Language Ability Predicts Health Literacy Skills

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Background

Health literacy is the ability to read, understand, navigate and communicate within the healthcare field in order to be able to make informed decisions about one's health. Health literacy contributes to an individual's ability to communicate health history information, employ preventative measures for disease, navigate insurance, fill prescriptions and understand mathematical concepts such as probability and risks for disease. This is an important skill in today's health industry because due to under-staffing in hospitals, there is a decrease in face-to-face patient to healthcare provider time (Rosseter). By extension, people with poor health literacy skills may be less capable of obtaining the highest level of patient care and their health may suffer as a result. This research seeks to reveal the connections between patient healthcare literacy and their language skills through analysis of language and healthcare related tests.

Testing Materials

Language Test	Subtests	Construct
WRMT-III	Word attack	Phonics and word recognition used to determine ability to apply structural analysis skills
	word ID	untimed sight-word recognition
TOWRE-II	Phonemic decoding	Timed decoding
	Sight Word Efficiency	Timed sight-word recognition
Spelling	N/A	Spelling of infrequent words (possible index of reading habit)
Modified Token Test	N/A	Spoken language processing
Health Literacy Test	**Subtests**	**Construct**
METER	N/A	Medical term recognition test
BREIF	N/A	Self-reported health questionnaire

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Table A

Methods

Participants:

- Inclusionary criteria for this study was that all participants must have previously completed a MAPS lab study.
- The sample size for this study was 52. Of this sample, 24.4% were male and 75.6% were female. 75% were White, 11.5% African American, 5.7% Asian and 7.8% were Hispanic/Latino. Their ages ranged from 18-32 and the mean age was 21 years old.

Materials:

- Subjects completed many language skill tests, outlined in Table A.
- RedCap and JASP software was used to record and analyze participant's scores.

Procedures:

- Participants came in for a 2 hour long language and reading testing session. Tests were administered one-on-one by a trained research assistant. Scores were then double scored and checked for accuracy.
- For the BRIEF and METER scores participants were emailed a link to a RedCap survey and participants completed the assessments online.

Analysis

Linear Regression BREIF, Reading Composite and Token

Model	R	R^2	Adjusted R^2	RMSE
1	0.154	0.024	-0.037	2.468

ANOVA

Model	Sum of squares	df	Mean Square	F	p
Regression	7.091	3	2.364	0.388	0.762
Residual	292.352	48	6.091		
Total	299.442	51			

Coefficients

Model	Unstandardized	Standard error	t	p
(Intercept)	16.783	3.052	5.498	< .001
Non-Spoken Language	0.473	0.449	1.052	0.298
age	-0.029	0.144	-0.201	0.841
Spoken Language	-0.044	0.37	-0.119	0.905

Linear Regression with BRIEF as the dependent variable and reading composite, Token test scores and age as covariates.

Linear Regression METER, Reading Composite and Token

Model	R	R^2	Adjusted R^2	RMSE
1	0.349	0.122	0.067	2.629

ANOVA

Model	Sum of Squares	df	Mean Square	F	p
Regression	45.931	3	15.31	2.215	0.098
Residual	331.838	48	6.913		
Total	377.769	51			

Coefficients

Model	Unstandardized	Standard Error	t	p
(Intercept)	33.124	3.252	10.186	< .001
Non-Spoken Language	0.99	0.479	2.068	0.044
age	0.153	0.153	0.997	0.324
Spoken Language	0.13	0.394	0.33	0.743

Linear Regression with METER as the dependent variable and reading composite, Token test scores and age as covariates.

Reading measures correlations

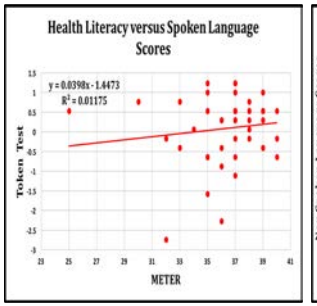
		Word ID	Sight Word Rep	Spelling	Word Attack	Phonemic Decoding
Word ID	p-value	—				
Sight Word Repetition	Pearson's r	0.346*	—			
	p-value	0.012	—			
Spelling	Pearson's r	0.808***	0.258	—		
	p-value	< .001	0.065	—		
Phonemic Decoding	Pearson's r	0.718***	0.459***	0.653***	0.732***	—
	p-value	< .001	< .001	< .001	< .001	—

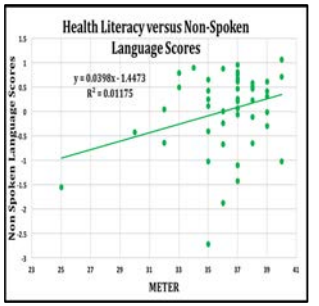
* p < .05, ** p < .01, *** p < .001

Correlation matrix shows that reading and spelling scores are highly correlated and therefore can be made into a composite reading score

Results

- The data was transformed by taking the Z score of all the raw language score data.
- A correlation matrix was used to show that all reading and spelling measures in the language battery were all highly correlated. A composite reading score was then created by averaging the Z scores.
- A linear regression was conducted to analyze METER, BRIEF, non-spoken and spoken language scores.
- In the linear regression, age was used as a covariate to control for any differences in age among participants.





Discussion

- It was found that BRIEF scores had no significant relationships with any of the reading scores.
- This may have been due to the order in which the BRIEF , a self assessment, was administered after METER, a quantitative measure.
- Initial hypothesis that poor spoken language skills is linked to poor health literacy scores was not supported.
- It was found that non-spoken language skills such as reading and spelling were predictive of health literacy.
- Spoken language scores did not show significance in our samples.
- The implications of these findings may act as a basis for developing more effective tools for doctor- patient communication such as informational videos that use spoken language and visuals rather than written material to instruct patients and relay important health information.

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