

Development of Cultural Belief Scales for Mammography Screening

Kathleen M. Russell, DNS, RN, Victoria L. Champion, DNS, RN, FAAN,
and Susan M. Perkins, PhD

Purpose/Objectives: To develop instruments to measure culturally related variables that may influence mammography screening behaviors in African American women.

Design: Instrumentation methodology.

Setting: Community organizations and public housing in the Indianapolis, IN, area.

Sample: 111 African American women with a mean age of 60.2 years and 64 Caucasian women with a mean age of 60 years.

Methods: After item development, scales were administered. Data were analyzed by factor analysis, item analysis via internal consistency reliability using Cronbach's alpha, and independent t tests and logistic regression analysis to test theoretical relationships.

Main Research Variables: Personal space preferences, health temporal orientation, and perceived personal control.

Findings: Space items were factored into interpersonal and physical scales. Temporal orientation items were loaded on one factor, creating a one-dimensional scale. Control items were factored into internal and external control scales. Cronbach's alpha coefficients for the scales ranged from 0.76–0.88. Interpersonal space preference, health temporal orientation, and perceived internal control scales each were predictive of mammography screening adherence.

Conclusions: The three tested scales were reliable and valid. Scales, on average, did not differ between African American and Caucasian populations.

Implications for Nursing: These scales may be useful in future investigations aimed at increasing mammography screening in African American and Caucasian women.

Key Points . . .

- Cultural beliefs can influence mammography screening.
- Scales were developed to measure cultural constructs, including space, time, and control.
- These valid and reliable scales predicted screening adherence.
- The cultural constructs measured by the scales did not differ in the African American and Caucasian participants.

women (Ashing-Giwa, 1999). However, standardized measurement instruments for cultural beliefs specific to cancer screening have not been developed. The purpose of the current study was to develop an instrument to measure culturally related variables that may influence mammography screening behaviors in African American women.

Background

Airhihenbuwa (1992) and King and Williams (1995) criticized the use of health behavioral models that do not include cultural variables that may explain health behaviors in African Americans. In relation to breast cancer screening behav-

African American women have higher breast cancer mortality rates than Caucasians and other ethnic minority groups (American Cancer Society, 2002). Furthermore, only Caucasian women aged 40 or older have experienced the recent and significant decreases in breast cancer mortality (Marbella & Layde, 2001). Screening mammography is the best way to discover breast cancer early, thus reducing mortality (Kerlikowske, Grady, Rubin, Sandrock, & Ernster, 1995).

Culture is known to influence health-seeking behaviors and health outcomes (King & Williams, 1995) and is a major determinant of preventive health practices in the African American community (Bailey, 2000). In the context of breast cancer, research shows that cultural beliefs are related to behaviors in African Americans (Smith, Phillips, & Price, 2001). The inclusion of cultural belief constructs in health behavioral models, therefore, may add to the predictability of breast cancer screening behaviors in African American

Kathleen M. Russell, DNS, RN, is an associate professor, and Victoria L. Champion, DNS, RN, FAAN, is an associate dean of research and Mary Margaret Walther/Distinguished Professor of Nursing, both in the School of Nursing at Indiana University in Indianapolis. Susan M. Perkins, PhD, is an assistant professor in the Division of Biostatistics in the School of Medicine at Indiana University in Indianapolis. This research was supported by grant #PA99104 from the National Cancer Institute, grant #P30NR05035 from the National Institute of Nursing Research to the Center for Enhancing Quality of Life in Chronic Illness in the School of Nursing at Indiana University, New Faculty Development Grant and Minority Faculty Grant from Indiana University Purdue University at Indianapolis Office for Professional Development, and Project Development Fund from the School of Nursing at Indiana University. (Submitted August 2002. Accepted for publication November 26, 2002.) (Mention of specific products and opinions related to those products do not indicate or imply endorsement by the Oncology Nursing Forum or the Oncology Nursing Society.)

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iors, Rajaram and Rashidi (1998) suggested that health behavioral models fail to address variations within the sociocultural context of individuals' health-seeking and health-behavior decisions, actual health practices, and risk perceptions. Cognitive models often do not consider the influence of individuals' social networks on the meaning they attach to illness and ignore the important emotional aspects of making decisions about health practices. Furthermore, health risks are defined within a medical paradigm rather than from individual cultural perspective of risks.

Although all African American women would not hold specific cultural beliefs in the same degree (Spector, 1996), the literature identifies several commonly held beliefs. In their review of cross-cultural breast cancer screening behavior studies, Smith et al. (2001) found that sociocultural factors were related significantly to breast cancer screening practices as well as provider and healthcare system barriers. Hoffman-Goetz and Mills (1997) reviewed studies of cultural barriers to cancer screening among African American women and concluded that cultural factors have a dominant influence on breast cancer screening behaviors. Predominant culturally related factors concerning breast cancer and screening in African American women include fear of cancer discovery, doctors, or treatment (Dangelis et al., 1995; Friedman et al., 1995; Phillips, Cohen, & Moses, 1999; Tessaro, Eng, & Smith, 1994) and a fatalistic view about the inevitability of death once diagnosed (Conrad, Brown, & Conrad, 1996; Jennings, 1996; Phillips, 1999). Spirituality and religiosity also have been related to African Americans' breast cancer screening behavior (Lannin et al., 1998; Phillips et al., 1999; Phillips, Cohen, & Tarzian, 2001; Price, Desmond, Slenker, Smith, & Stewart, 1992). Investigators have identified common folk beliefs about causes of cancer in African Americans (Gregg & Curry, 1994; Lannin et al.; Mathews, Lannin, & Mitchell, 1994; Phillips et al., 1999) and also have found that social networks influence breast cancer health-seeking behavior (Phillips et al., 2001; Tessaro et al.).

Situational and healthcare system factors are related to mammography adherence in African American women, including (a) low socioeconomic status (Burns et al., 1996; Hegarty, Burchett, Gold, & Cohen, 2000; Phillips & Wilbur, 1995), (b) lack of health insurance (Mandelblatt, Traxler, Lakin, Kanetsky, & Kao, 1993; Mickey, Durski, Worden, & Danigelis, 1995), (c) having no regular source of care (Burns et al.; Champion & Menon, 1997; Mickey et al.; Pearlman, Rakowski, Ehrich, & Clark, 1996), (d) lack of provider recommendation (Champion & Menon; Coleman & O'Sullivan, 2001; Crump, Mayberry, Taylor, Barefield, & Thomas, 2000; Mickey et al.; Vernon et al., 1992), and (e) provider attitudes perceived as uncaring and disrespectful (Burnett, Steakley, & Tefft, 1995). However, Reisch, Barton, Fletcher, Kreuter, and Elmore (2000) found that, even when these factors were controlled, African American women had lower mammography screening rates than Caucasian women. The researchers recommended further exploration of other factors, such as culturally related beliefs and mammography screening.

Theoretical Model

Because cultural influences appear to play a role in breast cancer screening behaviors for African American women, Giger and Davidhizer's (1999) cultural assessment model for health was used to guide the development of the study's cul-

turally related belief scales. Three constructs from the model, personal space preferences, temporal orientation, and perceptions of environmental control, were used to develop the scales. Each construct is proposed to independently influence health-seeking behavior, and preliminary exploration of these relationships has occurred in a few earlier studies on breast cancer screening behaviors in African American women.

Personal space refers to the domain of sensory perceptions related to the proximity and movement of objects in the environment relative to an individual's body. Personal space or the immediate environment surrounding the body also is related to territoriality, which means that individuals have a need to control their personal space and may feel threatened when they lose control of their space, such as in the case of illness (Hayter, 1981). Culture is a major determinant of how individuals delineate their personal space as well as their perceptions of and responses to invasion of that space (Giger & Davidhizer, 1999). Varying degrees of discomfort occur when an individual's personal space is affected, such as with loss of privacy or the interference of others or objects within the individual's personal space. In relation to health behaviors, an individual may submit to a medical regimen initially but fail to continue adherence because the individual perceives intrusion on his or her personal space (Hayter). Crump et al. (2000) found that privacy and embarrassment concerns were predictive of mammography screening in low-income African American women. In their study, African American women who perceived obtaining a mammogram as embarrassing were 2.8 times more likely to miss their screening appointments as women who did not hold this belief. In view of the varying beliefs about privacy across cultures, Rajaram and Rashidi (1998) strongly recommended further investigation of the influence of this cultural dimension on breast cancer screening.

Health temporal orientation refers to an individual's perspective on present health beliefs and health behaviors as related to concerns about future health. Hughes, Lerman, and Lustbader (1996) attributed lower perceptions of breast cancer risk among African American women with first-degree relatives diagnosed with breast cancer compared to Caucasian women as reflective of the Afrocentric view of time orientation. This worldview emphasizes the present rather than the future; therefore, a future probability of having breast cancer may be less relevant to African American women than to Caucasian women. From focus group data of African American women, Tessaro et al. (1994) found that the prevention of breast cancer was not emphasized as a social norm for these women.

A third component of the framework involves perceptions of control over a person's environment. **Personal control** is the ability of an individual or group to plan activities to control the environment and to direct factors within the environment (Giger & Davidhizer, 1999). Few studies have been conducted on control and breast cancer screening in women, and the results have been mixed. The investigators of these studies defined control as internal and external, with external control including control by powerful others and chance. Hallal (1982) found an inverse relationship between external control by powerful others and self-breast examination. She found no relationships involving internal or chance control. The results of Bundel, Marks, and Richardson's (1993) study showed that

both internal control and powerful-other control were related positively to breast self-examination. In their study of mammography screening behavior, Holm, Frank, and Curtin (1999) found no relationship among powerful-other, chance, or internal control and mammography screening. These inconsistent findings may have occurred because of nonrandomized sampling, differences in ethnic and racial makeup of the samples, and differences in measures of screening adherence.

Purpose

The purpose of this study was to develop three scales to measure perceptions related to personal space, health temporal orientation, and personal control in the context of mammography screening behavior and to determine whether these constructs differed by race on average. For this study, personal space was defined as the immediate environment during a screening mammography procedure, health temporal orientation as beliefs about preventive health practices, and personal control as the ability to detect health problems early. Although cultural issues have been addressed as they relate to African American women, this study used a sample with African American and Caucasian women and tested for differences between races. Study hypotheses were

1. The scales will have a content validity index of 0.7 or greater.
2. The scales will have an internal consistency reliability using Cronbach alpha of 0.7 or greater.
3. Exploratory factor analysis will produce three scales with item-to-factor correlations of 0.4 or greater.
4. The scales will demonstrate construct validity by predicting mammography adherence as theoretically specified.
5. No difference will be found in scale scores on average between African American and Caucasian women.

Methods

Instrument Development

Items for development of the scales were generated from literature review, focus groups, and review content by experts. Initially, the investigator generated items for the space, time, and control scales from psychology, anthropology, nursing, and health-related literature. Focus groups then were held to determine the relevancy and applicability of these items to mammography screening and to generate additional scale items.

Three groups of African American women, aged 40 or older from varied backgrounds and with no previous history of breast cancer, participated in the focus groups. The focus groups were divided by occupation and included an executive, administrative, and professional group of 10 women; a technical and middle-management group of 9 women; and a service and clerical group of 11 women. Participants described their own mammography screening experiences as well as their perceptions of the screening experiences of other African American women. The women described reasons for having a mammogram and why African American women may choose to delay or not have a mammogram. They reviewed scale items and made recommendations for modifications and deletions based on their experiences and the perceived expe-

riences of other African American women. Each focus group session was audiotaped and transcribed verbatim. The women received a gift certificate for their participation.

Analysis of the focus group data resulted in revision of the initial scales. After this revision, the personal space scale consisted of 22 items that measured discomfort related to having a mammogram, including sensory perceptions of the experience and concerns about privacy. The health temporal orientation scale consisted of 30 items measuring beliefs about health-seeking behaviors in relation to present and future health states and general beliefs about present- and future-directed behavior. The personal control scale consisted of 17 items that measured perceptions of control over general health, detection of health problems, and life in general. The scales were written at the sixth-grade level of readability. A 5-point Likert response scale was developed for each scale (1 = "strongly disagree" to 5 = "strongly agree"). A panel of three behavioral scientists with expertise in breast cancer early-detection behaviors in African American women and one nurse anthropologist with expertise in health-seeking behaviors from a cultural perspective reviewed the scales for content validity. Using procedures for developing a content validity index (Grant & Davis, 1997), the experts rated content relevance on a 6-point ordinal scale (1 = "not relevant" to 6 = "very relevant"). Items that received a rating of less than 4 were deleted, resulting in a content validity index of 0.90 for the personal space scale, 0.96 for the health temporal orientation scale, and 0.93 for the personal control scale.

Minor word changes for clarity and deletion of one item were made in the personal space scale, resulting in a total of 21 items. Eleven items asked about discomfort in relation to physical surroundings during the procedure. Sample items were "The temperature of the x-ray machine is a concern to me," "I am worried that the x-ray machine may be painful," and "When the x-ray machine gets close to me, I get nervous." Four items asked about privacy concerns, such as "Exposing my breasts during the test bothers me" and "Lack of privacy during the x-ray bothers me." The remaining items involved discomfort with staff in the individual's space, such as "The closeness of the x-ray staff during the test bothers me," "It bothers me when the x-ray staff touch my breasts," and "If the x-ray staff are a different race than mine, it bothers me."

In the health temporal orientation scale, all items pertaining to beliefs about present- and future-directed behavior in general were deleted because of nonrepresentation of the construct, resulting in a 12-item scale. The remaining items asked about beliefs related to engaging in health-seeking behavior for early detection of health problems. Sample items were "It is important for me to take steps to prevent illness," "Finding health problems early is important to me," and "I look for health problems when I am feeling healthy."

All items were retained in the personal control scale and an additional item was included based on reviewer comments, thus producing an 18-item scale. Half of the items pertained to the individual's belief in her own control over her early-detection health behaviors, such as, "I have a lot to do with finding health problems early" and "I can make a difference in my health by finding problems early." The other half of the items asked about beliefs about how powerful-others and chance control health states such as "It is solely up to God to decide if I am healthy or ill" and control-

ling early detection of health problems such as “My family members decide when I should be screened for health problems.”

Procedures

The newly developed scales and questions about personal mammography screening practices were administered to women from different community settings to provide for broad socioeconomic participation. These settings included church- and community-affiliated service organizations, a social club, a sorority, and public housing. To recruit the women, the investigator made presentations at meetings and posted announcements in facilities and newsletters. Eligibility criteria were defined as aged 40 or older with no history of breast cancer. A total of 214 women contacted the principal investigator indicating an interest to participate in the study. All women, except those residing in public housing, were contacted by phone to determine their continued interest in participating in the study, discuss and clarify any questions about the purpose of the study, and verify addresses for mailing informed consents. After the signed consents were returned, the women were administered the questionnaire by phone by the principal investigator or one of five trained research assistants. For women who resided in public housing and previously had indicated an interest in participating, a sign-up sheet was made available with a designated day for completing the questionnaire. The investigator or one of the research assistants approached each woman on site, obtained written consent, and read the questionnaire.

A gift certificate was given to each participant who completed the questionnaire. Also, each woman who did not have financial access to screening received referral information about obtaining a free screening mammogram, diagnostic follow-up procedures, and transportation through the state health department and local cancer-related community agencies. All study procedures followed institutional review board guidelines.

Results

Sample

A total of 175 women participated in the study, resulting in a response rate of 82% of those who initially contacted the principal investigator. Differences in demographics were found between the in-person interview group and the phone interview group. The in-person group was less likely to be married or live with a partner and had less education and lower incomes. No significant differences existed between the two groups for age or race or ethnicity.

The study participants consisted of a purposive sample of 111 African American and 64 Caucasian, non-Hispanic women. With these sample sizes, the researchers had 80% power to detect a mean difference in the cultural belief scales between African American and Caucasian women of at least 0.44 times the within-group standard deviation using a two-sample t test at the 5% level (two-sided). The African American group ranged in age from 40–97 years old with a mean age of 60.2 years (SD = 12.2). The majority of the women were unmarried (82%) and had 12 or more years of education (76%). Almost half (49%) of the women had incomes less than \$10,000, and 61% were unemployed. The Caucasian group ranged in age from 41–85 years old with a mean age of

60 years (SD = 12.4). The majority of the women were unmarried (72%) and had 12 or more years of education (77%). The majority (53%) had incomes less than \$10,000, and 70% were unemployed.

Instrument Testing

Psychometric evaluation of the scales included (a) factor analysis, (b) item analysis, and (c) independent t tests and logistic regression for theory testing. The evaluation was carried out using the SPSS® Version 11 (SPSS Inc., Chicago, IL).

Construct Validity

Factor analysis with the principal factor extraction method and varimax rotation was used for determining construct validity. Each scale was factored separately. Number of factors was determined by considering the Scree plot, percent of common variance explained by each factor, and interpretability of each factor. Items were removed if their factor loadings were less than 0.4 or if their factor loadings on several factors were within 0.05 of each other.

Items loaded on two factors for the personal space scale (see Table 1), explaining 42% of the total variance. The first factor accounted for 24% and the second factor 18%. Ten items loading on the first factor ranged from 0.43–0.76. These

Table 1. Exploratory Factor Analysis of Personal Space

Scale Item	Factor 1	Factor 2
When the x-ray machine touches me, it is a concern to me.	0.70	0.09
I don't like the sound of the x-ray machine.	0.68	0.23
The x-ray machine against my breasts is uncomfortable.	0.43	0.06
The appearance or look of an x-ray room is a concern to me.	0.51	0.22
It bothers me when my breasts are squeezed against the machine.	0.56	0.15
The temperature of the x-ray machine against my breasts is a concern to me.	0.66	0.32
When the x-ray machine gets close to me, I get nervous.	0.66	0.34
I am worried that the x-ray machine may be painful.	0.76	0.08
The temperature in the x-ray room is uncomfortable.	0.60	0.16
The lighting in the x-ray room is uncomfortable.	0.59	0.27
Being in the waiting room that lacks decorations and reading materials suitable to my culture is a concern to me.	0.19	0.40
I am uncomfortable in a waiting room with other people having different types of tests.	0.41	0.44
Lack of privacy during the x-ray bothers me.	0.31	0.55
Not having a privacy screen around my body during the test is a concern to me.	0.27	0.73
Exposing my breasts during the test bothers me.	0.47	0.54
It bothers me when the x-ray staff are always busy.	0.08	0.75
The closeness of the x-ray staff during the test bothers me.	0.43	0.61
It bothers me when the x-ray staff touch my breasts.	0.59	0.57
If the x-ray staff are a different race than mine, it bothers me.	0.39	0.34
It bothers me if the x-ray staff are unfriendly.	0.10	0.45
The staff that doesn't tell me enough about what to expect is a concern to me.	–0.02	0.42

items pertained to physical space and included items about the effect of objects in the environment on the senses. Retained items that loaded on the second factor ranged from 0.40–0.75. These eight items referred to interpersonal space and included items about privacy and staff.

All items loaded on one factor for the temporal orientation scale (see Table 2), explaining 25% of the total variance. Ten items were retained for the health temporal orientation scale, with loadings ranging from 0.40–0.62.

For control, two factors emerged (see Table 3), explaining 30% of the total variance. The first factor accounted for 18% of the variance, and the second factor accounted for 12% of the variance. Retained items that loaded on the first factor ranged from 0.45–0.78. These eight items measured perceived external control, or perceptions of finding health problems early outside the control of the individual. Retained items on the second factor had loadings ranging from 0.52–0.70. These four items pertained to internal control or the individual's control over finding health problems early.

Reliability

Internal consistency reliability analysis was performed using all retained items from each of the three scales. All items with a corrected item-to-total correlation of 0.3 or more were included (Nunnally, 1978). Corrected item-to-total correlations and Cronbach's alphas for the three scales are reported in Table 4.

Construct Validity and Testing of Theoretical Relationships

Theoretically, scale scores should significantly predict mammography adherence. To test for theoretical relationships between scale scores and mammography screening behaviors, logistic regression analysis was performed with scales as independent variables and mammography adherence as a binary dependent variable. All independent variables were entered simultaneously and included the two space subscales, the temporal orientation scale, and the two control subscales. Race, coded as African American or Caucasian, also was included as an independent variable. A race-by-scale interaction also was tested for significance (each scale tested separately). Mammography adherence was coded as a

Table 3. Exploratory Factor Analysis of Personal Control

Scale Item	Factor 1	Factor 2
What is going to happen will happen.	0.29	0.02
I can decide for myself when to get screened for health problems.	0.21	0.21
What happens to me is my own doing.	0.21	0.20
When I make plans, I am certain that I can make them work.	0.25	0.39
I can make a difference in my health by finding problems early.	−0.27	0.63
Getting what I want has little to do with luck.	−0.07	0.26
My family members decide when I should be screened for health problems.	0.45	−0.24
I have little influence over the things that happen to me.	0.59	−0.03
There is nothing that I can do to find health problems early.	0.78	−0.25
There is nothing that I can do to find breast cancer early.	0.68	−0.23
Other powerful people decide when I should be screened for health problems.	0.45	−0.28
I can decide whether to get a mammogram to detect breast cancer early.	−0.07	0.34
Finding health problems early is a matter of chance.	0.59	−0.08
I should take it upon myself to find health problems early.	−0.01	0.52
It is solely up to God to decide if I am healthy or ill.	0.47	−0.01
Finding health problems early is my responsibility.	−0.15	0.65
Luck has a lot to do with whether I am healthy or ill.	0.65	−0.03
I have a lot to do with finding health problems early.	−0.19	0.70

binary variable, with 0 reflecting nonadherent and 1 reflecting adherent behavior in accord with American Cancer Society (2001) guidelines. The race-by-scale interaction was not significant in any model, so this article reports the results from the final model that included a main effect for race only. The overall logistic regression was significant ($C^2 = 33.368$, $p < 0.001$). Physical space was only marginally related to mammography adherence ($p = 0.056$), whereas interpersonal space was more strongly related ($p = 0.005$). Women with greater discomfort with interpersonal space factors were less likely to adhere to mammography screening. Temporal orientation also was related significantly to mammography adherence ($p < 0.001$). Participants with a time orientation that reflected a belief that finding health problems early was important were more likely to adhere to mammography screening guidelines than participants with a lower prevention focus. Of the two control subscales, only the internal subscale was related to mammography adherence ($p = 0.006$). Surprisingly, women who perceived less internal control over finding health problems early were more likely to adhere to screening. The second subscale, which measured external control over finding health problems early, was not significant. Race was not a significant predictor. All odds ratio and confidence intervals are listed in Table 5.

To further determine whether these beliefs were unique to African American women, independent *t* tests were run, with

Table 2. Exploratory Factor Analysis of Health Temporal Orientation

Scale Item	Factor 1
Being healthy is important to my future.	0.57
It makes sense to take care of my health now so I can be healthy in the future.	0.62
It is important for me to take steps to prevent illness.	0.53
I only need to see my healthcare provider when I am sick.	0.49
Planning for regular health screenings is not important.	0.54
If I felt a lump in my breast, I would not worry about it.	0.47
As long as I am feeling good now, it is not important for me to have regular health screenings.	0.61
Finding health problems early is important to me.	0.61
I look for health problems when I am feeling healthy.	0.25
I will look for health problems early before they get worse.	0.40
It is important for me to plan to have a yearly mammogram.	0.40
If I felt a lump in my breast, I would see my doctor right away.	0.39

Table 4. Internal Consistency Reliability of Scales

Scale	Item-to-Total Correlation	Cronbach's Alpha
Space Belief Scale		
Physical Space Subscale		0.88
• When the x-ray machine touches me, it is a concern to me.	0.65	
• I don't like the sound of the x-ray machine.	0.68	
• The x-ray machine against my breasts is uncomfortable.	0.43	
• The appearance or look of an x-ray room is a concern to me.	0.49	
• It bothers me when my breasts are squeezed against the machine.	0.57	
• The temperature of the x-ray machine against my breasts is a concern for me.	0.69	
• When the x-ray machine gets close to me, I get nervous.	0.66	
• I am worried that the x-ray machine may be painful.	0.69	
• The temperature in the x-ray room is uncomfortable.	0.57	
• The lighting in the x-ray room is uncomfortable.	0.59	
Interpersonal Space Subscale		0.82
• Being in the waiting room that lacks decorations and reading materials suitable to my culture is a concern to me.	0.38	
• Lack of privacy during the x-ray bothers me.	0.55	
• Not having a privacy screen around my body during the test is a concern for me.	0.68	
• Exposing my breasts during the test bothers me.	0.59	
• It bothers me when the x-ray staff are always busy.	0.62	
• The closeness of the x-ray staff during the test bothers me.	0.59	
• It bothers me if the x-ray staff are unfriendly.	0.45	
• The staff who don't tell me enough about what to expect is a concern for me.	0.41	
Health Temporal Orientation Scale		0.79
• Being healthy is important to my future.	0.41	
• It makes sense to take care of my health now so I can be healthy in the future.	0.42	
• It is important for me to take steps to prevent illness.	0.36	
• I only need to see my healthcare provider when I am sick.	0.52	
• Planning for regular health screenings is not important.	0.53	
• If I felt a lump in my breast, I would not worry about it.	0.44	
• As long as I am feeling good now, it is not important for me to have regular health screenings.	0.66	
• Finding health problems early is important to me.	0.45	
• It is important for me to plan to have a yearly mammogram.	0.35	
Control Scales		
Internal Control Early Detection Subscale		0.76
• I can make a difference in my health by finding problems early.	0.56	
• I should take it upon myself to find health problems early.	0.42	
• Finding health problems early is my responsibility.	0.60	
• I have a lot to do with finding health problems early.	0.65	
External Control Early Detection Subscale		0.82
• My family members decide when I should be screened for health problems.	0.45	
• I have little influence over the things that happen to me.	0.53	
• There is nothing that I can do to find health problems early.	0.70	
• There is nothing that I can do to find breast cancer early.	0.63	
• Finding health problems early is a matter of chance.	0.46	
• Other powerful people decide when I should be screened for health problems.	0.55	
• It is solely up to God to decide if I am healthy or ill.	0.41	
• Luck has a lot to do with whether I am healthy or ill.	0.56	

N = 175

scale means as the dependent variable and race as the independent variable. No significant differences were found in the means of any scale by race.

Discussion

Scales to measure culturally related perceptions about personal space, temporal orientation, and personal control for mammography screening and early disease detection were developed and tested in African American and non-Hispanic, Caucasian women. Scale items were generated through focus groups with African American women and literature review. A panel of ex-

perts assessed content validity. Relevant items were retained, and an additional item was added to the personal control scale.

Construct validity was confirmed through separate factor analysis for each scale. Items were retained with loadings at or above 0.4, resulting in components with a number of strong loadings and explaining 25%–42% of the total variance. A two-factor solution resulted in the personal space and control items. The temporal orientation items produced a one-factor solution. The personal space components were interpreted as sensory or physical discomfort and interpersonal discomfort during the mammography procedure. This interpretation is consistent with previous research on sensory and social aspects

Table 5. Prediction of Mammography Adherence

Scale	B	Standard Error	Significance	Odds Ratios	Confidence Interval
Physical space	0.053	0.028	0.056	1.055	0.999–1.114
Interpersonal space	–1.000	0.035	0.005	0.905	0.844–0.970
Health time orientation	0.203	0.051	0.000	1.225	1.108–1.354
Internal control	–0.248	0.091	0.006	0.781	0.653–0.933
External control	0.018	0.039	0.639	1.019	0.943–1.100
Race	0.275	0.370	0.457	1.316	0.638–2.717

of spatial relationships (Giger & Davidhizer, 1999). The control components were interpreted as internal control and external control in the early detection of health problems. This result is comparable to the locus of control construct (Rotter, 1966). The temporal orientation one-factor solution was interpreted as a future or prevention orientation for health because retained items refer to the perceived importance of early detection of health problems. The scale items are goal-directed, which is consistent with having a future time perspective (Murrell & Mingrone, 1994). Internal consistency reliability results were acceptable. Cronbach's alpha coefficients ranged from 0.76–0.88, and item-total correlations were 0.35 and higher.

Lastly, theoretical relationships between the belief scales and mammography screening behaviors were tested for construct validity. Interpersonal space, temporal orientation, and internal control were related significantly to mammography screening adherence. Women who had less discomfort with privacy and staff relationships were more likely to adhere to screening than women with more discomfort. Embarrassment during the mammography procedure has been found to contribute to decreased screenings (Crump et al., 2000).

Women who had more future orientation for early disease detection were more likely to adhere to screening than women with less future orientation. Studies have shown that women who expressed beliefs reflecting the unimportance of finding breast cancer early were less likely to get screened. These beliefs included that screening could precipitate breast cancer (Mathews et al., 1994), screening was not needed for asymptomatic women (Crump et al., 2000), and contact with the

medical establishment was needed only when an individual was ill (Mathews).

An unexpected finding was that women with less internal perceived control were more likely to adhere than women with more internal control. One possible explanation is that, because the scale items asked about the individual finding health problems early, internally controlled women may believe health problems should be found early and confirmed by healthcare providers rather than themselves. This may be a plausible explanation considering that diagnosis of other health problems requires examination and diagnostic testing, which is under the control of a provider.

Cultural constructs predicted mammography adherence in a combined sample of African American and Caucasian women while controlling for race. The cultural constructs did not vary by race. The scales developed with this study hold promise for helping predict African American and Caucasian women's use of mammography.

More work needs to be conducted to test these scales with larger samples of ethnically, educationally, and economically diverse women. However, the scales do provide for further measurement of culturally related beliefs that influence mammography screening. By investigating cultural beliefs, researchers can examine their contribution to the prediction of mammography screening initiation and sustainability, which, in turn, will provide the knowledge needed to design interventions that will increase breast cancer screening rates.

Author Contact: Kathleen M. Russell, DNS, RN, can be reached at katrusse@iupui.edu, with copy to editor at rose_mary@earthlink.net.

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