



Brief Measures for Evaluating Engagement and Perceived Usefulness of Health Applications for Patients

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Purpose: We evaluated the measurement properties of newly adapted self-report scales designed to evaluate patients utility from web-based, mobile and tablet health applications. While existing scales measure satisfaction with computer tools, we sought to evaluate brief measures that examine additional dimensions of user experience--patient engagement and patient ratings of app utility.

Method: A sample of 105 patients, visitors and health professionals recruited from a safety net hospital, two community organizations, and meetings of health professionals. Participants completed a health risk assessment. Four items measure engagement in 2 factors, 9 perceived usefulness, and 12 user satisfaction (The EUCS). A 3-item measure screened for numeracy.

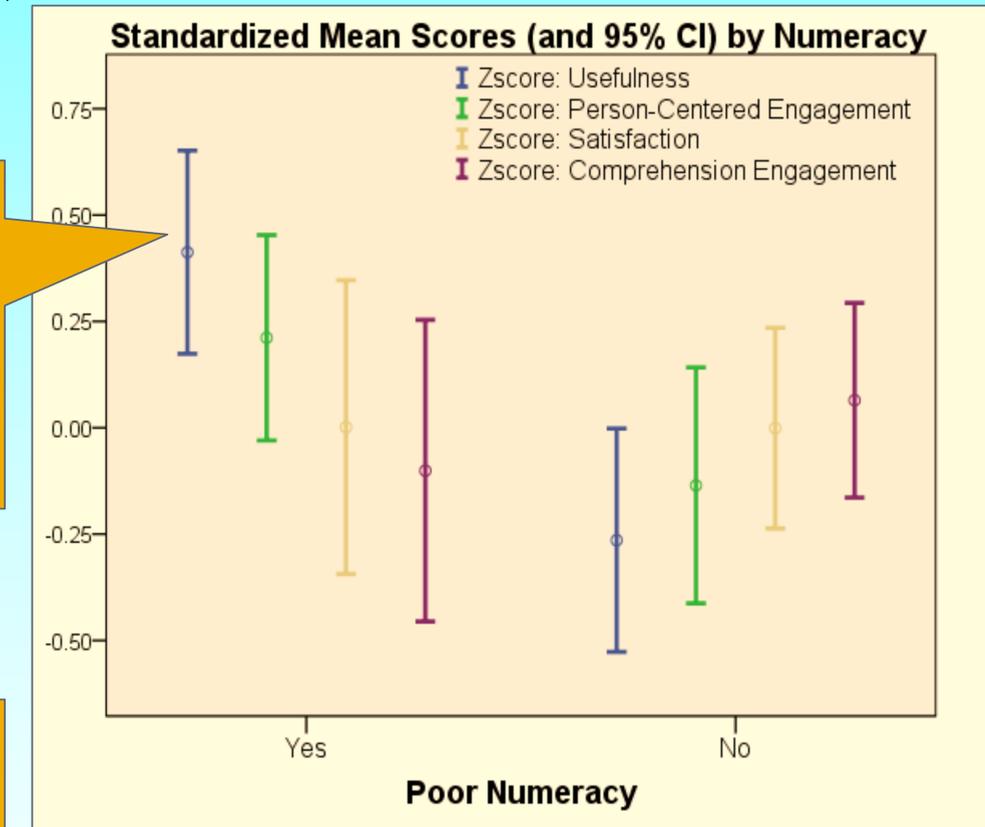
Result: Participants were 64% female; 41% white, 29% black, 12% other, 18% did not report race; average age was 42 (range 18-86). Participants were highly satisfied with the software; 97% responded “yes” on “easy to use,” and 100% yes on “quick enough”, useful format and clear report. Factor analysis results supported a 3-factor model of usefulness and engagement. Cronbach’s alpha internal consistency was > 0.8 for all scales. Participants rated the software as engaging them in caring for their health Mean=4.2, SD=1.0 on the 1-5 scale. The majority of patients agreed that the software is useful (Mean=7.1, SD=2.0). Numeracy screening indicated that 66% had adequate and 34% poor numeracy. Participants with poor numeracy rated the software as *more useful* (8.1 vs 6.7, p=.007) than participants with adequate numeracy. Usefulness and Engagement had moderate associations with an existing measure of computer satisfaction.

Conclusion: Brief, easy to administer self-report questions can be used to evaluate the extent to which health applications are found to be useful and engaging by patients and other users. Variability on these adapted measures is sufficient to capture differences according to key variables (such as numeracy for understanding the potential unintended consequence for apps to *increase* inequality via the “digital divide”). Future work is necessary to examine these measures in larger samples and with other health apps.

Pattern Matrix ^a			
	Factor		
	1	2	3
I learned about risks to my health.	.963		
I learned effective ways to manage my health.	.887		
The HRA helped me view my health differently.	.871	-.100	
I was able to make a plan to improve my health.	.850		-.105
The HRA identified health issues relevant to me.	.761	.144	
How well did you understand the recommendations for healthy living?		.920	
How well did you understand the information provided?		.814	
How well did the HRA support you in caring for your health?			-.929
How well were your concerns about your health addressed?			-.737

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 4 iterations.

Participants with poor numeracy rated the software as **MORE USEFUL** than those with adequate numeracy (p=.007)



Using the original 4 engagement and 9 usefulness items, we shortened the usefulness scale to 5 items (factor 1). Factor analysis suggested 2 factors for engagement--person-centered and comprehension (factors 2 and 3, respectively).

Correlations				
	Computer Satisfaction	Perceived Usefulness	Comprehension Engagement	Person-Centered Engagement
Computer Satisfaction	1	--	--	--
Perceived Usefulness	.462**	1	--	--
Comprehension Engagement	.304**	.211*	1	--
Person-Centered Engagement	.446**	.573**	.383**	1

Most of the scales show moderate to large correlations with each other with the exception of comprehension engagement and perceived usefulness

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

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Usefulness scale adapted from: Underwood, C. & Jabre, B. (2003). Arab women speak out: Self-empowerment. Ch. 10 in White, S.A., Ed. *Participatory Video: Images that Transform and Empower*. New Delhi: Sage.

Engagement scale adapted from: Nápoles, A. M., Santoyo-Olsson, J., Karliner, L. S., O'Brien, H., Gregorich, S. E., & Pérez-Stable, E. J. (2010). Clinician ratings of interpreter mediated visits in underserved primary care settings with ad hoc, in-person professional, and video conferencing modes. *Journal of health care for the poor and underserved*, 21(1), 301.