

Internet Access, Internet Health Information-Seeking Behaviors, and Numeracy

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Objectives. Numeracy, also called quantitative literacy, reflects an individual's preference to apply mathematical knowledge to everyday tasks including the use and evaluation of health and medical information. This research examined accessing the internet and engaging in internet health information-seeking behaviors (iHISB) as corollaries of perceptions about communicating health information with numbers.

Methods. Data were drawn from the 2007 Health Information National Trends Survey (HINTS, $n = 7,013$). Assessments of internet access and iHISB were combined forming a measure with three levels (not accessing the internet, accessing internet without iHISB, and engaging in iHISB). Measures assessing numeracy included understanding medical statistics ("very hard" [1] to "very easy" [4]), dependence on numbers/statistics in making personal health decisions ("strongly agree" [1] to "strongly disagree" [4]), and a preference for outcome probabilities expressed as either words or numbers (both dichotomously coded with "no preference" referent). Linear and logistic models, accommodating the HINTS survey design and adjusting for demographics, were computed.

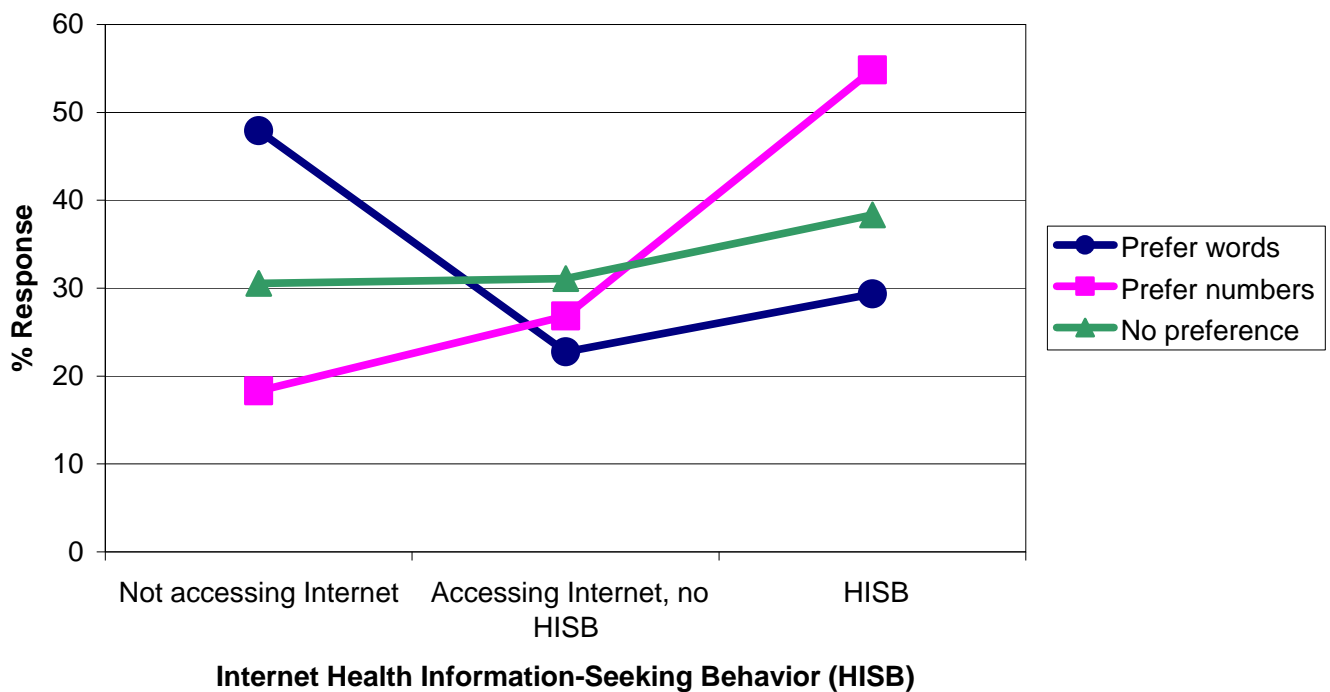
Results. Sample demographic characteristics are detailed in Table 1. The results reveal that access and use of the Internet, whether for seeking health information or for other reasons, differ significantly across all sample demographic characteristics; with those 65 and older, less educated, less than \$20,000 in household income, divorced, of ethnic minority, and male more likely to not access the internet at all. Those respondents who are between 18 and 34 years of age, post college with income between \$50,000-\$74,999, single, male, and of ethnic minority other than African-American and Hispanic tended to access the internet but did not seek health information. On the other hand, respondents between 35-49 years of age, college graduates, making more than \$75,000, married, white and female were more likely to seek health information over the internet.

The results from the general linear models (ANCOVA), summarized in Table 2, reveal significant differences between individuals using the internet ($n = 1,852$) and



using the internet as the primary source for health information ($n = 3,020$), compared with non-internet users ($n = 2,141$) on two measures. Respondents not accessing the internet found it more difficult to understand medical statistics ($M = 2.43$) than those in the other two groups ($M = 2.79$ for both). Females disagreed that they depend on numbers and statistics to help them make decisions about their health ($M = 2.50$) whereas males tended to agree ($M = 2.64$). Preferences for probabilities expressed as words or numbers varied significantly ($p < 0.0001$) across the three-level internet measure. As can be seen below, most respondents not accessing the internet preferred probabilities expressed in words (47.9% vs. 22.8% accessing and 29.3% iHISB), while those engaging in iHISB preferred numbers (54.8% vs. 18.3% not accessing and 26.9% accessing).

Health Information Preferences: Words versus Numbers



Conclusions. The findings illustrate prominent differences in preferences for how outcome probabilities in medical information are expressed as a function of accessing the internet and iHISB.

Learning Objectives: To discuss the role numeracy plays in internet health-information seeking behaviors. To illustrate, using data from a national cross-sectional study, that those whom access the internet, and in particular, those with access that actively seek health information online, are differentiated from those without access in their understanding of medical information presented in a quantitative format. Apply enhanced understanding of links between accessing the internet and engaging in internet health-information seeking behaviors (iHISB) in the tailoring and targeting of health promotion and disease prevention intervention models.

Table 1. Sample Characteristics as a Function of Internet Health Information-Seeking Behaviors (iHISB)

Characteristics	Sample Estimates (<i>n</i> = 7,013)	Not Accessing Internet (<i>n</i> =2141)	iHISB	
			No (<i>n</i> =1,852)	Yes (<i>n</i> = 3,020)
<i>Age (years) (Age; $\chi^2[6] = 463.05^*$)</i>				
Age 18 to 34	31.2%	17.8%	34.4%	47.8%
Age 35 to 49	30.0%	22.3%	26.9%	50.8%
Age 50 to 64	23.4%	29.8%	26.5%	43.7%
Age 65 or older	15.4%	63.5%	20.2%	16.3%
<i>Education (Edu; $\chi^2[6] = 752.04^*$)</i>				
High school or less	39.8%	51.0%	25.5%	23.5%
Post high school	35.0%	18.7%	30.0%	51.3%
College graduate	16.3%	9.7%	27.3%	63.0%
Post college	8.8%	6.3%	34.1%	59.7%
<i>Household income (HI; $\chi^2[10] = 413.74^*$)</i>				
Less than \$20,000	16.8%	55.5%	22.8%	21.7%
\$20,000 – \$34,999	14.4%	44.9%	26.4%	28.7%
\$35,000 – \$49,999	12.0%	24.6%	25.8%	49.5%
\$50,000 – \$74,999	16.8%	17.3%	30.3%	52.4%
\$75,000 or more	27.0%	9.1%	29.7%	61.2%
Not reported	13.1%	37.7%	32.8%	29.5%
<i>Marital status (MS; $\chi^2[4] = 157.01^*$)</i>				
Never married	26.2%	22.6%	37.2%	40.2%
Unmarried	16.8%	49.4%	20.1%	30.5%
Married	56.9%	25.9%	26.3%	47.8%
<i>Race/Ethnicity (R/E; $\chi^2[6] = 142.14^*$)</i>				
African-American	11.5%	40.9%	28.3%	30.8%
Hispanic	12.7%	48.9%	26.5%	24.5%
Other	6.3%	25.3%	31.8%	42.9%
White	69.5%	23.7%	28.0%	48.2%
<i>Sex ($\chi^2[2] = 19.09^*$)</i>				
Female	51.2%	26.7%	26.9%	46.4%
Male	48.8%	31.4%	29.4%	39.2%

Note: Referent categories of dummy coded variables indicated by “Ref.”.

**p* < .05 via Sidak’s adjustment.

Table 2 General Linear Models (ANCOVA): Health Information Perceptions as a Function of Respondent Sex and Internet Health Information-Seeking Behaviors (iHISB)

Source	Health Information Perceptions			
	Understand Medical Statistics (<i>F</i>)	Numbers in Health Decisions (<i>F</i>)	Prefer Probabilities as Words (Wald χ^2)	Prefer Probabilities as Numbers (Wald χ^2)
<i>Fixed Effects</i>				
Sex	1.32	20.70***	9.34**	0.00
iHISB	21.88***	2.28	19.52***	14.92***
Sex X iHISB	1.46	0.39	1.48	2.50
<i>Covariates</i>				
ABS Sampling Frame	0.81	(-) 19.74***	(-) 323.87***	(-) 135.96***
Age: 18 to 34	Ref.	Ref.	Ref.	Ref.
Age: 35 to 49	(-) 3.65	2.23	(-) 0.12	(-) 3.34†
Age: 50 to 64	(-) 1.83	4.67*	(-) 0.10	(-) 8.08**
Age: 65 or older	(-) 0.46	1.89	1.31	(-) 9.88**
Edu: High school or less	(-) 38.84***	(-) 14.19***	4.62*	(-) 17.57***
Edu: Post high school	(-) 10.82**	(-) 22.14***	1.04	(-) 26.35***
Edu: College graduate	(-) 0.80	(-) 1.45	0.01	(-) 5.35*
Edu: Post college	Ref.	Ref.	Ref.	Ref.
HI: Less than \$20,000	0.00	2.53	0.16	1.20
HI: \$20,000 – \$34,999	1.11	(-) 0.00	0.28	1.75
HI: \$35,000 – \$49,999	5.38*	2.73	(-) 0.00	1.42
HI: \$50,000 – \$74,999	2.37	0.87	(-) 0.04	2.23
HI: \$75,000 or more	9.01**	2.10	(-) 0.11	9.00**
HI: Not reported	Ref.	Ref.	Ref.	Ref.
MS: Never married	1.38	(-) 0.00	(-) 0.50	(-) 0.28
MS: Unmarried	0.18	(-) 2.53	(-) 2.12	(-) 3.24
MS: Married	Ref.	Ref.	Ref.	Ref.
R/E: African-American	(-) 0.34	(-) 2.43	15.67***	(-) 5.43*
R/E: Hispanic	(-) 2.14	0.91	3.58†	(-) 2.05
R/E: Other	(-) 13.83***	5.92*	(-) 1.66	(-) 1.11
R/E: White	Ref.	Ref.	Ref.	Ref.

Note: Referent categories of dummy coded variables indicated by “Ref.”. Model covariates with negative parameter estimates indicated by “(-)”.

† $p \leq 0.06$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$