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The Association of Perceived Provider–Patient Communication and Relationship Quality With Colorectal Cancer Screening

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Abstract

Background—Two-thirds of adults aged 50 years and older are adherent to recommendations for colorectal cancer screening. Provider–patient communication and characteristics of the patient–provider relationship may relate to screening behavior.

Methods—The association of provider communication quality, relationship, and colorectal cancer screening was examined within data from the 2007 Health Information National Trends Survey.

Results—Perceived provider communication and relationship quality were associated with both adherence to colonoscopy and with ever having been screened. Predictive margins analyses indicated that increasing perceptions from lowest to highest levels of communication and relationship quality would be associated with increases in screening rates approaching 16 percentage points.

Conclusion—Improving provider–patient communication and relationship quality could potentially improve colorectal cancer screening behaviors among adults aged 50 years and older. Future research and clinical practice should focus on understanding the role of these factors in screening behavior and enhance the provider–patient interaction.

Keywords

cancer prevention and screening; health communications; health promotion; patient education; quantitative methods

Colorectal cancer is the second leading cause of cancer deaths in the United States (Jemal, Siegel, Xu, & Ward, 2010). Though it is known that screening for colorectal cancer may lead to early detection and treatment of disease, only 53.2% of adults aged 50 years and older are adherent to recommendations (Smith, Cokkinides, Brooks, Saslow, & Brawley, 2010). Addressing cancer prevention and detection with screening is vital to address the health burden of colorectal cancer.

Multiple modalities are recommended for colorectal cancer screening in average-risk individuals aged 50 years and older. Most commonly, these modalities include fecal occult blood testing (FOBT), colonoscopy, and sigmoidoscopy (Smith et al., 2010). An average-

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risk individual aged 50 years or older may undergo colorectal screening effectively by either having an annual FOBT, colonoscopy every 10 years, or sigmoidoscopy every 5 years (Smith et al., 2010).

A key focal area for increasing adherence to colorectal cancer screening is the primary care setting. Because primary care often includes a focus on health promotion and disease prevention through the encouragement of healthy behaviors, interaction regarding cancer screening is a natural part of the primary care encounter (Hoffman et al., 2010; Smith et al., 2010). Such interactions are a key influence on screening adherence (Beydoun & Beydoun, 2008; Feeley, Cooper, Foels, & Mahoney, 2009; Geiger et al., 2008; Lasser, Ayanian, Fletcher, & Good, 2008; Subramanian, Klosterman, Amonkar, & Hunt, 2004). Provider referral and having had a recent health appointment are also related to colorectal cancer screening adherence (Haskard Zolnierek & DiMatteo, 2009; Klabunde et al., 2005; Smith, Cokkinides, & Brawley, 2009). Given the centrality of the primary care encounter to screening, it is important to understand features of the provider–patient interaction that might influence screening and adherence.

Conceptual Framework

In recent years, increasing attention has been given to the role of patient-centered care in increasing both satisfaction with health care and health care outcomes (for reviews and discussion, see Epstein & Street, 2011; Institute of Medicine, 2001). Although definitions of patient-centered care vary, core features include making sure that patients are fully informed about their conditions and treatment options, ensuring that patients feel respected in the clinical encounter, and facilitating appropriate patient involvement in treatment decisions (Epstein & Street, 2011).

Theoretical models of patient-centered care include provider–patient communication quality as a construct. For example, in Mead and Bower's (2000) patient-centeredness model, one of the four core features of patient-centeredness is "therapeutic alliance," defined as the quality of the relationship and interaction between provider and patient. Similarly, Stewart et al. (2003) present a model of patient-centered medicine that includes as core constructs "patient–doctor relationship" and "finding common ground."

A key question for understanding patient-centered care is which behavioral patterns in the provider–patient interaction lead to quality patient-centeredness along the dimensions outlined by Mead and Bower (2000) and Stewart et al. (2003). In a series of articles, Epstein has outlined four key features that define high-quality, patient-centered provider communication (Epstein et al., 2005; Epstein & Street, 2007). According to Epstein, quality patient-centered communication has four key features: (a) ensuring that communications during the clinical encounter involve the perspective of the patient and elicitation of key concerns and feelings, (b) dealing with the patient in light of the patient's individual psychological needs and social/cultural background, (c) ensuring that the encounter facilitates a common "shared understanding" of the underlying medical problem and treatment options, and (d) ensuring that the patient is an equal power partner in the clinical encounter and decision making regarding treatment options (for further details, see Epstein et al., 2005).

Patient-Centered Communication and Patient Outcomes: Impact on Adherence

Patient-centered communication is an important influence on outcomes of clinical encounters and on overall health outcomes. The purpose of communication within the

provider–patient relationship is to create an interpersonal relationship, exchange information, and make medical decisions (Ong, de Haes, Hoos, & Lammes, 1995). Positive patient perceptions of provider communication may lead to improved adherence and patient satisfaction (Makoul & Curry, 2007). As patient satisfaction has the potential to lead to improved adherence to medical advice (Franks et al., 2006), one might expect that the quality of communication within the provider–patient relationship would influence colorectal cancer screening behavior.

Patient–provider communication quality can affect health care outcomes, both psychosocially and medically, through a variety of mechanisms. These can include increasing a patient's understanding of his/her health, helping to manage uncertainty about health, allowing a relationship to form between the provider and patient, and allowing the patient and provider to participate in appropriate decision making (Epstein & Street, 2007).

Research related to medical outcomes in other health domains (e.g., blood sugar levels for diabetics) demonstrates that adherence to provider recommendations is more likely when an individual perceives better provider communication (Haskard Zolnierek & DiMatteo, 2009; Street, Makoul, Arora, & Epstein, 2009) and more effective quality care (Franks et al., 2006). Factors related to provider–patient communication quality have been shown to influence knowledge, self-efficacy, and psychosocial outcomes (Epstein & Street, 2007; Stewart, 1995; Street et al., 2009). However, to our knowledge, the relation of these factors to colorectal cancer screening and adherence has not been explored.

Purpose

In this article, we report a study examining the relation between colorectal cancer screening behavior and patients' perceived quality of provider–patient communication along the dimensions outlined by Epstein et al. (2005) to colorectal cancer screening behavior. This study used data from the National Cancer Institute's Health Information National Trends Survey (HINTS) 2007, a nationally representative survey of U.S. adults.

Method

Sample, Design, and Procedure

HINTS 2007 surveyed a total of 7,674 individuals, from January 2008 through May 2008, in a mixed mode survey design (Cantor et al., 2009). Additional details about the HINTS survey, sampling framework, and study purposes have been published previously (Hesse, Moser, Rutten, & Kreps, 2006; Nelson et al., 2004), and a full report of the methodology for the HINTS 2007 survey is available (Cantor et al., 2009).

Given population recommendations for beginning colorectal cancer screening at the age of 50 years, the subset of the full HINTS sample reported here consisted of all respondents aged 50 years and older (Smith et al., 2010). Because provider–patient communication quality questions were only asked of participants who had seen a provider in the past year, inclusion was restricted to those who had seen a health care provider in the past year. Based on these two inclusion criteria, the sample size for the current analyses was $n = 4{,}675$.

Measures

Screening behavior—Participants were first asked whether they had ever had FOBT, colonoscopy, or sigmoidoscopy screening in the past. Those answering "yes" were then asked when the last time that they had undergone the screening procedure. Two screening behavior variables were coded from these responses. First, for each of the three modalities an "ever screened" variable was created, coded as "no" if the patient had never been

screened by a given modality and "yes" if they had been screened; an overall "ever screened" variable was also created and coded as yes if a given participant had ever been screened by any of the three modalities. Second, based on the screening guidelines in place at the time of the HINTS 2007, respondents were categorized as adherent or nonadherent to each screening modality if they had been screened within the time frame specified (i.e., FOBT within 1 year, colonoscopy within 10 years, or sigmoidoscopy within 5 years); an overall adherence variable was computed and coded as yes if a participant was adherent for at least one of the three modalities.

Perceptions of provider–patient communication quality—The HINTS 2007 questionnaire includes a number of items related to provider–patient communication and other aspects of the clinical encounter. The HINTS protocol defines "provider" as any doctor, nurse, or other health care professional seen within the past 12 months.

For the analyses reported here, items were selected that assessed respondents' perceptions of the quality of communication and relationship building behaviors on the part of the health care provider. The items selected for analysis relate to the four areas of quality patient-centered communication described by Epstein (Epstein et al., 2005; Epstein & Street, 2007). The items used, categorized by Epstein's dimensions, can be found in Table 1.

Five of the items (how often the provider gave them the chance to ask questions, paid attention to their feelings, involved them in decision making, made sure they understood information, and helped them deal with uncertainty about their health) were modified versions of items developed for the Consumer Assessment of Health Plans (CAHPS; Darby, Crofton, & Clancy, 2006; Hays, Chong, Brown, Spritzer, & Horne, 2003; Marshall, Morales, Elliott, Spritzer, & Hays, 2001). The items used in HINTS 2007 index the same dimensions of communication as the original CAHPS items but use slightly different wording (e.g., the equivalent to the original CAHPS item ". . . how often were you involved as much as you wanted in these decisions about your health?" was worded as ". . . involve you in decisions about your health care as much as you wanted."). CAHPS items have been previously shown to index a single underlying latent communication quality construct (Hays, Chong, Brown, Spritzer, & Horne, 2003; Marshall, Morales, Elliott, Spritzer, & Hays, 2001; Ok, Marks, & Allegrante, 2008) and have been previously used to assess the impact of provider communication on mammography screening (Silk, Westerman, Strom, & Andrews, 2008). An additional item, created for the HINTS survey, asked "in the past 12 months how often did you feel you could rely on your doctors, nurses, or other health care professionals to take care of your health care needs?"

Respondents rated each of the six items on a 4-point response scale, with choices ranging from "always" to "never." For analysis, responses were reverse scored so that higher numbers indicated more positive perceptions of communication. The mean of the 6 items served as the measure of communication quality, consistent with previous research using the CAHPS measures (Rutten, Auguston, & Wanke, 2006; Silk et al., 2008). Reliability analyses in the HINTS sample showed high internal consistency as assessed by Cronbach's alpha ($\alpha = .90$); examination of the item–total correlations and recalculated alpha if an item was deleted showed that all items related strongly to the overall scale.

Provider recommendation—Participants responded to a question concerning whether and when a discussion with a health professional about colorectal cancer screening had taken place. Responses to this question were coded as no discussion, discussion within the past year, 1 to 2 years ago, 2 to 5 years ago, or more than 5 years ago. Those who could not recall whether a discussion had taken place were coded as missing values.

Demographics—Relevant to the analyses reported here, participants reported gender, age, race, education, and household income.

Analysis Strategy

All analyses were conducted in STATA 11 (STATA Corp., College Station, TX) using survey design features to incorporate the HINTS sampling weights. These weights account for the sampling design, population oversampling, and nonresponse patterns in the data set (additional information on the sampling weights can be found in Cantor et al., 2009).

Logistic regression analysis was used to examine the association between provider–patient communication quality and with the behavioral variables of having had colorectal screening and adherence to screening recommendations, controlling in each model for demographic variables and for whether there was an explicit discussion with the provider about screening. We examined both the overall communication quality score based on all 6 items and the breakdown of items into the four components of provider–patient communication described by Epstein et al. (2005; Epstein & Street, 2007).

The significance test for the relation of the communication quality variables to the outcome assesses the statistical significance of the findings. From a public health perspective, the practical significance of the findings (Kirk, 1996) is related to the magnitude of increase in the proportion of the population screened as a function of increasing communication quality. To examine this practical significance question more directly, we analyzed logistic regression equations to estimate the proportion of the population that would be screened at each level of the communications quality variables, holding demographic covariates constant. This was done through the predicted margins technique described by Korn and Graubard (1999). This technique uses the estimated logistic regression equation to estimate the predicted value of an outcome variable (proportion of people being screened) at a given level of a predictor variable (e.g., for a value of “3” on the communication quality variable), when all covariates included in the logistic regression model are held constant at their mean levels in the population (for examples of similar use of predicted margins analyses, see Ellickson, McCaffrey, & Klein, 2009; Graubard & Korn, 1999; Kerlikowske et al., 2008; Meissner et al., 2009).

Results

Characteristics of the Sample

Given the sampling frame in the HINTS survey, the sampling weight analyses provided population-representative results from the U.S. population at the time of survey (2007). The weighted demographic characteristics of the analysis sample are presented in Table 2.

Provider–Patient Interaction and Screening Behavior

The relation between patient–provider communication quality and screening behaviors are presented in Tables 3 and 4. As can be seen in the tables, communication quality predicted the likelihood that an individual had ever been screened for colorectal cancer and that an individual was adherent with screening by at least one modality at the time of the survey. Analyses examining this relation separately for each of the three screening tests revealed that communication quality was associated with ever screening and adherence for colonoscopy screening but not for either FOBT or flexible sigmoidoscopy. This was true both for the overall measure of communication quality and for three of the four subcomponents.

In addition to the results reported in the table, we also analyzed data for two subsets of the sample. First, some individuals may be adherent with screening by more than one means; analyses excluding individuals who were adherent to multiple screening modalities were identical to the ones reported above. Second, screening tests can be ordered to follow-up on prior abnormal findings, because of clinical symptoms, or due to other medical problems. Analyses excluding individuals who reported screening for these reasons also yielded identical results.

Predictive Margins

The full set of predictive margin estimates for overall screening and for colonoscopy screening is presented in Table 5. As can be seen in the table, each stepwise increase in communication quality was associated with an increase in the probability of ever having had screening and being adherent to screening. For example, for overall current adherence with screening, moving participants from the lowest (61% adherent) to the highest level (77% adherent) of perceived communication quality was associated with a 16 percentage point increase in screening behavior.

Discussion

Overall, the analyses presented here demonstrate that an individual's perception of the quality of interaction with her/his provider is an important factor associated with colorectal cancer screening. Among individuals who had seen a health care provider in the past year, both overall quality of patient-centered communication and three of the four individual factors associated with patient–provider communication were significantly related to both current adherence to screening and with having ever been screened. This augments current literature that supports the importance of both patient–provider communication, in terms of having the time to discuss screening and describing screening procedures, as well as the influence of socioeconomic status on screening adherence (Carcaise-Edinboro & Bradley, 2008).

In terms of Epstein's taxonomy of patient-centered communication variables, three of the four components of quality communication were significantly related to adherence and ever screening. Ensuring that the patient's perspective is understood, addressing the patient's psychosocial needs are understood and met, and incorporating the patient as an equal partner in decision making were all associated with engagement in screening behavior.

The magnitude of the effects related to communication and relationship quality are important to note. As indicated by the predictive margins analysis, there is a substantially greater likelihood of engaging in and being compliant with screening if individuals have more positive perceptions of their health care interactions. Given the applicable population of individuals aged 50 years and older in the United States, this increase could potentially affect screening behaviors of several million individuals. This is clinically significant as screening has been a crucial part of decreasing suffering and death from colorectal cancer (Jemal et al., 2010).

Interestingly, this relation of perceived provider–patient communication quality did not extend to screening via sigmoidoscopy and FOBT. The nature of these findings suggests both the importance of provider–patient communication factors and also the mechanisms through which communication factors might influence screening. The fact that communication quality seems to be more strongly related to colonoscopy than FOBT may stem from important differences in the two screening procedures. Colonoscopy screening is a procedurally complex modality—it requires referral to an endoscopy clinic as well as education on the nature of the procedure and on necessary preparatory work. Given this,

significant provider–patient interaction is required en route to successful completion of the procedure. In contrast, FOBT is procedurally more straightforward. Although some instruction is required, it is not as complex and, with written instruction, may require little or no provider–patient interaction.

The findings for sigmoidoscopy are somewhat more difficult to interpret. The differences may be in part due to the fact that relatively few individuals reported screening via sigmoidoscopy. It is also the case that, in procedural complexity terms, sigmoidoscopy represents something of a “middle ground” between FOBT and colonoscopy. It is often done in the provider’s office, does not involve the complicated preparation and scheduling necessary for colonoscopy, and thus may not be as influenced by provider–patient communication. Recent evidence that providers may be more likely to recommend colonoscopy than other screening modalities (McQueen et al., 2009) might also explain the difference. To the extent that providers are more likely to communicate to patients about colonoscopy than other modalities, colonoscopy decisions would be more likely to be influenced by provider communication quality. Additionally, though the guidelines reported for the purpose of this study are the standard approach to colorectal cancer screening, a recent survey of 132 primary care providers demonstrates that there are a variety of ways in which a clinician may follow through with colorectal screening recommendations (Feldstein et al., 2011), which may also play a role in the reported results.

Limitations

The study design is a cross-sectional, self-report survey design and therefore findings should be interpreted as associations between provider–patient communication quality and colorectal cancer screening behavior. Causality cannot be inferred from the data. Also, limits of the participants’ self-report bias should be recognized. In addition, given that the behavior questions are retrospective and require retrieval of past behavior from memory, the possibility of recall biases should be considered in interpreting the findings. Future studies prospectively examining the influence of perceived communication quality on screening would be valuable for investigating causal relations.

Additionally, the survey asked about interactions with providers over the past year; it did not ask specifically about the provider with whom an individual might have discussed cancer screening. Therefore, it is unclear whether answers specifically address the provider most relevant for screening decisions. Future work examining relations with specific providers would be valuable to address this concern.

The questions used to measure communication quality provide an assessment of patient perceptions of provider–patient interactions. There are other dimensions of provider–patient relations, over and above communications factors, which might also affect patients’ screening decisions (e.g., overall level of trust in the specific provider and in the health care system, power dynamics in the relationship). Further research would be valuable to explore these other dimensions of provider–patient relations and how these other dimensions of relationships interplay with the communication quality factor studied here to influence screening behavior. Given the importance of the provider–patient relationship for ensuring quality care (Institute of Medicine, 2001), a more multidimensional approach to examining relationship factors would further our understanding of the influence of the provider–patient relationship on screening and other behaviors.

Practice and Research Directions

These findings demonstrate the important role of communication and relationship quality on screening behavior and have clear implications for clinical practice. At a very basic level,

clinicians should be aware of the influence their communication and patient satisfaction with their relationship may have on screening adherence. Awareness of the key role played by provider–patient interaction in screening and adherence, although not alone sufficient to motivate action, is a necessary first step to ultimately motivate providers to enhance communication and relationship development skills.

Conclusion

Perceived patient–provider communication quality is associated with engagement in and adherence to colorectal cancer screening. These findings add to our understanding of what factors influence colorectal cancer screening. Findings have implications for both understanding screening behavior and clinical practices to encourage screening adherence.

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Table 1

Dimensions of Patient-Centered Communications and Survey Items Used to Assess Dimensions

Communication Dimension		Survey Items
1.	Ensuring that communications during the clinical encounter involve the perspective of the patient and elicitation of key concerns and feelings	During the past 12 months, how often did doctors, nurses, or other health professionals give you the chance to ask all the health-related questions you had?
		In the past 12 months, how often did you feel you could rely on doctors, nurses, or other health professionals to take care of your health care needs?
2.	Dealing with the patient in light of the patient's individual psychological needs and social/cultural background	During the past 12 months, how often did doctors, nurses, or other health professionals give the attention you needed to your feelings and emotions?
		During the past 12 months, how often did doctors, nurses, or other health professionals help you deal with feelings of uncertainty about your health or health care?
3.	Ensuring that the encounter facilitates a common "shared understanding" (p. 2) of the underlying medical problem and treatment options	During the past 12 months, how often did doctors, nurses, or other health professionals make sure you understood the things you needed to do to take care of your health?
4.	Ensuring that the patient is an equal power partner in the clinical encounter and decision making regarding treatment options	During the past 12 months, how often did doctors, nurses, or other health professionals involve you in decisions about your health care as much as you wanted?

Table 2

Descriptive Information

Demographic Variables	**%**
Gender	
Male	45.3
Female	54.7
Race	
White, Non-Hispanic	79.0
African American, non-Hispanic	10.3
Hispanic	6.6
Other	4.1
Education	
Less than high school	16.8
High school	27.7
Some college	31.2
College graduate	14.8
Advanced degree	9.4
Income ($)	
<20,000	20.8
20,000 to <35,000	19.3
35,000 to <50,000	14.0
50,000 to <75,000	18.5
75,000+	27.4
Age (years)	
50-64	58.4
65-74	21.2
75+	20.1
Provider conversation about screening	
No	29.1
Yes	71.0
	M (*SD*)
Provider communication,[a] I (*never*) to 4 (*always*)	
Overall	3.28 (0.71)
Patient concerns	3.37 (0.71)
Psychological needs	3.11 (0.87)
Shared understanding	3.44 (0.76)
Involved in decisions	3.27 (0.89)
Outcome Variables	% Had Screening (Adherent)
Overall	68.3 (57.9)
Colonoscopy	51.6 (48.0)
Fecal occult blood testing	46.4 (21.9)

Demographic Variables	%
Sigmoidoscopy	15.4 (5.6)

[a] Mean and standard deviation of 6 items; all reported descriptive statistics are weighted based on the sampling weights (see *Methods*).

Table 3

Association Between Provider–Patient Communication and Relationship Quality With Ever Having Had Screening

Variable	Overall, OR (95% CI)	Colonoscopy (*n* = 3,835), OR (95% CI)	FOBT (*n* = 3,832), OR (95% CI)	Sigmoidoscopy (*n* = 3,770), OR (95% CI)
Provider–patient communication quality	1.17 (1.01, 1.36) **	1.22 (1.08, 1.38) **	0.96 (0.85, 1.09)	0.91 (0.76, 1.09)
Patient concerns	1.18 (1.01, 1.39) *	1.20 (1.07, 1.37) **	0.98 (0.86, 1.11)	0.87 (0.72, 1.07)
Psychological needs	1.13 (0.98, 1.30) +	1.20 (1.05, 1.37) **	0.96 (0.87, 1.07)	0.95 (0.84, 1.07)
Shared understanding	1.06 (0.92, 1.22)	1.03 (0.92, 1.16)	1.01 (0.91, 1.13)	1.00 (0.85, 1.18)
Involved in decisions	1.17 (1.03, 1.33) *	1.21 (1.09, 1.34) ***	0.96 (0.88, 1.06)	0.92 (0.82, 1.04)

Note. OR = odds ratio; CI = 95% confidence interval; FOBT = fecal occult blood testing. All analysis controlled for gender, age, race, education, and household income. Missing values for the screening behavior were not included in the analysis and account for the differences in *n* values for each behavior.

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Association Between Provider–Patient Communication and Relationship Quality With Screening Adherence

Variable	Overall, OR (95% CI)	Colonoscopy (*n* = 3,835), OR (95% CI)	FOBT (*n* = 3,832), OR (95% CI)	Sigmoidoscopy (*n* = 3,770), OR (95% CI)
Provider–patient communication quality	1.27 (1.13, 1.43)***	1.26 (1.12, 1.40)***	1.07 (0.94, 1.23)	0.94 (0.69, 1.29)
Patient concerns	1.23 (1.08, 1.41)**	1.23 (1.10, 1.37)***	1.06 (0.94, 1.20)	0.89 (0.63, 1.24)
Psychological needs	1.28 (1.13, 1.44)***	1.23 (1.09, 1.40)***	1.05 (0.93, 1.18)	1.01 (0.80, 1.26)
Shared understanding	1.07 (0.96, 1.20)	1.04 (0.93, 1.16)	1.06 (0.94, 1.20)	1.13 (0.85, 1.51)
Involved in decisions	1.19 (1.07, 1.33)**	1.23 (1.11, 1.36)***	1.06 (0.94, 1.20)	0.86 (0.71, 1.05)

Note. OR = odds ratio; CI = 95% confidence interval; FOBT = fecal occult blood testing. All analysis controlled for gender, age, race, education, and household income. Missing values for the screening behavior were not included in the analysis and account for the differences in *n* values for each behavior.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Predictive Margins Analysis

Provider–Patient Communication Quality	Overall Ever	Overall Adherence	Colonoscopy Ever	Colonoscopy Adherence
1 (*poor*)	0.73 (0.68, 0.79)	0.58 (0.52, 0.64)	0.54 (0.49, 0.61)	0.50 (0.44, 0.55)
2	0.75 (0.73, 0.79)	0.63 (0.60, 0.67)	0.59 (0.55, 0.62)	0.54 (0.51, 0.58)
3	0.78 (0.76, 0.80)	0.68 (0.66, 0.70)	0.63 (0.61, 0.64)	0.59 (0.57, 0.61)
4 (*excellent*)	0.80 (0.78, 0.83)	0.72 (0.71, 0.75)	0.66 (0.64, 0.69)	0.64 (0.61, 0.66)

Note. Predictive margins analyses estimate the predicted value of an outcome variable (screening status) for a particular level of a predictor variable (communication/relationship quality), controlling for all other covariates in the regression model. Predictive margins estimates reported here controlled for gender, age, race, education, and household income.