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## Measuring health information seeking challenges in chronic disease: A psychometric analysis of a brief scale

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### Abstract

Information seeking is a cornerstone of patient activation in chronic disease self-management. To date, there are few brief and literacy-sensitive tools to measure intrinsic barriers of health information seeking. The Health Information National Trends Survey includes four items from the Information Seeking Experiences scale to measure frustration, effort, concern, and comprehension of information sought during a recent medical/health information search. Limited evidence exists for its construct validity and use in primary data collection in chronic disease. This measurement study examines the psychometric properties of the scale. Qualtrics Panelists with at least one chronic disease ( $N = 684$ ) participated in an online survey. The average score was  $M = 12.85$  ( $SD = 3.97$ ), indicating a moderate degree of health information seeking challenges. Confirmatory

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#### Contributorship

All authors contributed to the literature review and introduction to conceive and argue for the study's need. SRP and JLK was involved in the protocol development, patient recruitment, and data cleaning. MDM and SRP were involved in data analysis. All authors contributed to the data interpretation and discussion sections. All authors reviewed, edited, and revised all aspects of the discussion

#### Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

#### Ethical approval

The data collected in this study received approval from the lead researcher's institution at the University of Florida by their Institutional Review Board (IRB#15U0435).

#### Guarantor

SRP.

#### Informed consent

Electronically signed informed consent was obtained prior to the start of the online survey.

factor analysis of data collected using this scale supported unidimensionality (RMSEA = .03; CFI/TLI = .99/.99). There was adequate scale ( $\omega = .83$ ) and item (value = .98) reliabilities. Rasch analyses showed optimal measurement error and response predictability with item-fit (values = .80–1.20). Response option “agree” was less likely to be selected than any other response option, although not posing a threat to scale reliability. Results demonstrate that this brief scale has sufficient measurement properties for its use as a measure of intrinsic health information seeking barriers among patients with chronic disease.

## Keywords

Chronic disease; psychosocial barriers; health information seeking; measurement

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## Introduction

Health information seeking is an active and effort-driven behavior that has the potential to promote or mute patient activation.<sup>1</sup> Patient activation is having the knowledge, skills, motivation, and support to make effective decisions to manage and maintain one’s health.<sup>2</sup> More activated patients generally demonstrate greater knowledge and behavioral self-efficacy to enact self-management recommendations.<sup>2</sup> Patients with low activation, specifically those who are becoming aware of their self-management needs but still face uncertainty,<sup>1</sup> actively seek health information to overcome low self-efficacy and any lack of knowledge they may have related to self-management.<sup>3</sup> However, given the progressive nature of chronic disease in the aging population, these patients are especially prone to cognitive and affective barriers that impede their ability to access, understand, and use relevant health information.<sup>4–5</sup> Such barriers can lead to negative affect, including avoidance of health information altogether, which can further diminish patient activation.<sup>2</sup> Understanding the intrinsic cognitive and affective barriers to health information seeking is essential for promoting patient activation among patients living with chronic disease.

Healthcare practitioners and researchers who proactively identify the degree that patients experience cognitive and affective barriers when seeking health information can intervene. The Information Seeking Experiences (ISEE) scale is a brief literacysensitive scale that measures cognitive and affective barriers experienced during a recent health information search.<sup>6</sup> Inspired by a study of breast cancer patients,<sup>7</sup> the scale initially measured cancer information seeking challenges in the general US population.<sup>6</sup> Since 2008, the Health Information National Trends Survey has included four ISEE items. Without evidence for scale unidimensionality and reliability beyond Cronbach’s  $\alpha$ , which assesses average correlations among items,<sup>8</sup> there is limited support for the construct validity of these items and their use in the chronic disease population. Given the importance of measuring intrinsic cognitive and affective barriers as a protective measure against patient inactivation, this study explores the reliability and internal structure of a brief scale among patients with chronic disease.

## Methods

Qualtrics Panelists ( $N=684$ ) self-reporting at least one chronic disease completed an online survey after reviewing an electronic informed consent (approved by IRB#15U0435, University of Florida). In addition to measuring socio-demographics, the four items were measured by adding a “neutral” point (1 = *strongly disagree*, 5 = *strongly agree*).

The unidimensionality and reliability of the scale was measured with a confirmatory factor analysis. Good model fit, or the degree the model explains the observed covariance matrix, was defined as<sup>9</sup>: (a) non-statistically significant  $X^2$ ; (b) root mean square approximation (RMSEA)  $<.05$ ; (c) Comparative Fit Index/Tucker Lewis Index (CFI/TLI)  $>.90$ ; and (d) statistically significant ( $p < .05$ ) standardized factor loadings. The omega ( $\omega$ ) coefficient is a measure of reliability for congeneric factor structures.

Data from scale items were fit to the rating scale model (RSM).<sup>10</sup> Item responses should not be random or predictable (mean square or MSQ range = .5–1.5). Items must be adequately placed across the latent continuum (measurement stability; separability  $>2.0$  and reliability  $>.80$ ). Items should also meet the assumption of monotonicity (i.e. having a higher degree of perceived challenges corresponds with selecting “agree” or “strongly agree” for any given item). The probability of selecting adjacent response options at any point on the latent trait continuum should reflect optimal variability (1.4–5.0 logits).

## Results

Table 1 presents responses to scale items ( $M=12.85$ ;  $SD=3.97$ ), which had adequate internal consistency ( $\alpha .79$ ). Participants generally reported feeling frustrated during a recent information search and felt it took a lot of effort to obtain information. Participants reported the information was difficult to understand; however, they were not concerned with its quality.

The scale was unidimensional with statistically significant factor loadings ( $\lambda .61-.85$ ) and high reliability ( $\omega = .83$ ). Good model fit was achieved (RMSEA=.03 (90% confidence interval .00–.09), CFI = .99, TLI .99); however, the  $X^2$  value was statistically significant ( $p < .001$ ). The  $X^2$  is sensitive to large sample sizes.<sup>9</sup> The RMSEA statistic, which serves a similar function as  $X^2$  but adjusts for sample size, verifies good model fit.

Infit MSQ values ranged 0.81 to 1.20 and outfit values .80 to 1.16, indicating optimal predictability in responses. Figure 1 shows some evidence for monotonicity. However, the response option “agree” was least often selected; at its highest probability of being selected, its peak was below the threshold of “neutral/strongly agree.” Likewise, the difference in “neutral/agree” and “agree/strongly agree” values was .26 logits, indicating less variability. Item reliability was .98, but person separability and reliability were slightly below the cutoff values (1.86 and .78) although not posing a noteworthy threat to measurement validity.

## Discussion

This scale is a unidimensional and reliable measure of intrinsic barriers to health information seeking among patients with chronic disease. The sample of educated, middle-age patients reported feeling frustrated and overburdened by recent ISEE, yet showed little concern about information quality.

Response options “neutral” and “strongly agree,” rather than “agree,” were selected most often among participants with above average health information seeking challenges. Although this is a violation of RSM assumptions,<sup>10</sup> the item and scale reliability remained high with minimal concern over the “neutral” response option. Participants may have been more certain of their responses and favor “strongly agree” over “agree.” Intrinsic barriers are likely memorable, especially for people with chronic disease, posing significant hindrances to desired critical self-management information. Considering their reported challenges, it is possible that patients were satisfied by simply gaining access to content and had little concern over its quality.

This scale can be used as part of a measurement battery to assess the degree that patients experience intrinsic barriers to health information seeking. Due to its brevity, the scale can help practitioners to understand which cognitive and affective barriers of ISEE pose as challenges to health information seeking behaviors. With this information, practitioners can direct patients to resources that alleviate the overall frustration and effort of accessing high-quality and actionable information. This will allow patients to focus less on intrinsic barriers to information seeking and more on examining the quality health information to facilitate patient activation. With this instrument, practitioners will be better prepared to deliver tailored assistance during the shared decision-making process in chronic disease self-management.<sup>1</sup>

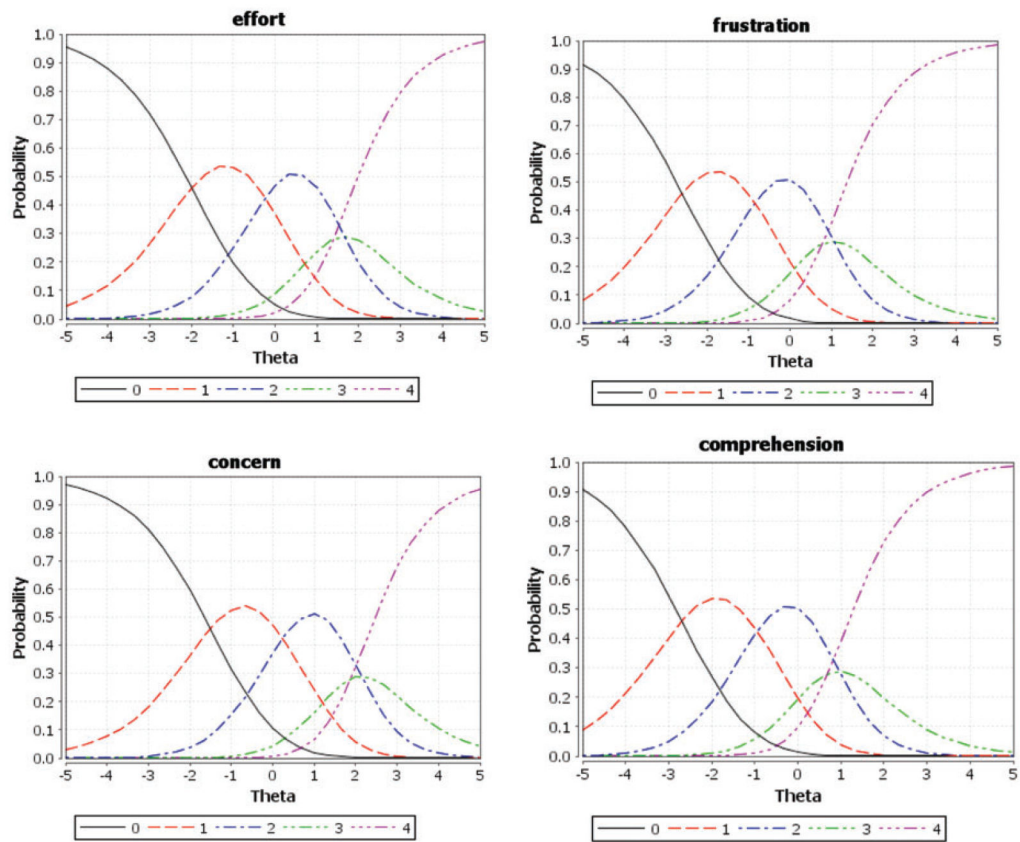
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	Thresholds [Relative Difficulty, (SE)]			
	1	2	3	4
	Strongly Disagree to Disagree	Disagree to Neutral	Neutral to Agree	Agree to Strongly Agree
Value	-2.20 (.09)	-0.45 (.06)	1.45 (.05)	1.19 (.06)

**Figure 1.** ICCs and thresholds for the probability of response categories under the RSM. Theta: latent trait continuum; Responses: 0 = strongly disagree to 4 = strongly agree.

**Table 1.**Socio-demographics and scale responses ( $N = 684$ ).

	n (%)
<i>Socio-demographics</i>	
Age, $M$ ( $SD$ )	47.2 (17.1)
Gender	
Female	493 (72.1)
Male	191 (27.9)
Race	
Caucasian	343 (50.1)
Black/AA	341 (49.9)
Annual income	
Less than \$20,000	132 (19.3)
\$20,000-\$49,999	252 (36.8)
\$50,000 or more	300 (43.2)
Education	
Did not complete high school	25 (3.7)
High school	159 (26.1)
Some college or higher	500 (70.2)
Chronic disease	
Cardiovascular disease	311 (47.9)
Arthritis	131 (20.2)
Mental health disorder	181 (27.9)
Chronic lung disease	52 (8.1)
Cancer	31 (4.5)
Other condition	269 (41.5)
<i>Scale items and responses</i>	
11: "It took a lot of effort to get the information you needed"	
Strongly disagree	89 (13)
Disagree	141 (20.6)
Neither agree nor disagree	226 (33)
Agree	83 (12.1)
Strongly agree	145 (21.3)
12: "You felt frustrated during your search of the information"	
Strongly disagree	56 (8.2)
Disagree	108 (15.8)
Neither agree nor disagree	178 (26)
Agree	146 (21.3)
Strongly agree	196 (28.8)
13: "You were concerned about the quality of the information"	
Strongly disagree	108 (15.8)
Disagree	202 (29.5)

	n (%)
Neither agree nor disagree	215 (31.4)
Agree	54 (7.9)
Strongly agree	105 (15.5)
14: "The information you found was hard to understand"	
Strongly disagree	48 (7)
Disagree	99 (14.5)
Neither agree nor disagree	190 (27.7)
Agree	141 (20.6)
Strongly agree	206 (30.1)

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