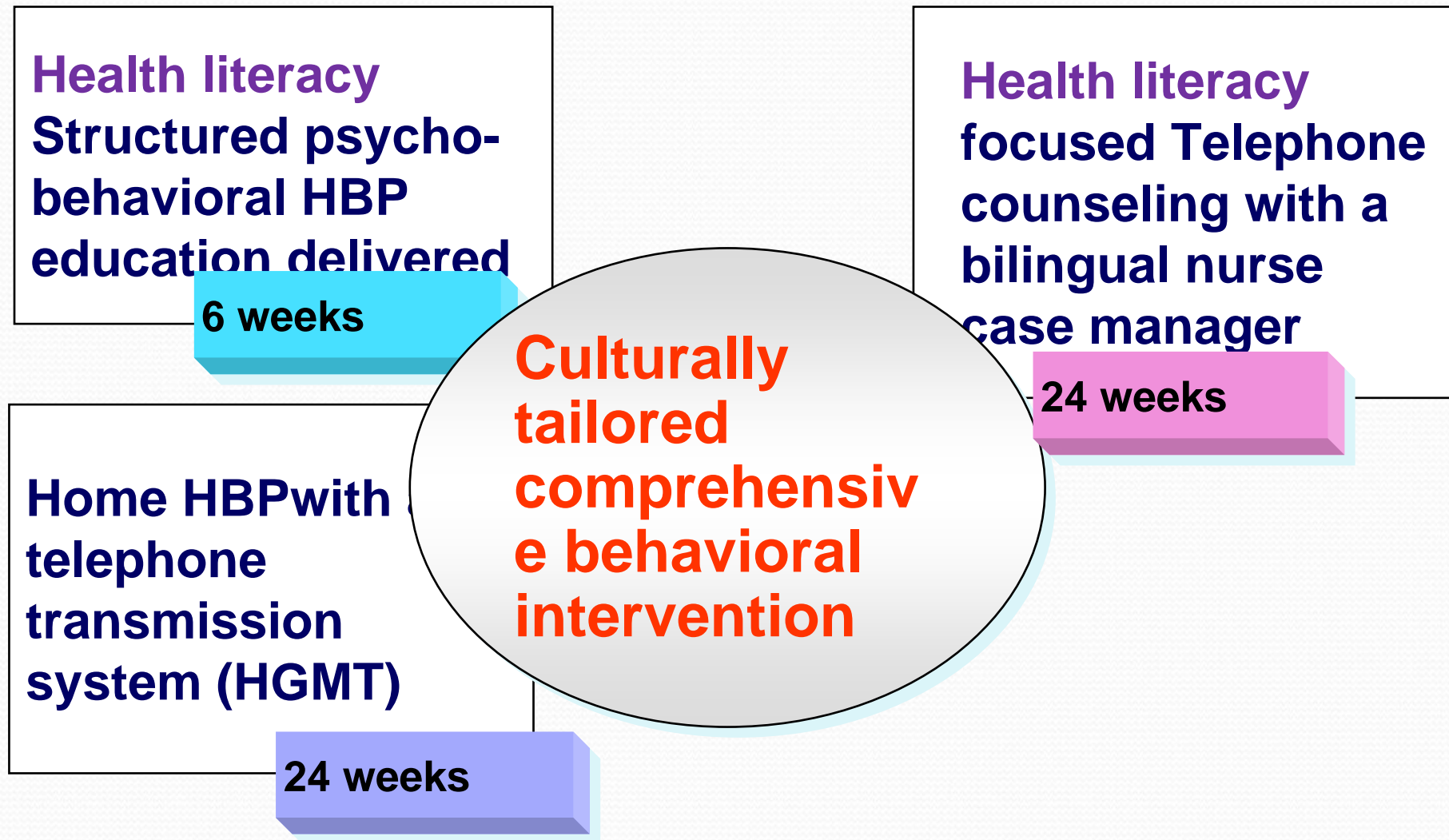
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Intervention Strategies



Intervention Strategies



Intervention Materials for Health Literacy

Health literacy word slides

Diabetes

🔊 다이아비티스
(당뇨병)



Insulin

🔊 인슐린
(인슐린)



Medication

🔊 메디케이션
(약)



Obesity

🔊 오비씨리
(비만)



Calorie

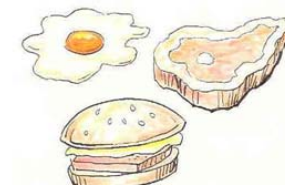
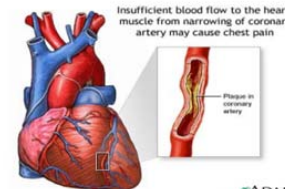
🔊 칼로리
(열량)

Nutrition Facts	
Serving Size 23g	
Servings per Container about 6	
Amount Per Serving	
Calories 100	Calories from Fat 20
% Daily Value*	
Total Fat 2g	3 %
Saturated Fat 0g	0 %
Trans Fat 0g	0 %
Cholesterol 0mg	0 %
Sodium 160mg	7 %
Total Carbohydrate 20g	7 %
Dietary Fiber 1g	3 %
Sugars 9g	
Protein 1g	
Vitamin A 0 %	Calcium 0 %
Vitamin C 0 %	Iron 6 %



Cholesterol

🔊 콜레스테롤



Intervention Materials for Health Literacy

English Dialogue slides

Dialogue (대화)



Doctor (의사):

Hello, Mrs. Kim.

헬로우, 미세스 김.

How are you?

하우 아 유?

Mrs. Kim (미세스 김):

I am OK in general.

아이 엠 오케이 인 제너럴.

Doctor (의사):

We have to run some tests to see how your diabetes is doing.

워 해브 투 런 썸 테스트 투 씨 하우 유어

다이하비티스 이즈 두잉.



Major barriers to implement HL focused intervention

- Limitation on outcome measurement
 - * Sensitivity to capture the intervention effect
 - * Global measure vs. disease specific instrument
- Researcher skepticism :

“Can Health Literacy be improved by a short-term intervention?”

Major methodological contributors of false “ non-significant ” findings in intervention research

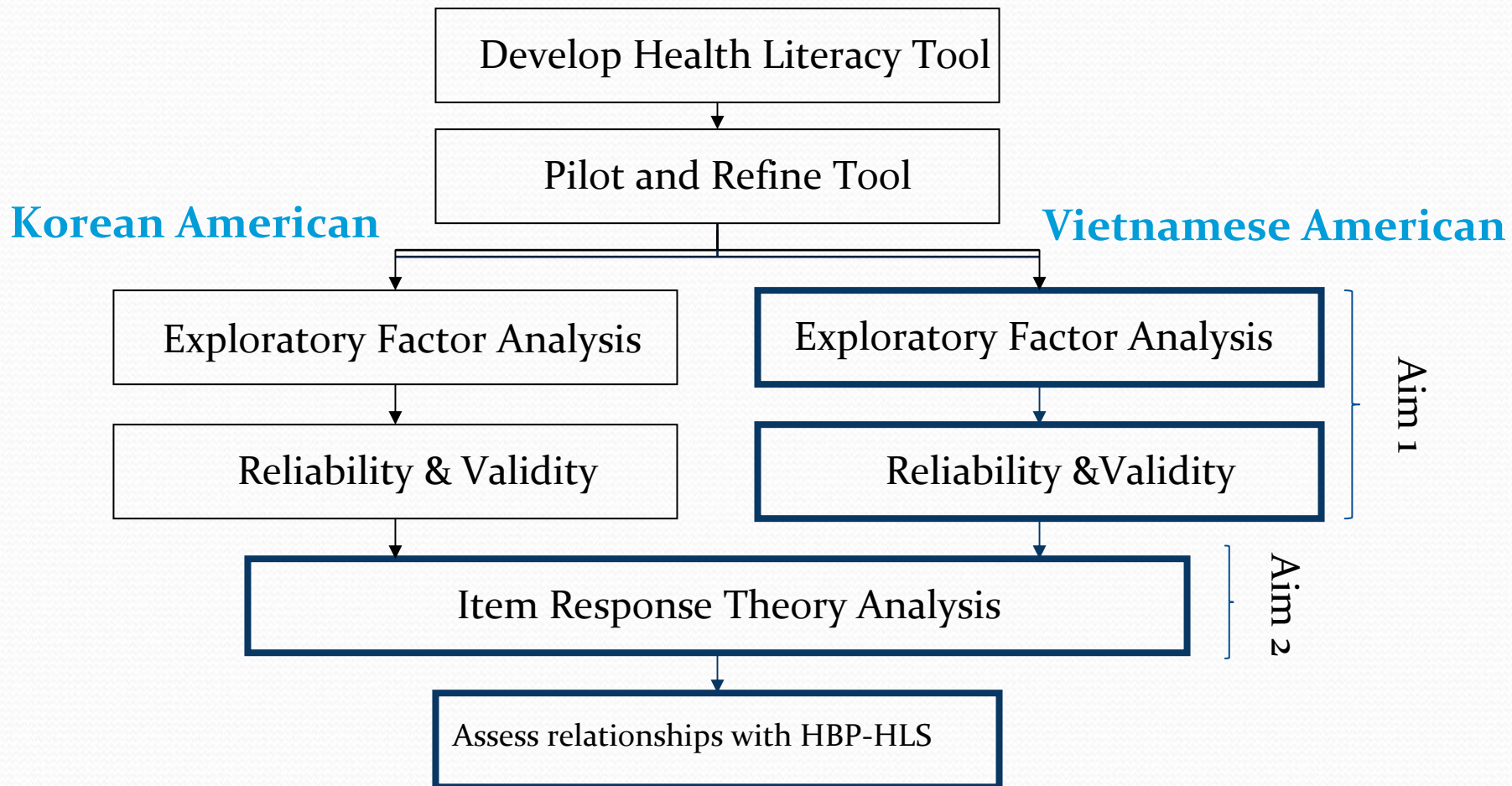
- Randomization method may not yield comparable treatment & control groups in terms of attributes.
- The treatment (independent variable) may not be powerful enough to produce a change.
- Measurement of the independent variables may not be sufficiently specific or sensitive to detect change.
- The timing (interval) of the test and measurements of data may not allow for detection of effect of the independent variable.
- Uncontrolled extraneous variables have a dominant effect on the dependent variables or independent variable.

High Blood Pressure Health Literacy Scale (HBP-HLS) Kim et al, 2011

- 43-Item HBP-HLS
 - 30 print items
 - 13-functional items
- Development & validation of scale was guided by several principles:
 - The use of simple word recognition test would be appropriate
 - The addition of functional items would ensure the assessment of comprehension
 - Making it content specific to HBP will reduce the shame and stigma of limited HL, and make it more relevant for targeted clinical interventions
 - Inclusion of community member input was necessary
- Wanted to further support its utility in other ethnic populations such as Vietnamese American
 - Create a shorten scale that was more applicable in clinical settings

Kim MT, Nguyen T, et al, (2011). Development and Validation of the High Blood Pressure Focused Health Literacy Scale. *Patient Education & Counseling*. PMID:22030252

Instrumentation Process



State of Science of HL Measures

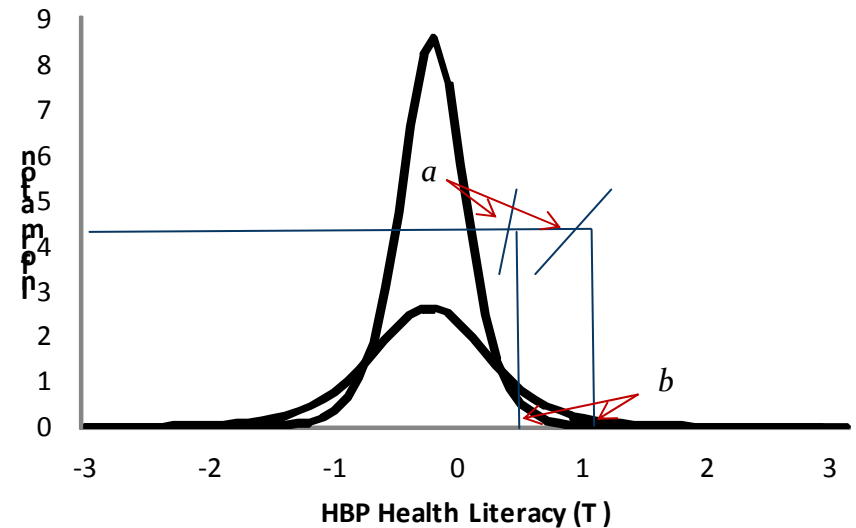
- 59 existing instruments; 29 general, 30 content/context-specific
- None of the disease specific measures were related to HBP
- Evidence supporting use of disease specific HL measures was not clear, but strong arguments were made regarding their usefulness in reducing the shame and stigma of limited HL.
- Most were validated with White (n=33), Black (n=29), and/or Hispanic (n=14) Americans samples

Item Response Theory (IRT)

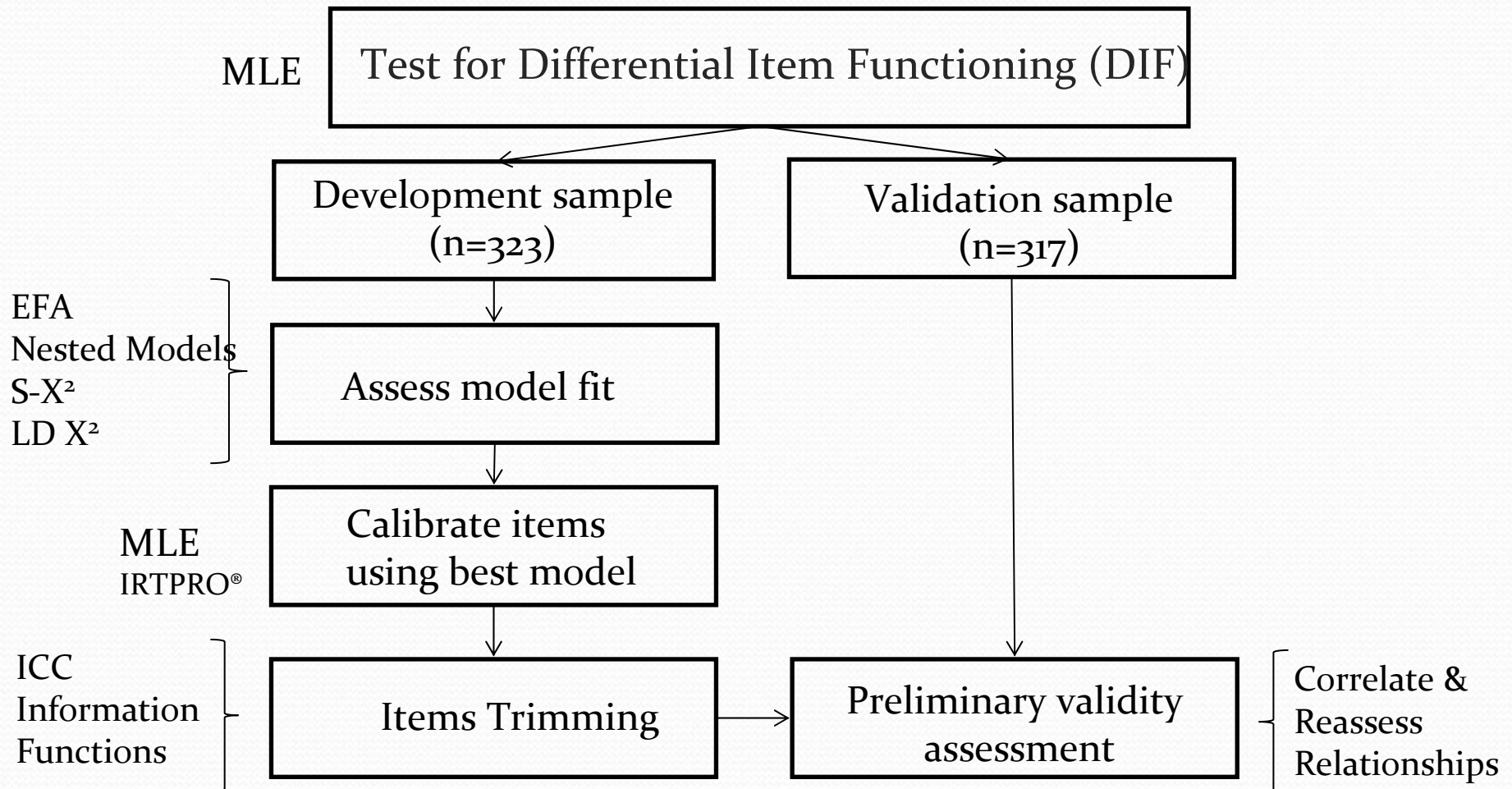
- General statistical theory that uses logistic models to describe the relationship between an individual's ability and how they respond to an item
- This relationship is described by the item characteristic curve (ICC)
 - Interpreted by its
 - Difficulty parameter, b
 - Discrimination parameter, a
- Information function curves

→ 2 parameter logistic model

$$P(\theta) = \frac{1}{1 + e^{-L}} = \frac{1}{1 + e^{-a(\theta - b)}}$$



IRT Process



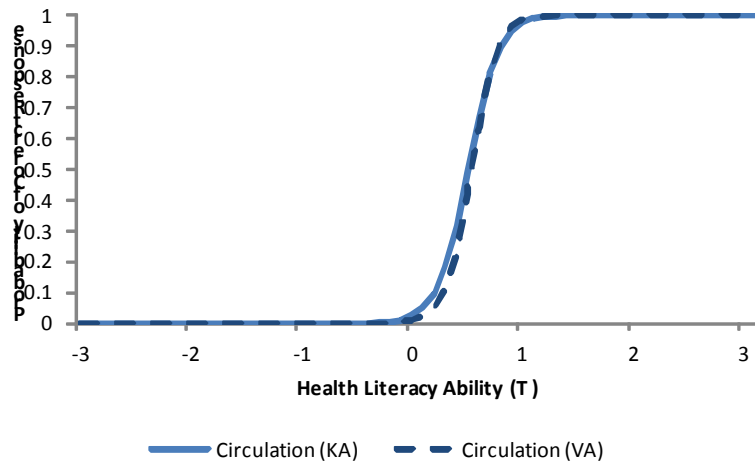
Study Demographics

Characteristics	Korean American (n=440)	Vietnamese American (n=200)
	n(%) or mean±SD	n(%) or mean±SD
Age	70.9±5.5	57.0±14.6
18-29		12 (6.0%)
30-44		22 (11.0%)
45-59		72 (36.0%)
60-69	186(42.3%)	56 (28.0%)
70-79	223(50.7%)	29 (14.5%)
≥80	31(7.0%)	9 (4.5%)
Gender		
Male	134(30.5%)	97 (48.5%)
Female	306(69.5%)	103 (51.5%)
Education		
≤ Middle school	165 (37.5%)	71 (35.5%)
High school	126 (28.6%)	55 (27.5%)
≥Some College	149 (33.9%)	74 (37.0%)
Year in U.S.	24.2±11.3	19.0±11.5
Observed HBP-HL Score		
0-10	202 (46%)	31 (16%)
11-20	47 (11%)	10 (5%)
21-30	61 (14%)	25 (13%)
31-43	130 (30%)	134 (67%)

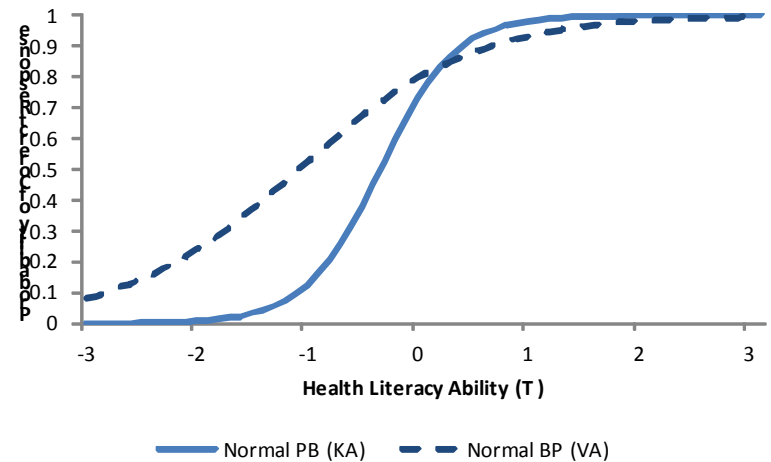
Results:

Differential Item Functioning (DIF)

35-items, (-) DIF



8-items, (+) DIF

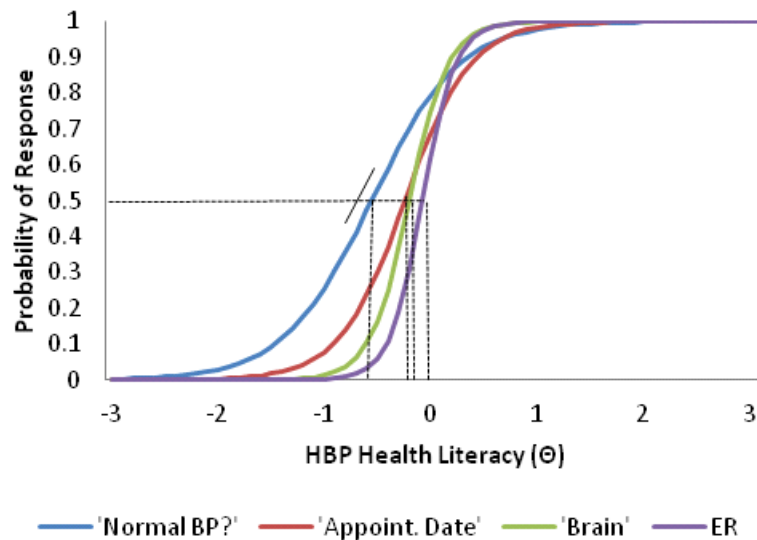


Results:

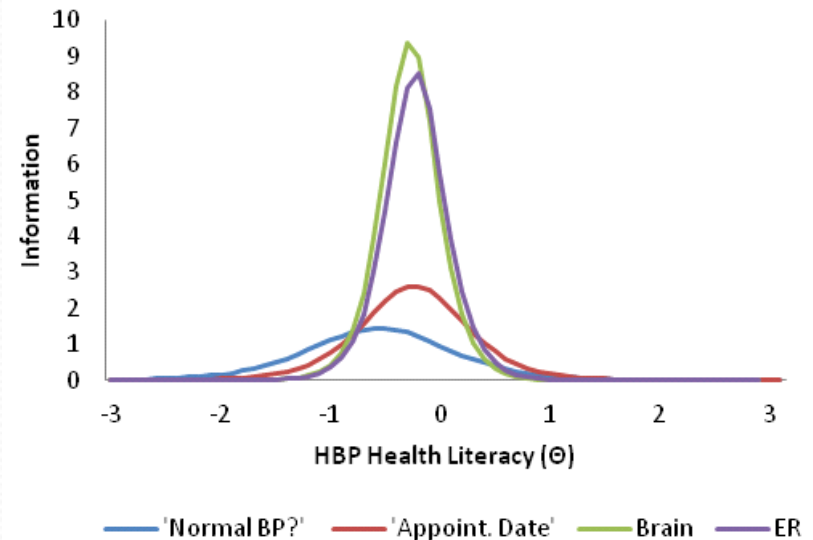
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Item Trimming (Interval 1)

ICC

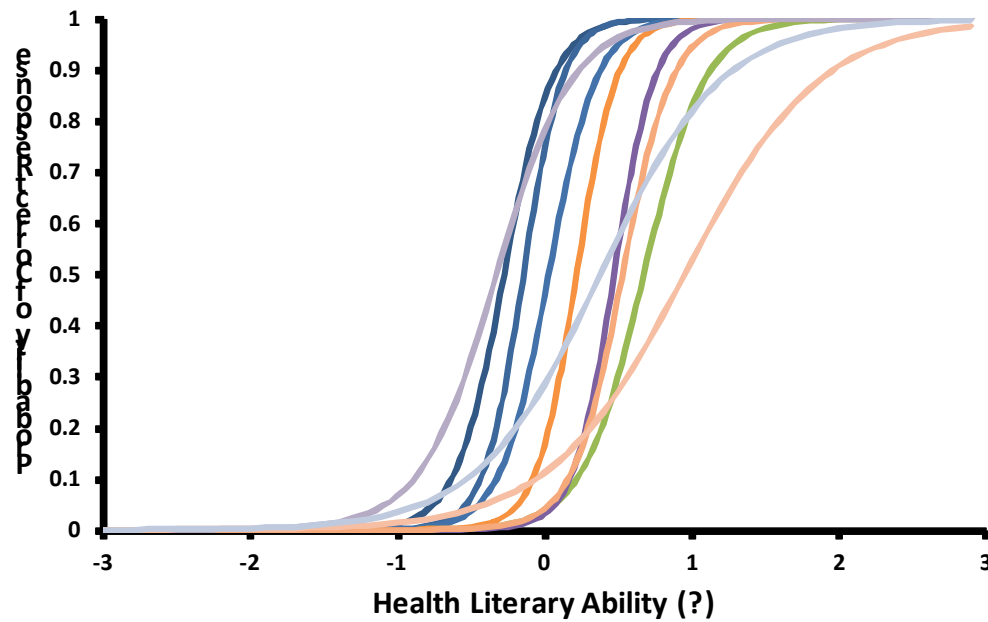


Information Functions



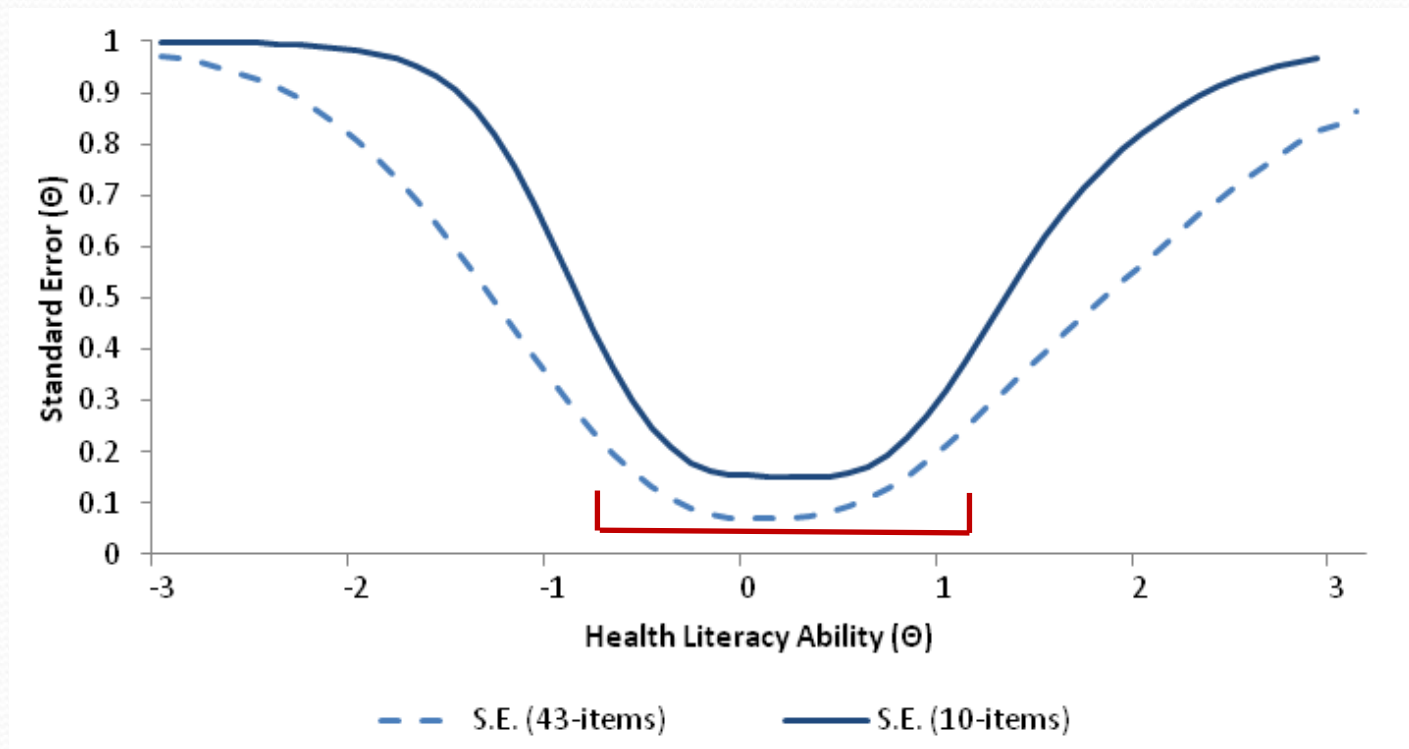
Results:

ICCs of 43 versus 10-item HBP-HLS



Results:

Standard Error of Measurement Functions



Conclusions

- The HBP-HLS was effectively shortened by over 75% to 10-item (7 print, 3 functional) while retaining optimal precision, content coverage and preliminary evidence of validity
- Measurement equivalence was achieved in two ethnic groups whose native language is vastly different
- This has tremendous implications for participant burden, feasibility of use in clinical settings, and cost



Future HL instrumentation Research direction

- Contribute to NIH Patient Reported Outcome Measurement Information System (PROMIS) health literacy item bank

Implication on Health Disparity Research

- Given the growing health disparity gap in chronic disease management among those special populations, researchers and clinicians should consider **an educational intervention that directly influences health literacy as a viable option** to address this important issue.