Racial Disparities in Age-Associated Cognitive Decline: The Role of Health Literacy

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Background

- Cognitive Decline: Public Health Issue
  - Decreased quality of life
    - Loss of independence
    - Depression
  - Correlated with risk of mortality
  - Estimated healthcare costs: $13.26 billion
  - Prevalence in elderly >65: 26.6%
    - Elderly population expected to double by 2050

Background

- Racial differences in cognitive decline
  - Faster rate of decline in African Americans
    - Poverty
    - geographic segregation
    - education

Background

- Health literacy mediates health disparities
  - Medication adherence
  - End-of-life treatment
  - Premature mortality
  - Preventable health behaviors
- However—has never been examined as a mediator of racial differences in cognitive decline

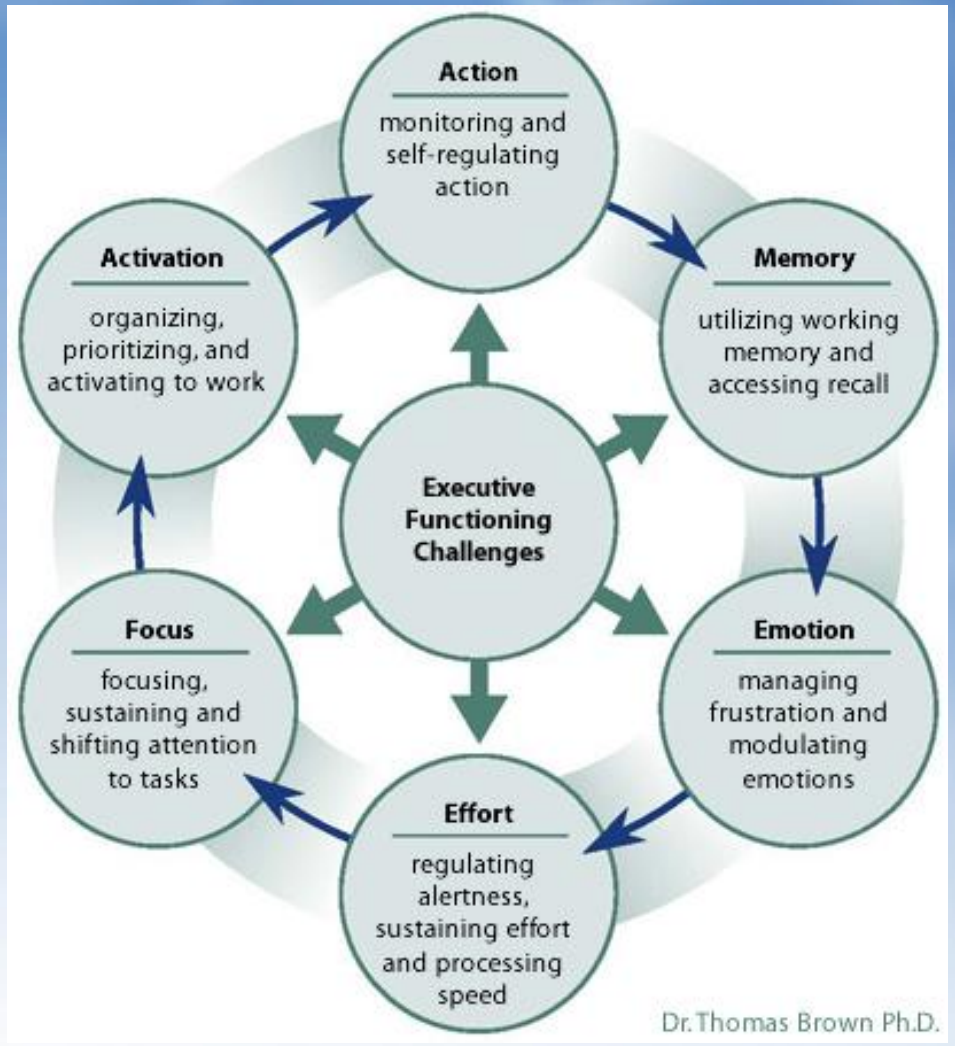
Hypothesis

- We hypothesize that health literacy is a mediator of racial differences in cognitive decline

Methods

- **Elderwalk**: a study to promote walking
  - **Patient population:**
    - Community-dwelling elders, 226 in total, all of whom were independently consented
  - **Inclusion/exclusion requirements**:
    - 65+ years old, English-speaking, computer skills, no indication of depression or severe cognitive impairment
  - **Data collection**:
    - baseline + 12-month follow-up

Domains of Executive Function



Methods

- **Assessments**
  - Executive Function
    - Trailmaking A and B (Trails B-A): Dep. Variable **A**
    - Controlled Oral-Word Association Test (FAS): Dep. Variable **B**
    - Categorical Fluency: Dep. Variable **C**
  - Health Literacy
    - Short Test of Functional Health Literacy in Adults (S-TOFHLA)
      - Used dichotomously (**High**=adequate; **Low**=marginal + inadequate)
  - Dependent variables
    - For each measure of executive function, a change score was calculated between baseline and 12 months

Methods

- Analysis
  - Multivariable linear regression models were created to measure associations between race and variables
  - Three sets constructed for outcomes A, B, C
  - Analysis limited to participants who completed both baseline and 12-month follow-up assessments
    - 211/226 participants (93.3%)

Results

- Selected demographics: Significant differences

Variable	African American (%)	Caucasian (%)
Mean age (SD):	71.2 (5.5)	71.7 (5.7)
% Female*	72.6	47.6
Currently married*	24.4	52.4
Sufficient finances to support family*	55.2	90.5
Consider health “very good” or “excellent”*	31.8	61.9
Have regular experience with computers*	25.2	46.2
Find computers useful*	44.4	61.5
Education past high school*	35.6	73.0
High health literacy*	46.7	95.2

*significant difference between groups (races)

Results-Dependent Variable A

- **Data for change in Trails B-A**

Results-Dependent Variable A

- **Data for change in Trails B-A**
  - Significant difference between races

	Model 1	
	Time	P
White (ref) Black	30.15	0.01
Education <HS HS >HS (ref)		
Health literacy Low High (ref)		

Model 1 adjusted for for intervention group, clinic location, age, sex, number of comorbidities, baseline scores

Results-Dependent Variable A

- **Data for change in Trails B-A**
  - Education is a significant mediator

	Model 1		Model 2	
	Time	P	Time	P
White (ref) Black	30.15	0.01	26.48	0.02
Education <HS HS >HS (ref)			38.78 12.97	**<0.01**
Health literacy Low High (ref)				

Model 2: Model 1 + education

Results-Dependent Variable A

- **Data for change in Trails B-A**
  - Health literacy has a significant mediation effect
    - Makes differences between races insignificant

	Model 1		Model 2		Model 3	
	Time	P	Time	P	Time	P
White (ref) Black	30.15	0.01	26.48	0.02	20.56	**0.12**
Education <HS HS >HS (ref)			38.78 12.97	<.01		
Health literacy Low High (ref)					29.23	**<.01**

Model 3: Model 1 + health literacy

Results-Dependent Variable A

- **Data for change in Trails B-A**
  - Health literacy and education: independent mediators of cognitive decline
    - Difference between races remains insignificant

	Model 1		Model 2		Model 3		Model 4	
	Time	P	Time	P	Time	P	Time	P
White (ref) Black	30.15	0.01	26.48	0.02	20.56	0.12	20.30	**0.12**
Education <HS HS >HS (ref)			38.78 12.97	<.01			31.91 11.47	**0.01**
Health literacy Low High (ref)					29.23	<.01	20.32	**0.03**

Model 4: Model 1 + education + health literacy

Results-Dependent Variable B

- **Data for change in FAS**

Results-Dependent Variable B

- **Data for change in FAS**
  - Significant difference between races

	Model 1	
	Words	P
White (ref) Black	-5.75	<.01
Education <HS HS >HS (ref)		
Health literacy Low High (ref)		

Model 1 adjusted for for intervention group, clinic location, age, sex, number of comorbidities, baseline scores

Results-Dependent Variable B

- **Data for change in FAS**
  - Education does not create significant change

	Model 1		Model 2	
	Words	P	Words	P
White (ref) Black	-5.75	<.01	-5.46	<.01
Education <HS HS >HS (ref)			-3.30 -0.56	0.13
Health literacy Low High (ref)				

Model 2: Model 1 + education

Results-Dependent Variable B

- **Data for change in FAS**
  - Health literacy has significant mediation effect

	Model 1		Model 2		Model 3	
	Words	P	Words	P	Words	P
White (ref) Black	-5.75	<.01	-5.46	<.01	-4.59	0.02
Education <HS HS >HS (ref)			-3.30 -0.56	0.13		
Health literacy Low High (ref)					-3.05	**0.04**

Model 3: Model 1 + health literacy

Results-Dependent Variable B

- **Data for change in FAS**
  - Health literacy loses mediation effect when education included in model

	Model 1		Model 2		Model 3		Model 4	
	Words	P	Words	P	Words	P	Words	P
White (ref) Black	-5.75	<.01	-5.46	<.01	-4.59	0.02	-4.66	0.02
Education <HS HS >HS (ref)			-3.30 -0.56	0.13			-2.51 -0.34	0.32
Health literacy Low High (ref)					-3.05	0.04	-2.33	0.14

Model 4: Model 1 + education + health literacy

Results-Dependent Variable C

- **Data for Categorical Fluency**
  - Followed same pattern as FAS
  - Health literacy: no significant mediation effect

Conclusion

- Difference in health literacy has a role in the racial disparity in cognitive decline as shown by TMT B-A
- Effect was less evident with FAS and categorical fluency
  - May not be sensitive indicators of cognitive decline over the course of 1 year

Conclusion

- Strengths of study:
  - Diverse cohort, large number of known confounders accounted for in analysis
- Limitations
  - Generalizability, context of intervention study to promote walking

Implications/Next Steps

- Interventions to reduce cognitive decline
- Modify setting to accommodate those with less health literacy
  - Implement cognitive enhancement tools usable by those with low health literacy
    - Walking
    - Cognitive training programs

Thank you!