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## Article

# The utility of cancer-related cultural constructs to understand colorectal cancer screening among African Americans

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## Significance for public health

The 29 items of the Multi-construct African American Cultural Survey, identified through IRT analyses, can be used by community health researchers interested in determining the relevance of cultural constructs in the design and implementation of colorectal cancer screening programs in the African American community. With appropriate identification of sociocultural concerns, CRC health education materials and promotion strategies may avoid unnecessary conflicts with community beliefs and values. Avoiding conflicts between beliefs and values increases the likelihood that evidence and the recommended behaviours are considered for adoption. In addition, the short survey, as well as the broader item set, may be useful as a starting point for surveys to be used with other cancer sites. The application of IRT analysis to measures of cultural constructs to facilitate the development of accurate and efficient measures may prove useful in other racial/ethnic communities where cultural concerns may be relevant for health education and promotion.

## Abstract

**Background.** Data suggest that colorectal cancer could be cut by approximately 60% if all people aged 50 years or older received regular screening. Studies have identified socio-cultural attitudes that might inform cancer education and screening promotion campaigns. This article applies item response theory (IRT) to a set of survey items selected to assess sociocultural attitudes in order to determine how current measures may affect what we know about how these attitudes affect colorectal cancer screening (CRCS).

**Design and Methods.** A survey of colorectal cancer screening, screening attitudes and cultural beliefs was administered to 1021 African Americans – 683 women and 338 men, ages 50 to 75. Eligibility criteria for participation included being born in the United States, self-identified African American male or female, age 50 to 75 years. The IRT analysis was performed on 655 individuals with complete data for the 43 observed variables.

**Results.** Twenty-nine items comprise the Multi-construct African American Cultural Survey (MAACS) that addresses seven cultural constructs: mistrust/distrust, privacy, ethnic identity, collectivism, empowerment, and male gender roles. The items provide adequate information about the attitudes of the population across most levels of the constructs assessed. Among the sociocultural variables considered, empowerment (OR=1.078; 95% CI: 1.008, 1.151) had the strongest association with CRCS adherence and privacy showed promise.

**Conclusions.** The MAACS provides a fixed length questionnaire to assess African American CRCS attitudes, two new constructs that might assist in CRCS promotion, and a suggested focus for identification of additional constructs of interest.

## Introduction

Colorectal cancer (CRC) incidence rates have been decreasing for the past two decades, largely because of increased use of colorectal cancer screening (CRCS) tests that permit detection and removal of colorectal polyps.<sup>1</sup> It is estimated that deaths from CRC could be cut by approximately 60% if all people aged 50 years or older received regular screening tests.<sup>2</sup> Current guidelines recommend that men and women ages 50 to 75 be screened via an annual faecal occult blood test (FOBT), a sigmoidoscopy (Sig), a combination of annual FOBT and Sig every 5 years, or a colonoscopy (Col) every 7 to 10 years.<sup>3</sup>

Understanding individual attitudes and beliefs toward cancer screening is a critical step in understanding screening behaviour. Using the theory of reasoned action/planned behaviour (TRA/TPB) to situate the role of culture in African American screening behaviour, CRCS rates among African Americans are likely to be higher if individuals believe that screening will prolong their lives and improve their health, and if they believe that important people in their lives think screening is good and that they should be screened.<sup>4,5</sup> Because the typicality of a behaviour as well as the perceived degree of social approval have both been found to be important in predicting screening behaviour,<sup>6,7</sup> the need to examine the role of sociocultural attitudes in understanding screening behaviour is strengthened.

Accepting the theoretical support for the role of sociocultural attitudes in screening, several studies have identified cultural beliefs and attitudes that may be relevant to screening behavior.<sup>8,9</sup> Although theory and data indicate that there are several dimensions underlying cultural attitudes affecting screening behaviours, there are few studies that have simultaneously studied these dimensions. This article applies item response theory (IRT) to a set of items identified and/or developed to assess the different dimensions derived inductively from literature review and supplemented by those derived deductively from formative research. The goal of the research was to determine whether the items could be integrated into a comprehensive measure comprising several sub-scales representing the different attitudinal dimensions. Item difficulties and ordering of response thresholds were analysed for the different subscales and scores from the subscales were used to examine the predictive validity of the measure.

## Design and Methods

### Participants

The participants were 1021 African Americans - 683 women and 338 men, recruited from a targeted list sample created using random digit

dial (RDD) generated lists matched to a market research data sample. The list was drawn to assure that major geographical regions were represented. In addition to this list, a separate RDD list was purchased and used in calling to reduce biases produced by a listed sample. Eligibility criteria for participation included birth in the United States, self-identified African American male or female aged 50 to 75, a mailing address (for mailing of incentives), and working telephone number. The rate at which females answered the telephone calls and agreed to participate in the study resulted in oversampling of this population.

## Measures

**Item selection.** As a part of scale development, research assistants completed a search of computerized databases, including Ovid Healthstar (1990-2006), PsycINFO (1990-2008), Medline (1990-2008), Sociofile (1990-2008), and Social Sciences Citation Index (1990-2008), structured to capture items and scales that have been empirically linked to cancer preventive behaviour among African Americans. Key words, including i) sociocultural, ii) cultural, iii) cultural and social constructs, iv) sociocultural measures, v) cultural measures, vi) medical mistrust, vii) fatalism, viii) religiosity, ix) spirituality, x) collectivism, xi) communalism, xii) racial and ethnic identity, and xiii) privacy were used to search titles, abstracts, and subject headings in all databases. Religiosity/spirituality items addressed the internal manifestation of belief in a higher power and commitment to attendant values.<sup>10,11</sup> Fatalism items focused on the belief that events are beyond an individual's control.<sup>12</sup> Cancer fatalism is defined as the belief that death is inevitable when cancer is present.<sup>13,14</sup> Racial/ethnic identification items referred to a psychological attachment to a social category, when the category selected is based on *race* or skin colour, common history, nationality, culture, or ancestry.<sup>15</sup> Items covered the centrality, salience, and public and private regard of ethnic identity<sup>16</sup> and racial pride as an aspect of racial identification.<sup>17</sup> Trust of the medical profession items addressed the belief that individuals and institutions will act appropriately and in a manner consistent with patients' interests and included behaviour all factors, such as the experience of discrimination.<sup>18</sup> Finally, collectivism items assessed the belief that one is linked with family and similar others and holds a cooperative attitude, often leading to personal goals being subordinated to those of the group.<sup>19</sup>

A Scientific Advisory Committee (SAC) composed of research faculty from health, psychology, health social work, epidemiology, communications and a Community Advisory Committee (CAC) composed of members from social service, health and religious not-for-profits received an annotated version of the items and were asked to suggest new constructs, item deletions, item additions, rewording or edits of existing items based on grammar, readability, knowledge of African American socio-cultural beliefs, attitudes and behaviour and experience working in the African American community.<sup>20</sup> The SAC recommended and generated items that addressed privacy, gender and cancer specific beliefs, in addition to the items taken from the literature; the new items were reviewed by the CAC for appropriateness. All items (those developed for the study and items from previous scales) were subjected to cognitive response testing conducted by the project PI and graduate research assistants (see article cited for a full description of item development).<sup>20</sup> Based on the cognitive response testing, fatalism items were reworded to address a more positive attitude toward African Americans' ability to exert control of health and cancer outcomes through screening or a sense of empowerment.

Fifty-five items were subjected to confirmatory factor analysis conducted using the *cfa* procedure in the structural equation modelling (SEM) package in R version 2.11.1 (R Development Core Team, 2010).<sup>21</sup> Each factor was anchored by one item with an assigned loading of 1. Once items with low loadings (<0.3) were removed, the 43 useful items retained,<sup>22</sup> represented seven scales: religiosity ( $\alpha=0.79$ ),

mistrust/distrust ( $\alpha=0.81$ ), privacy ( $\alpha=0.70$ ), ethnic identity ( $\alpha=0.49$ ), collectivism ( $\alpha=0.65$ ), empowerment ( $\alpha=0.61$ ), and male gender role ( $\alpha=0.70$ ). Items were rated on a 5-point Likert-type scale ranging from 5 = *strongly agree* to 1 = *strongly disagree*.

**CRCS.** The National Cancer Institute (NCI) CRCS questionnaire was administered to determine participant adherence status.<sup>23</sup> NCI CRCS items included whether participants ever had a screening test to see if their colon was healthy, whether participants had ever received a FOBT, Sig, Col, or barium enema, the date of the most recent test and the reason for that test. A description of each screening test was provided. The validity and reliability of the measures have been established.<sup>24</sup> All items were used to determine CRCS adherence.

**Demographic variables.** Data on age, education, income, occupational status and category, marital status, and health insurance status were gathered.

## Procedure

The Washington University in St. Louis Institutional Review Board approved this study and the consent procedures used. A national telephone survey of African Americans was conducted via call centre. Individuals were told that researchers were recruiting participants for a study of attitudes that may relate to cancer screening. If two eligible individuals resided at the residence associated with the telephone number, the Computer Assisted Telephone Interview system accessed a preselected random number for the sampled household, which determined which respondent was selected. Of 7471 completed calls, 40% (N=2986) of those contacted were ineligible for the study and 41.69% (N=3115) refused to respond at the point of screening. Of the 1370 respondents who were eligible for the study, 1021 African Americans (84.66%) completed the survey. Participants provided verbal consent for administration of a baseline survey, which included social and cultural variables, CRCS, and demographic information. The survey took approximately 35 minutes to complete by telephone. Five percent of participants ( $n=50$ ) were asked to consent to a re-administration necessary to establish test-retest reliability.<sup>25</sup>

## Analyses

Prior to conducting the IRT analyses, the survey was checked for unidimensionality, a fundamental assumption of the IRT model, using (*i.e.*, Samejima's Graded Response Model,<sup>26</sup> GRM). Reckase demonstrated that IRT models are robust to departures from unidimensionality when at least 20% of the variance in a scale is explained by the first factor.<sup>27</sup> To examine this, an exploratory factor analysis without rotation was conducted for each subscale individually, using a principal axis extraction. For all subscales, examination of the scree plots suggested that a dominant first factor emerged. In addition, the first factor in each solution explained at least 20% of the variance, above Reckase's minimum rule of thumb. Specifically, the mean eigenvalue for the first factor was 2.53 (minimum = 2.07, maximum = 3.62), and the mean percent of variance explained was 42% (minimum = 30%, maximum = 53%). Accordingly, item parameters were estimated using the IRT analyses, evaluating each factor as a single test.

To estimate item parameters, MULTILOG 7.03,<sup>28</sup> using Samejima's GRM,<sup>26,29</sup> was used. The GRM is an extension of the two-parameter logistic (2PL) model, where the response options are represented as a series-ordered dichotomies (*i.e.*, choosing between one response option and the next). Because items were rated on a 5-point Likert-type scale, this IRT model was used.<sup>30</sup> For each item, the GRM yields a single discrimination, or slope parameter ( $a$ ) and  $m-1$  threshold, or difficulty parameters ( $b$ ), where  $m$  indicates the number of response options for a scale. The  $a$ -parameter indexes the extent that an item can differentiate between respondents with different levels of the latent trait, with larger values indicating a greater capacity to differen-

tiate between respondents. The GRM operates by also estimating a series of *b*-parameters, which index the location(s) on the latent trait continuum where respondents have a 0.50 probability of choosing the next highest response option in each adjacent pair of options. These are subsequently interpreted similarly to the *b*-parameters in the 2PL model. The *a* and *b* parameters are numerical summaries of the item characteristic curves (ICCs) for the response options, which can be used to visually examine items and describe the combined characteristics of questions on the underlying opinion/attitude of the scale. Test Characteristic Curves (TCCs) are also used to evaluate items and describe the combined characteristics of the scale questions on the underlying opinion/attitude of the scale. In the context of this research, this statistic shows the relationship of the combined socio-cultural attitude items and the scale being measured.

In addition to the aforementioned parameters, IRT can be used to estimate an item information curve (IIC) for each item. These IICs show the range of the trait that a test question covers and where the question shows its strongest measurement. In other words, this is the point on the latent trait continuum where it best differentiates among people on the characteristic being measured. The peak of the question corresponds to where the question provides the most information. Using the individual IICs to select items, the criterion for selecting items can be set at Information  $\geq 1.0$ . The IICs for a test can be summed to provide a summary index of information across the latent trait continuum for the overall test. Specifically, TIFs represent the additive combination of the IICs in a scale. In the context of this research, this statistic shows the relationship of the combined socio-cultural attitude

items and the scale being measured.

Using SPSS software, version 19.0, a logistic regression analysis was conducted to determine the associations between the sociocultural scales and self-reported CRCS adherence status. The independent variables in these analyses were religiosity, mistrust/distrust, privacy, ethnic identity, collectivism, empowerment, and male gender role scales. The dependent variable was CRCS screening status, determined using US Preventive Task CRCS guidelines for screening.<sup>31</sup>

## Results

### Sample characteristics

The IRT analysis was performed on 655 individuals with complete data for the 43 observed variables. To determine whether there were any notable differences between those with missing data and those with complete data, we compared complete and incomplete survey participants for average age and the distribution of sex, education, marital status, unemployment status, and income. We found significant differences in age, education, and marital status between the two groups, however, the differences were not extreme (Table 1). For example, complete data participants were more likely to be in the high school diploma or graduate degree categories, but less likely to be in the college degree category compared to those with incomplete data. For those with complete data, the average age was about 63 years, with a mean of 63.4 years for women and 62.4 years for men. Women were more

**Table 1. Comparison of demographic characteristics for participants with complete (n=655) and incomplete (n=364) data on variables utilized in confirmatory factor analysis.**

Demographics	Complete (n=655)		Incomplete (n=364)		t or $\chi^2$ ; P
	n	%	n	%	
Age (mean, SD)	62.5	7.4	64.2	8.0	t(1019)=3.3; <0.01
Sex					$\chi^2(1)=0.01$ ; n.s.
Male	216	33.0	122	33.3	
Female	439	67.0	244	66.7	
Education					$\chi^2(6)=12.8$ ; p<0.05
<high school	17	2.6	17	4.7	
Some high school	47	7.2	39	10.7	
High school diploma/GED	188	28.7	83	22.8	
Trade or tech school or training	31	4.7	23	6.3	
Some college	171	26.1	89	24.5	
College degree	114	17.4	73	20.1	
Graduate degree	87	13.3	40	11.0	
Marital status					$\chi^2(3)=10.1$ ; p<0.05
Single	129	19.7	50	13.7	
Married or living with partner	270	41.3	139	38.2	
Divorced or separated	139	21.3	99	27.2	
Widowed	116	17.7	76	20.9	
Employment status					$\chi^2(2)=3.3$ ; n.s.
Unemployed	456	69.7	274	75.1	
Part-time employment	57	8.7	26	7.1	
Full-time employment	141	21.6	65	17.8	
Total household income					$\chi^2(6)=5.7$ ; n.s.
<\$10k	58	9.8	32	11.1	
\$10k to <\$20k	124	20.9	60	20.9	
\$20k to <\$35k	136	22.9	62	21.6	
\$35k to <\$50k	96	16.2	54	18.8	
\$50k to <\$75k	79	13.3	44	15.3	
\$75k to <\$100k	55	9.3	23	8.0	
\$100k+	45	7.6	12	4.2	

likely to have some college ( $n=185$ , 27.1%) compared to men ( $n=75$ , 22.2%), whereas a higher percentage of men reported completing college ( $n=72$ , 21.3%) than women ( $n=115$ , 16.8%). A higher percentage of men were employed full time ( $n=91$ , 26.9%) than women ( $n=115$ , 16.8%). Women were more likely to earn less than \$35,000 a year (49.7%) compared with men (39%) and less likely to earn \$75,000 or more (9.7% and 20.5%, respectively). An overwhelming majority of participants reported having insurance (women, 97.6% and men, 94.7%) and approximately 60% of participants were CRCS adherent.<sup>22</sup>

### Item response theory analysis

As explained above, the IICs were examined to determine the amount of information each item contributed to the sub-scale. Using the individual IICs to select items, the criterion for selecting items can be set at Information  $\geq 1.0$ . In this study, this yielded only 10 items and excluded two dimensions entirely (ethnic identity and collectivism). The Most Information selection criterion was lowered from 1.0 to 0.80 and resulted in retention of one additional item. When items with Moderate information were added ( $0.40 \leq \text{Information} \leq 0.80$ ), an additional 18 items were retained, bringing the total to 29 usable items. While insufficient for some measurement strategies, such as computer adapted surveys (the minimum specified number of items is 5 for each of the 7 constructs), 29 items might form a useful short survey of cultural attitudes informing CRCS. Thus the analysis focused on how well the items fit together and sought to understand whether a useful set of scales could be constructed for a short survey.

Based on the analysis of IICs, there are 29 questions that provide information related to the respondents feelings and/or opinions in the seven general areas of interest (Table 2). The items provide information on all seven dimensions addressing respondents' opinions on cultural attitudes related to CRCS, although not to the same degree. Of these, six items are in the mistrust/distrust dimension (MD), five each are in religiosity (RE) and ethnic identity (EI), four are in privacy (PR), and three each are in collectivism (CO), empowerment (EM), and male gender role (MGR). The strongest dimension was privacy (PR), where four of the six items available were strong ( $>0.80$ ) in providing information. The MD scale has the most usable items (6), although most of them (4) provide only moderate information ( $0.40 \leq \text{Information} \leq 0.80$ ). Two of the areas of interest, EI and CO, provide only moderate information. Proportionally, RE has the largest number of included items from those that emerged from the factor analysis five out of six, although only three of these provide strong information.

The TCCs showed that all of the dimensions and their collective items provided information about at least some opinions they cover. For example, EM, EI, MD, and MGR cover all ranges of opinion ( $\theta=-3.0$  to 3.0) in providing information. RE, on the other hand, provided information from  $-3.0 \geq \theta > 0.20$ , which is to say that it is most useful for those who have little or no religious faith to those who are neutral about it.

Privacy provides maximum information at about  $\theta=0.80$ , 1.6, and 2.4. That is, it provides the most information about those who disagree with the items on PR, and those who agree or strongly agree with the opinions about how much information to share with healthcare providers, although there is a strong drop-off over  $\theta=2.6$ .

The effect changes when the individual items, relative to the 29-item survey, are examined. The distribution of the responses for each item included in the religiosity dimension will be used to illustrate this point. The examination of ICCs and IICs was completed to assess who would tend to answer the question where it provides the maximum amount of information (an IRT characteristic). When ICCs and IICs are assessed, the item addressing consultation of religious leaders in health decisions is essentially flat and low across all levels of RE and offers little information. There are several reasons why this might be.<sup>32</sup> First, it may be measuring something different from the other items in the RE scale. Second, perhaps the item is poorly worded for African

Americans in this age range considering CRCS or in the context of the survey, and needs to be rewritten. Third, the item may be too complex or multifaceted for the respondents. Fourth, the item may be out of place in the survey or the overlap of constructs may have caused this item to be in the wrong place. All of these possibilities need to be considered and addressed if this item is to be included in future versions of the instrument.

ICCs also show the relationship between someone's response to each category (in this case, *strongly disagree*, *disagree*, *neither agree nor disagree*, *agree*, and *strongly agree*) and their level on the underlying trait ( $\theta$ ). For example, on the religiosity item *I seek God's guidance when making decisions about my health* – a person with low religious beliefs ( $\theta = -2.0$ ) would have about a 27% probability of strongly disagreeing with the statement and about a 58% probability of disagreeing with it. On the other hand, they would show only a 5% probability of agreeing with the statement and essentially a 0% probability of strongly agreeing with it. Based on the current sample, African Americans 50 to 75 years of age ( $\theta=0.0$ ) present quite a different picture. Such a person would have nearly a 0% chance of selecting *strongly disagree*, *disagree*, or even *neither agree nor disagree* for this item. They would have a 57% probability of selecting *Agree* and a 43% probability of selecting *strongly agree*. That is, about 100% of the people in this population (as suggested by this sample) will at least agree with this statement. Another way of looking at this is that an African American age 50 or over seeks God's guidance in medical matters.

Another religiosity item – Religion offers me comfort – is similar to the religiosity as guidance on health and screening and suggests that people who are not religious have an 82% probability of being at least neutral or less about religion providing them comfort. An interesting point about this is that an equal percentage of this group would select *agree* as would select *neither agree nor disagree*. Essentially, no one would pick *strongly agree*, as would be expected, given their religious belief. The ( $\theta = 0.0$ ) response of a person similar to those in this sample is quite similar to the responses on the item discussing whether religion provides guidance on health behaviours. In general, no one at this level of this dimension selects *strongly disagree*, *agree*, or *neither agree nor disagree* as their choice. The probability of selecting *agree* is 0.70 and of selecting *strongly agree* is 0.30. While there is a 13% probability of selecting *strongly agree* on the guidance item, the *strongly agree* and *agree* options of both items are strongly associated with CRCS adherence in this population. If the item that addresses consulting a religious leader about health is again considered, a person who is not particularly religious ( $\theta=-2.0$ ) has an 88% chance of picking *strongly disagree* or *disagree* for this item. Most of them will probably select *disagree* (probability = 0.68).

### Associations with colorectal cancer screening adherence

Given an understanding of the strength and range of the attitudes covered by the items representing the seven constructs, construct association to CRCS adherence was examined using logistic regression. The model controlled for the effects of sex, income, education, and marital status and usual place to receive health care. Scales were constructed using two strategies: simple summing of items and summing items, with strong items multiplied by 2. When scales were created by summing items, privacy (OR=0.984; 95% CI: 0.913, 0.916) and empowerment (OR=1.07; 95%CI: 1.005, 1.129) were associated with CRCS adherence. Participants who held strong privacy beliefs and believed CRC and other health issues should not be shared with physicians, family members, and close friends were less likely to be screening adherent ( $P<0.01$ ). Individuals who reported a strong belief that they could affect cancer outcomes were more likely to be CRCS adherent ( $P<0.03$ ). Table 3 shows the results when strong items were weighted. Empowerment (OR=1.08; 95% CI: 1.008, 1.151) was associated with

**Table 2. Item parameter estimates (a: discrimination parameter, b1-b4: m (number of responses) -1 discrimination threshold parameter).**

Parameter	a	b1	b2	b3	b4	ICC
<b>Religiosity</b>						
I seek God's guidance when making every important decision about my health	3.24	-2.31	-1.49	-1.17	0.07	Strong
Religion offers me comfort when I have health problems	2.67	-2.74	-1.79	-1.44	0.24	Strong
When I have a health problem, I talk with a religious leader about the problem	0.97	-3.43	0.11	0.64	2.31	Little
When I have decisions to make in my life, I often ask God what He wants me to do	2.93	-2.52	-1.32	-1.05	0.51	Strong
God gives me the strength to take care of myself and my health	1.67	-4.24	-2.47	-2.01	0.80	Some
God works through health care professionals to heal us	1.71	-3.45	-1.95	-1.49	0.93	Some
<b>Mistrust/discrimination</b>						
I prefer having an African American doctor	0.58	-4.72	1.05	3.61	6.13	Little
Health care professionals are as concerned about the health of African Americans as other racial groups	1.52	-1.69	0.43	1.06	2.81	Some
Health care workers do not take the medical complaints of African Americans seriously	2.26	-1.75	0.43	0.92	2.24	Strong
African Americans cannot trust doctors and/or health care workers	1.84	-1.51	1.12	1.83	3.12	Some
I have personally been treated poorly or unfairly by doctors or health care workers because of my race	1.62	-1.52	1.16	1.56	2.96	Some
I believe that racial discrimination in a doctor's office is common	2.02	-2.07	0.31	0.86	2.70	Strong
African Americans continue to experience discrimination in the healthcare system	1.27	-4.24	-1.15	-0.34	2.43	Little
African Americans receive the same medical care from doctors and health care workers as people from other racial groups	1.73	-2.23	-0.19	0.46	2.12	Some
African Americans have access to health care opportunities that are available to most people	1.03	-3.25	-0.06	0.48	2.62	Little
<b>Privacy</b>						
Colon (colorectal) cancer screening is something that I don't talk about with others	0.95	-3.33	0.75	0.96	4.37	Little
There are some health matters that I don't tell even my closest friends about	0.70	-4.83	0.10	0.39	4.80	Little
I don't think family health problems such as blood in the stool should be discussed with health care professionals	2.82	-0.78	1.64	1.75	2.63	Strong
My doctor does not need to know some personal information about my health	3.54	-0.68	1.78	1.86	2.52	Strong
I don't like answering some of the personal questions my doctor asks	2.30	-1.18	1.33	1.44	2.88	Strong
I worry about what my healthcare professional will think of me if I give certain information	2.43	-1.20	1.52	1.68	2.79	Strong
<b>Ethnic identity</b>						
Overall, being African American has very little to do with how I make decisions about my health	0.50	-6.77	-2.51	-2.13	3.05	Little
It is important that my doctor respects me as an African American or Black person	1.48	-3.95	-2.12	-1.62	0.97	Some
It is important that my doctor recognizes me as an African American or Black person	1.21	-3.99	-1.83	-1.11	1.67	Some
I have a lot in common with members of my racial group	1.32	-4.59	-1.78	-1.17	2.36	Some
I often think about being a member of my racial group	0.58	-6.44	-0.85	0.14	5.40	Little
In general, I am glad to be a member of my racial group	1.66	-4.21	-2.70	-2.10	0.81	Some
I don't feel a strong sense of being connected to my racial group	1.30	-4.09	-2.04	-1.59	1.83	Some
<b>Collectivism</b>						
When I hear information about the health of the black community, I am more likely to get screened	0.85	-5.36	-1.07	-0.32	3.37	Little
The decisions I make about my health influence the health decisions of other African Americans	1.37	-3.42	-0.97	-0.34	2.31	Some
I believe that it is my duty to work together with friends to stay healthy	1.80	-3.65	-1.59	-1.26	1.27	Some
When I get well, it is usually because other people such as family, friends, or church members have been taking care of me	0.96	-4.58	-1.04	-0.44	2.72	Some
I believe that a person has an obligation to the community to maintain one's health	1.69	-4.12	-1.52	-1.08	1.52	Little
<b>Empowerment</b>						
Black/African Americans should obtain recommended screening to prevent cancer	2.38	-3.58	-2.46	-2.10	0.78	Strong
I believe that there are things that I can do to find colon (colorectal) cancer	1.02	-4.87	-1.76	-1.02	2.38	Little
My decision to get tested for cancer will help find cancer	1.14	-5.16	-2.59	-2.03	1.56	Some
I avoid medical problems by having screening tests	1.45	-3.71	-1.60	-1.28	1.79	Some
I believe that if I get screened for cancer I will live a longer life	1.26	-4.62	-1.71	-1.07	2.05	Little
It is my responsibility to maintain my health for my family	1.21	-4.90	-3.11	-2.87	0.69	Little
<b>Male role (males only)</b>						
Black/African American men are afraid of going to the doctor	2.17	-2.41	-0.61	-0.30	1.98	Strong
A Black/African American man's image of himself is affected by exams that involve rectal insertion	1.59	-2.46	-0.26	0.16	2.55	Some
There are some health topics that Black/African American men don't talk about	2.11	-2.58	-1.14	-0.79	1.65	Some
Black/African American men don't like to show emotions in situations that involve health	1.23	-4.42	-1.20	-0.77	2.30	Little

**Table 3. Association of socio-cultural constructs (weighted) with CRCS adherence**

Item	B	S. E. (B)	Wald	OR (95% CI)
Religiosity	-0.009	0.013	0.477	0.991 (0.967, 1.016)
Mistrust discrimination	-0.020	0.011	3.067	0.989 (0.959, 1.002)
Privacy	-0.006	0.015	0.165	0.994 (0.966, 1.023)
Ethnic identity	-0.016	0.030	0.280	0.984 (0.928, 1.044)
Collectivism	-0.007	0.028	0.060	0.993 (0.940, 1.049)
Empowerment*	0.75	0.034	4.877	1.078 (1.008, 1.151)
Male gender role	0.023	0.018	1.633	1.023 (0.988, 1.060)
Sex	-0.228	0.152	2.251	0.796 (0.591, 1.072)
Education	0.007	0.042	0.032	1.007 (0.929, 1.093)
Marital status**	0.176	0.065	7.428	1.193 (1.051, 1.354)
Income*	0.092	0.030	9.524	1.096 (1.034, 1.162)
Usual place for healthcare	-0.152	0.148	1.055	0.859 (0.642, 1.148)

\*P<0.001. \*\*P<0.01. Model variance explained: 4.3%; socio-cultural variance: 1.7%.

CRCS adherence. Individuals who reported a strong belief that they could affect cancer outcomes were more likely to be CRCS adherent (P<0.008).

## Discussion

This analysis was conducted to determine how current sociocultural measures may affect what we know about how these attitudes and beliefs affect CRCS of US-born African American population aged 50 or older. Fortunately, the IRT analysis showed that the Multi-construct African American Cultural Survey (MAACS) could form a good fixed-length questionnaire to assess seven constructs of interest for African Americans eligible for CRCS. The 29 items included on the seven scales provide adequate information about this population across most levels of the constructs assessed. Unfortunately, even under very relaxed conditions for item selection, there were an insufficient number of items to create the item bank necessary to construct a usable computer adaptive survey, since these surveys require more items to assure efficient and accurate assessment across constructs and the population of interest. While computer adaptive surveys would be ideal in community settings where the use of a minimum item set could result in more rapid assessments, the MAACS is a short questionnaire sufficient to accurately assess the opinions and feelings of African Americans 50 to 75 years of age about preventive screening related to CRC. The MAACS fills a critical need for a comprehensive questionnaire that assesses cultural attitudes and beliefs relevant for CRC health behaviours that have been identified to date.

Although the items and scales included in the survey have been reported on and examined in the literature, only two of the scales, privacy and empowerment, were associated with CRCS adherence; the association between empowerment and adherence was present regardless of scale construction. Consistent with TRA/TPB's emphasis on the role of social norms and influences on health behaviours, these findings suggest that the identification and selection of new constructs should focus on those cultural attitudes and beliefs that signal the strength of social influence on the screening or health behaviour (privacy) and social norms that prime active engagement in health behaviours (empowerment).

The IRT analyses permit a better understanding of how well the items identified fit together. The examples from the analyses suggest

that even items that have been previously used to assess attitudes about dimensions such as religiosity and health may not function as well as previously noted when used in specific cancer contexts.<sup>11</sup> A number of the items examined were found in the breast and prostate cancer screening literature and responses may have been affected by cultural issues relevant to sex specific cancers.<sup>10,11,17,18</sup> This finding suggests the importance of exploring the relevance of items for specific cancers. The construction of scales and measures concerned with the assessment of sociocultural attitudes in cancer preventive behaviour must be carefully considered. Without appropriate selection and analysis, this IRT study suggests that it is not certain how well surveys composed of items drawn from the general health or cancer literature capture the relevance of cultural attitudes and beliefs for specific cancer behaviours.

## Conclusions

Several limitations in these data should be noted. First, this sample is not representative of a national sample of African Americans 50 to 75 years, and a representative sample might yield different results. For example, it is estimated that 20% of African Americans between 50 and 64 years of age are uninsured,<sup>33</sup> but the uninsured rate in this sample was approximately 4.3%. However, the analyses were conducted using a large national sample of African Americans eligible for colorectal cancer screening, with adherence rates consistent with national data which increases the likelihood that these data contribute to our understanding of sociocultural measurement issues. In addition, the search of the databases used to select items that might comprise scales included articles up to 2008 so that more recent data and items are excluded. Additional research should explore the literature for new items that might better capture relevant attitudes. In addition, it is possible that different sub-groups in the sample (*i.e.*, males and females) might have different response tendencies to the items. Specifically, this should be investigated in future research using differential item functioning analyses. Despite these limitations, the data indicate the validity of a short survey covering several cultural constructs previously discussed in the literature that may be useful to other researchers examining relationships between cultural constructs and health in African-American populations.

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