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A Spiritually-based approach to breast cancer awareness: Cognitive response analysis of communication effectiveness

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Abstract

The purpose of this study was to compare the communication effectiveness of a spiritually-based approach to breast cancer early detection education with a secular approach, among African American women, by conducting a cognitive response analysis. A total of 108 women from six Alabama churches were randomly assigned by church to receive a spiritually-based or secular educational booklet discussing breast cancer early detection. Based on the Elaboration Likelihood Model (Petty & Cacioppo, 1981), after reading the booklets participants were asked to complete a thought-listing task writing down any thoughts they experienced and rating them as positive, negative, or neutral. Two independent coders then used five dimensions to code participants thoughts. Compared with the secular booklet, the spiritually-based booklet resulted in significantly more thoughts involving personal connection, self-assessment, and spiritually-based responses. These results suggest that a spiritually-based approach to breast cancer awareness may be more effective than the secular because it caused women to more actively process the message, stimulating central route processing. The incorporation of spiritually-based content into church-based breast cancer education could be a promising health communication approach for African American women.

The American Cancer Society (2005_a) estimates that there will be 1,372,910 new cancer cases in the United States in 2005 and 570,280 cancer deaths, or about 1,500 per day. Breast cancer is the most common type of cancer among all women in the United States (SEER, 2005). Among the many cancer disparities that impact the African American community, breast cancer is the number one cancer killer among African American women (ACS 2005_b). Although breast cancer is more common in European American women over age 40 years, African American women with breast cancer are more likely to die from the disease (ACS 2005_b).

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Importance of early detection

Treatment is available for breast cancer; however, successful treatment depends heavily upon early diagnosis. Regular mammography screenings play a vital role in early detection and treatment of breast cancer. Unfortunately, African American women with low access to health information through the mass media have lower likelihood of getting a mammogram than other women (Danigelis, Worden, Flynn, Skelly, & Vacek, 2005). In a sample of African American, Latina, and European American women, perceived access to healthcare services was predicted by perception of prejudicial treatment in health service delivery, language spoken, and financial capability (Facione, 1999). In addition, low perceived access predicted low rates of mammography usage and low performance of breast self-examination. In another mixed-race sample, stage that breast cancer is diagnosed (later stage) was related to being African American, lower availability of mammography facilities in the area, and lower area of residence socioeconomic status (Mandelblatt, Andrews, Kao, Wallace, & Kerner, 1995).

Self-reported likelihood of delaying reporting breast symptoms to a doctor has been associated with being African American or Latina, having lower income, lower education, experiencing prejudice in health care delivery, perceived lack of access to health care, lack of knowledge, and fatalism (Facione, Miaskowski, Dodd, & Paul, 2002). In a meta-analysis, it was concluded that community-based “outreach” intervention programs (e.g., church-based health interventions) have been effective in increasing the use of mammography, though comparable in effectiveness to “inreach” programs (e.g., interventions in a primary care setting) (Yabroff, O’Malley, Mangan, and Mendelblatt, 2001).

Religion/spirituality in African American culture and health

The present study uses the term religion/spirituality (except when summarizing the work of others if a different term is used). Religion may be conceptualized as “an organized system of beliefs, practices, rituals, and symbols”, and spirituality as “one’s transcendent relationship to some form of higher power” (Thoresen, 1998, p. 415). While it is recognized that these terms are not interchangeable, they are “distinguishable yet overlapping” (Miller & Thoresen, 2003, p 29). While the current study was conducted within the context of a church, which would suggest religiosity, the approach to cancer communication being examined is referred to as “spiritually-based” in that although it often involves religious concepts and scripture, it may also involve broader more spiritual and even cultural concepts (see below; also Holt, Kyles, Wiehagen, & Casey, 2003). Thus, in the interest of inclusivity, the term religion/spirituality is used throughout the present discussion.

For many African American women, religion plays a significant role in their everyday lives (Taylor, Chatters, Jayakody, & Levin, 1996). Those who are female and older reported higher subjective religiosity than others, as did those living in the South (Chatters, Taylor, & Lincoln, 1999). The church has stood as a cornerstone in the African American community (Lincoln & Mamiya, 1990). Studies have shown that religion and spirituality are associated with health-seeking behaviors of African American women (Dessio, Wade, Chao, Kronenberg, Cushman, & Kalmuss, 2004). Specifically, in a national study, it was found that

African American women reported using religion/spirituality for health reasons, and those who did were more likely to have used complementary and alternative medicine, and to have seen a medical doctor in the past year, compared to those who did not. The literature on religion/spirituality and health is too vast to be reviewed comprehensively here, but extensive reviews of the literature conclude that there is a positive association between religiosity/spirituality and an array of different health conditions, health behaviors, and mortality, such that those who are religious/spiritual tend to experience more positive outcomes (Koenig, McCullough, & Larson, 2001; Levin, 2001).

Church-based health education programs

In accordance with Grindel's belief that interventions need to be done in the context of the cultural norms and the education levels of the target population, numerous interventions and educational programs have been developed to utilize the African American church as a health education venue (Grindel, Brown, Caplan, & Blumenthal, 2004). A church-based telephone counseling intervention for breast cancer screening was effective for reducing mammography nonadherence (Duan, Fox, Derose, & Carson, 2000). Hypertension programs using community health educators were effective for increasing knowledge (Smith, 1992) and decreasing blood pressure (Smith, Merritt, & Patel, 1997). A church-based program conducted by trained lay volunteers was more effective for weight loss than a control condition (McNabb, Quinn, Kerver, Cook, & Karrison, 1997). A smoking cessation program led by church coalitions was effective for moving rural smokers along the stages of change toward cessation (Schorling, Roach, Siegel, Baturka, Hunt, Guterbock, & Stewart; 1997).

With regard to breast cancer, an outreach program including a church-based breast cancer education and screening component was effective for increasing mammography utilization (Fox, Stein, Gonzalez, Farrenkopf, & Dellinger, 1998). In another study, breast cancer screening educational programs (full program including two video presentations, question/answer session, and trained University staff to provide education; partial program including videos only) were introduced into African-American churches to examine their effectiveness compared to a delayed treatment control condition. It was found that the likelihood of getting a mammogram was significantly increased with the implementation of either of the programs (Husaini, Sherkat, Levine, Bragg, Van, Emerson, & Mentes, 2002).

Another previous church-based approach to increasing breast cancer early detection awareness uses peer role models who share their experience with breast cancer. The Witness Project is a church-based cancer communication intervention aimed at promoting breast and cervical cancer screening among low-income African American women in Arkansas (Bailey, Erwin, & Belin, 2000; Erwin, Spatz, Stotts, Hollenberg & Deloney, 1996). In the project, local breast cancer survivors called "Witness role models" talk about (i.e., "witness") their breast cancer experiences in small groups in various church community settings. The role models also discuss early detection and treatment, and the importance of taking personal responsibility for their health. They are encouraged to spread the message to the greater African American community through word of mouth. Participants in the program are taught how to perform BSE, and there is an opportunity to have their questions about breast cancer answered. Sessions are opened and closed with a hymn and prayer. Importantly, the role

models serve to model early detection behavior and impart skills to their peers, which according to Social Learning Theory can promote a social norm and behavior change (Perry, Baranowski, & Parcel, 1990). This type of interpersonal communication, using a storytelling approach rather than didactic, may be more effective for those with limited educational background, such as medically underserved populations (Erwin, Spatz, Stotts, Hollenberg & Deloney, 1996).

In a Witness Project pilot study, self-reported BSE and mammography rates increased significantly from baseline to 6-month follow-up among women who had attended a Witness session (Erwin, Spatz, Stotts, & Hollenberg, 1999). In a recent qualitative evaluation of the Witness Project, the sessions were reported to be well-received by attendees largely because the Witness role models were seen as coming from their own social and cultural network, and were trusted (Bailey, Erwin, & Belin, 2000). The Witness Project is an approach that is largely targeted to and unique to the needs of African American women. This is a group of women who may not otherwise receive the breast cancer early detection message or the encouragement (e.g., from the Witness role models) to receive screening.

Spiritually-based health education programs

Church-based interventions may be characterized by a typology of spiritual orientation (Winett, Anderson, Whiteley, Wojcik, Rovniak, Graves, & Galper, 1999). Level 1 interventions use the church as a venue for recruitment, and message content is secular. In Level 2, secular interventions are implemented through the church by health care professionals. In Level 3, secular interventions are implemented through the church but by lay individuals. Finally, Level 4 interventions include religious or spiritual content or themes in the intervention. It is these Level 4 interventions that are underrepresented in the church-based literature. Winett and colleagues view this level as a necessary but not sufficient intervention approach for continued behavior change, and call for more randomized trials to test the effectiveness of Level 4 interventions.

There have been several interventions that would be characterized as Level 4 because they include spiritual content. In one such program promoting cardiovascular health, a church-based standard behavioral group intervention was compared with the behavioral program supplemented with spiritual strategies, or with self-help strategies (Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001). Spiritual strategies included group prayer, aerobics to gospel music, and integration of scripture in the intervention. Those who received the interventions (not self-help) saw improvements in body weight, waist circumference, systolic blood pressure, dietary energy, dietary total fat, and sodium intake. Another program combined bible study with cardiovascular risk messages for African Americans (Oexmann, Thomas, Taylor, O'Neill, Garvey, Lackland, & Egan, 2000). This program was developed in conjunction with members of the local faith community. Participants who attended at least 75% of the educational sessions experienced significant decreases in weight and mean blood pressure. A project working with barbershops and beauty salons in the African American community also added a church-based component, where ministers gave "healthy heart sermons" (p. 366), but no evaluation data was provided (Ferdinand, 1997). Finally, in a church-based program targeting both diet and physical activity, the intervention consisted of

videos, an exercise guide, and an audio cassette, all of which contained scripture passages supporting the health message (Resnicow, Jackson, Braithwaite, Dilorio, Blisset, Rahotep, & Periasamy, 2002). This intervention was being compared with standard commercial nutrition and physical activity educational materials, and the spiritual program but with the addition of telephone motivational interviewing.

To address smoking, a spiritual church-based cessation program was developed using pastoral sermons addressing smoking, testimonials of those quitting smoking, lay smoking cessation counselors, spiritual gospel audiotapes, a scripturally-guided booklet on quitting smoking, and health fairs (Voorhees, Stillman, Swank, Heagerty, Levine, & Becker, 1996). This program was compared with churches that received health fairs and an educational pamphlet on smoking, designed for African Americans. Participants who received the more intensive intervention were more likely to progress along the stages of change for smoking cessation than those in the minimal intervention group.

Most church-based health education is not spiritually-based, meaning it does not explicitly include religious or spiritual content in the intervention. The above studies illustrate that the spiritually-based approach may be a promising way to increase the effectiveness of church-based health communication interventions. Some behavior change has been seen in controlled trials, but there is no data to date as to *why* such programs may be effective, other than the intuitive notion that a more culturally-relevant intervention will be more effective.

The Elaboration Likelihood Model in health communication

Petty and Cacioppo's (1981) Elaboration Likelihood Model provides a theoretical rationale for providing a spiritual cancer communication intervention to spiritual individuals. Additionally, ELM provides an explanatory model as to why the spiritually-based approach may be more effective than typical secular approaches conducted in church settings. According to the model, individuals are more likely to actively and thoughtfully process information, engaging in central route processing, if the information is perceived to be personally relevant. Research suggests that information processed this way (central route processing) tends to be retained longer and is more likely to lead to permanent attitudinal change than messages that do not stimulate cognitive elaboration and the central route processing (Cacioppo, Stratham, & Priester, 1994). Thus, a church-based health communication that includes spiritual content should be viewed as more personally relevant than one that does not (secular message), which should stimulate central route processing, and attitudinal and finally behavior change.

Cognitive responses in health communication research

Studies have suggested the importance of cognitive responses to health education messages, based on the Elaboration Likelihood Model. In a study of university, community, and student participants, under high anxiety conditions, health promotion messages resulted in more cognitive responses than disease detection messages, and under the low anxiety manipulation, the detection messages resulted in more cognitive responses than the promotion messages (Millar & Millar, 1998). In a similar study by these investigators using

this framework, coping or noncoping (neutral) primes were presented before prevention or detection messages (Millar & Millar, 2000). Participants produced more positive cognitive responses to the detection message when preceded by the coping than by the noncoping prime, but this effect was not significant in response to the prevention message.

In an analysis of college students' responses to fear appeals, those who felt vulnerable to the health problem generated more total thoughts, and more positive thoughts, than those who did not feel vulnerable (Das, de Wit, & Stroebe, 2003). Positive cognitive processing mediated the relationship between vulnerability and positive attitudes toward the health behavior recommendation. In a study examining processing of an exercise message in college students, stage of change was not predictive of cognitive elaboration, however attitude toward exercise was positively associated with the generation of positive exercise-related thoughts (Rosen, 2000). In addition, attitude toward exercise moderated the effect of argument strength on negative exercise-related thoughts. In another study examining exercise health messages among college students, message framing was examined, and positively framed messages from credible sources resulted in more cognitive responses than negatively framed messages or those from other sources (Jones, Sinclair, & Courneya, 2003). In a similar study, positively framed exercise messages resulted in more positive cognitive responses than negatively framed message (Jones, Sinclair, Rhodes, & Courneya, 2004).

Issue involvement/personal relevance

College students with low issue involvement reported more intention for a prevention behavior in response to a musical format AIDS prevention message than those high in issue involvement, but with a dialogue format message, those high in involvement reported more behavioral intention than those low in involvement (Igartua, Cheng, & Lopes, 2003). In addition, the dialogue format (being of better argument quality) resulted in more cognitive processing and more positive attitude toward the prevention behavior than did the musical format. In another study of AIDS education messages, those high in protection motivation and who found the message personally relevant processed the message more elaborately than did those low in motivation, and low in personal relevance (Dinoff & Kowalski, 1999). In an examination of issue involvement, African American women who had high involvement in a mammography message had more intention to get a mammogram than those low in involvement, for both strong and weak arguments, and high or low peripheral characteristic favorability (acceptable music and colors used in the advertisement) (Kirby, Ureda, Rose, & Hussey, 1998). Women with low issue involvement reported mammography intentions only in response to the favorable peripheral characteristics. These findings are in accord with ELM.

Tailored health communication, developed to fit each unique recipient based on an individualized assessment, was found in one study to be more effective than non-tailored communication, based on the increased levels of positive cognitive responses, positive personal connection thoughts, positive self-assessment thoughts, and positive behavioral intention thoughts in response to weight loss educational materials in a community sample of overweight adults (Kreuter, Bull, Clark, & Oswald, 1999). In a subsequent analysis, those

overweight adults high in external weight locus of control who received tailored weight loss materials responded with more total negative cognitive responses, more negative strong self-efficacy thoughts, more negative self-assessment thoughts, and more negative moderate personal connection thoughts than those high in internal weight locus of control, suggesting that those who do not feel that their weight is in their control, tend to produce counter-arguments against tailored weight loss materials (Holt, Clark, Kreuter, & Scharff, 2000).

In summary, previous research using the ELM to examine processing of health education messages suggests that in addition to particular personality or attitudinal characteristics associated with elaboration, a strong message, and addressing a topic in which recipients are highly involved, or high in personal relevance, will result in increased elaboration, expressed through positive cognitive responses to the message.

The present study

The purpose of this study was to determine whether, and if so, why, a spiritually-based (Level 4) approach to breast cancer early detection education is more effective than a secular approach, among African American women in church settings, using the Elaboration Likelihood Model. Although church-based interventions have shown some efficacy and have been an effective way to reach this population that has been traditionally underserved by the medical system, health education approaches integrating spiritual beliefs and themes may be more effective than secular programs housed in churches (Winett, Anderson, Whiteley, Wojcik, Rovniak, Graves, Galper, & Winett, 1999). This may particularly be the case among African American women, a group that on average reports higher levels of religiosity/spirituality than the general population (Chatters, Taylor, & Lincoln, 1999; Taylor, Chatters, Jayakody, & Levin, 1996), for whom the church is often an institution of high social and cultural importance and centrality (Lincoln & Mamiya, 1990), and among whom spirituality has been associated with breast cancer beliefs (Holt, Clark, Kreuter, & Rubio, 2003; Holt, Lukwago, & Kreuter, 2003).

To date, spiritually-based health educational approaches have not yet been adequately tested for communication outcomes against a comparable secular (non-spiritual) comparison intervention. There is very little evidence for the effectiveness of this relatively new approach, nor evidence for why it may be effective for this population subgroup (e.g., cognitive processes related to persuasive communication, based on theories such as ELM). The present study tested the relative communication effectiveness of the spiritually-based approach compared with a secular approach using the Elaboration Likelihood Model framework by examining African American women's patterns of cognitive responses to the materials. It was expected that the spiritually-based intervention would result in more central route processing, as evidenced through increased numbers of cognitive responses in particular a priori selected coded categories, than the secular intervention. If this were to be the case, it would suggest not only that the spiritually-based approach may be a more effective way to educate church-attending African American women about cancer, but it would provide clues as to why this approach is more effective (e.g., through increased personal relevance) than traditional (secular) approaches conducted in church settings.

Method

Intervention materials

The study protocol and all study materials were approved by the University of Alabama at Birmingham Institutional Review Board. Two educational booklets on breast cancer early detection were developed; one spiritually-based and one secular in nature. The present analysis was as part of a larger study also investigating the impact of the booklets on breast cancer and mammography knowledge, and perceived barriers to mammography (Holt & Klem, 2005; Holt, Kyles, Wiehagen, & Casey, 2003). The secular booklet addressed topics such as the importance of early detection, screening methods, and benefits of mammography. It discussed that African American women have higher rates of breast cancer deaths than White women, and the importance of screening for African American women. It included screening guidelines for mammograms, clinical breast exams, and breast self-exams. Potential symptoms of breast cancer were discussed, as well as risk factors. The spiritually-based booklet consisted of the same core breast health information, but also incorporated themes of spiritual beliefs and scripture. For example, spiritual themes included the idea that the body is the temple of God, to be respected and taken care of, and that God enables doctors to care for and heal us. The idea that God will take care of one but one has to help themselves, was discussed. The importance of body, mind, and spirit being in balance was covered. A generational theme was used, in which positive role modeling can go both up and down the generations of women, consistent with age-related breast screening guidelines. Information on where to obtain free or low-cost mammograms was provided in both booklets. The booklets were similar in graphical appearance so as to avoid a potential confound of graphic design effects. The process used to develop the intervention is described in detail elsewhere (Holt, Kyles, Wiehagen, & Casey, 2003).

Procedure

The Recruitment Coordinator (an African American female member of the study staff) mailed letters describing the project to a convenience sample of church leaders in the study region with whom she was familiar through previous community-based research and networking. She made follow-up telephone calls to several of these churches to solicit support for the project (study recruitment is described in detail in Holt, Clark, & Klem, 2005). Out of the 10 churches contacted, 6 agreed to participate. The Recruitment Coordinator worked with the head of the Women’s or health ministries in each of the interested churches to identify eligible women interested in participating. These ministry leaders made announcements about the study during their services, and potentially interested women provided their names and telephone numbers through use of a sign-up sheet. This sheet was returned to the Recruitment Coordinator, who then made follow-up calls to the women to confirm their eligibility and to invite eligible women to a scheduled study session at their church.

Women in each church were randomly assigned to receive either the spiritually-based or the secular intervention (by church) through use of a random number table. At each church, the Coordinator described the project, and asked women age 40 and over, who had not had breast cancer, were able to read material written at 5th grade level, and had a telephone to be

reached for a follow-up survey (for the larger study) to participate. Each church hosted one group session ranging from 9 to 26 women, with an average of 18 women per group. Eligibility was assessed using a brief screening survey (the aforementioned telephone screening was more informal, not recorded with a survey). Reading level was assessed by whether the women could complete the survey on their own without assistance. Although an individual who cannot read would be able to check yes/no boxes on a survey and "guess" the correct answers, the last item asked women to write in the year of their birth, and required reading comprehension through the written response. This method has been used successfully to unobtrusively and inoffensively screen for reading level in previous studies (Kreuter, Skinner, Holt, Clark, Haire-Joshu, Fu, Steger-May, Booker, & Bucholtz, 2005).

If women were interested and eligible to participate, they completed a baseline questionnaire (for the larger study), read the booklets independently without discussion, and completed a thought-listing form. Participants completed the thought-listing task independently while in the group sessions. They were instructed to list all the thoughts they had while reading the booklets, and to write each thought on the form. On this form, participants wrote down one thought (complete sentence or sentence fragment) on each line of the form, and then they rated each thought as positive, negative, or neutral in valence. Independent reviewers' ratings of thought valence have been found to be very similar to participant ratings (Petty, Wells, & Brock, 1976; Cacioppo, Harkins, & Petty, 1981) therefore, it had been decided to ask participants to rate their own thoughts in terms of valence rather than staff conducting this coding. Participants then completed another questionnaire, and received a $20 gift card.

Thought coding

Two independent coders were used to establish inter-rater reliability. Coders coded each line on each thought coding form as a separate thought. The coders were trained on a 10% random sample, which was included in the analysis. The coders were unaware of study group assignment. Selected a priori based on theory and previous research, thoughts were coded on five dimensions: (1) **personal connection**, responses that made a personal connection to one's self (e.g., "I can tell my daughters that are under 40."); (2) **self-assessment**, responses that were evaluative/assessment comments about one's self (e.g., "I need to get a mammogram"); (3) **spiritually-based**, responses involving religiosity, spirituality, or God (e.g., "God gives us free will to take care of our bodies."); (4) **behavioral intention**, responses expressing intention to perform a breast health related behavior (e.g., "I will now contact my doctor and make arrangements for an exam."), and (5) **health locus of control**, responses expressing ideas about what impacts one's health (e.g., "Mammograms are good and they can spot cancer early."). Each thought was coded affirmative or negative on each of the five dimensions. All discrepancies were resolved by discussion between coders. Inter-rater reliability was strong across all categories (96.5%, 94.1%, 99.3%, 98.3%, 94.6% respectively).

Results

Participants

A total of 112 African American women were recruited for participation. Two women were ineligible because of a personal history of breast cancer, 1 was ineligible because she was associated with the project staff, and 1 refused to participate fully in the study protocol, leaving 108 eligible participants (.01% refusal rate; .03% ineligible rate). This left a total of 108 eligible participants (53 in the spiritually-based group and 55 in the secular group). The women in the study ranged in age from 40 to 79 years and had a mean age of 55.65 years (SD = 10.67) with an average education of 14.95 years (SD = 2.62), ranging from 7 to 20 years. Nearly 40% (38.88%; n = 42) of the women were married, 26.85% (n = 29) were single, 16.66 percent (n = 18) were separated or divorced, and 17.59 percent (n = 19) were widowed. Most (58.3%, n = 63) worked full time, 6.5% (n = 7) worked part time, and 34.2 percent (n = 37) were not employed at the time of enrollment (n = 1 was missing data). The median household income before taxes was in the $40,001–50,000 bracket, ranging from less than $5,000 to more than $100,000 per year (5.6% in this highest bracket). Most (93.5%, n = 101) reported belonging to a Christian religion (e.g., Baptist, Methodist), 0.9% (n = 1) were Jehovah Witness (another Christian denomination), and 5.6% (n = 6) reported another (unspecified) affiliation.

At least two churches needed to be recruited in order to be randomized by church to the spiritually-based versus secular intervention conditions, to avoid intervention contamination. In order to reach the recruitment goal for the larger study (112 women), multiple churches needed to be recruited in order to identify sufficient numbers of eligible and interested women, resulting in a total of six participating churches to reach the recruitment goal. Four of the six participating churches were Baptist while one was Methodist and one was Nondenominational (Christian). Three of the congregations were large ranging from 900–2,000 in total membership while the others were smaller ranging from 200–300.

Cognitive response analysis

Because there were no between-church differences in either the number of positive, negative, neutral (coded by participants), total thoughts, or the number of thoughts in any of the five coded categories (coded by the authors), church was not included in the analyses. The two study groups did not differ on education or income, but women in the spiritually-based group were older than those in the secular group. Although demographic characteristics were not associated with study outcomes, the analyses were computed controlling for age, and the results were the same as the uncontrolled analyses (latter reported below). A total of 538 cognitive responses were recorded, 270 were of the secular study group, and 268 were of the spiritual study group. Across study groups, there were 4.98 (SD = 2.94) average number of total thoughts per participant. Independent t-tests indicated that although there was a trend, there were no statistically significant differences in the number of positive, negative, neutral, positive minus negative, or total thoughts generated by study group (see Table 1). Chi square analyses were then used to examine whether study group differences existed in frequencies across the five categories of thought codings. Significant study group differences were found for thoughts involving personal connections ($\chi^2 = 20.39$ [1], $p <$.

001), self-assessment (χ^2 = 17.22 [1], p <.001), and spiritually-based thoughts (χ^2 = 9.51 [1], p <.01) (See Table 2). The other differences were non-significant. The chi-square results are consistent with results of independent t-tests examining mean differences by study group in the code usage for personal connections (t [538] = 4.59, p < .001), self-assessment (t [538] = 4.21, p < .001), and spiritually-based thoughts (t [538] = 3.11, p < .01) (the others were non-significant).

Discussion

In the present study we examined the communication effectiveness of a spiritually-based approach to education on breast cancer early detection versus a secular approach, using a cognitive response analysis. The data indicated the spiritually-based intervention to be more effective with regard to some of the types of cognitive responses it stimulated, but not for others. The Elaboration Likelihood Model (Petty & Cacioppo, 1981) suggests that individuals are more likely to thoughtfully process information if it is perceived to be personally relevant. In our research, breast cancer information was made relevant to church-attending women by the integration of spiritual content into the educational materials. This integration did in fact raise levels of relevance, indicated by a greater number of personal connection thoughts in the spiritually-based study group. There were significantly more personal connection cognitive responses in the spiritually-based group compared to the secular group. In this church-based context, the spiritually-based intervention stimulated the women to make personal connections with themselves more so than did the secular intervention. The spiritually-based booklet also resulted in more self-assessment thoughts, where the women made evaluative comments about themselves. The spiritually-based booklet was more likely than the secular to stimulate women to assess their own breast health and screening practices, family history, and health behaviors in general. Finally, as would be expected, the spiritually-based booklet resulted in more thoughts of a spiritual nature than did the secular. This would be expected given the nature of the content, and serves as a type of manipulation check that the spiritual content did in fact reach the women. However, there were no significant differences in the number of responses reflecting behavioral intention. This may reflect the relatively low frequency of these thoughts. There were also no study group differences in the number of health locus of control thoughts. Locus of control may not have been a relevant coding category, reflecting the type of thought that one would expect to differ by study group, based on the intervention content or theory.

Although this is the first study to examine the effectiveness of a spiritually-based approach to health communication using a cognitive response technique, the results were consistent with previous health studies using ELM. To the extent to which the spiritually-based message was of higher quality than the secular, it did result in more cognitive processing in particular coded categories (e.g., personal connection; self-assessment), which is consistent with the findings of Igartua and colleagues (2003). However, a significant difference in number of negative thoughts was not evidenced as in previous work (Rosen, 2000). Perhaps this is due to that fact that both interventions indeed contained strong arguments. In terms of personal relevance of the message, Dinoff and Kowalski (1999) found that those high in protection motivation and for whom the message was personally relevant processed an AIDS

message more elaborately than those low in motivation and relevance. In the present study, to the extent that the spiritually-based booklet was higher in personal relevance to these church-attending women, the results are consistent in that there was more elaborate message processing than with the secular booklet. Although many of the ELM studies have been conducted with college student samples, the model was supported in this community sample of African American women, which suggests the utility of the model for examining cognitive processing of information as related to persuasive communication, across different types of samples.

Finally, these results are consistent with those found in tailored health communication, where more positive personal connection and positive self-assessment thoughts were generated by those who received tailored than non-tailored weight loss materials (Kreuter, Bull, Clark, & Oswald, 1999). To the extent that the spiritually-based materials were a better fit for the women in the present sample than the secular (although neither of the materials were individually tailored), the significant difference in personal connection and self-assessment thoughts can be viewed as consistent with the tailoring study.

In summary, results of the present study are in agreement with these findings, in that the message that was more personally relevant (e.g., the spiritually-based message) resulted in more specific types of elaboration than did the secular materials. Interestingly, the spiritually-based booklet did not result in significantly more total thoughts or total positive thoughts, as in previous research. However, the means were in the expected directions, and may have become statistically significant if more observations were included. It should be noted that the secular intervention was demographically targeted (for African American women) and culturally relevant (though not spiritual in nature) so it may have still been relatively appealing to participants, which is why it resulted in a comparable number of positive cognitive responses. It is also possible that it is not the total number of thoughts but the *type* of thoughts (indicating the type of elaboration stimulated), as was seen in the present results, that is a more relevant communication outcome.

Limitations

The results of this study should be considered within the context of several limitations. First, it is unknown whether these findings would generalize beyond African American women, to groups such as African American men, or groups of other races or ethnicities. The spiritually-based approach may not be appropriate or effective with other racial/ethnic groups because of the centrality of the church in African American culture (Lincoln & Mamiya, 1990), and because on average, African American women tend to report high levels of religiosity/spirituality (Chatters, Taylor, & Lincoln, 1999; Taylor, Chatters, Jayakody, & Levin, 1996). In other words, the spiritually-based approach may not be effective for groups who do not consider themselves religious/spiritual. It is possible that the results may have differed had the sample been of younger age, because religiosity tends to increase with age (Chatters, Taylor, & Lincoln, 1999), and those who are more religious may have been most receptive to the spiritual message. While there was no differential effectiveness of the intervention by level of religiosity as assessed using an established 8-item scale (Lukwago, Kreuter, Bucholtz, Holt, & Clark, 2001), religiosity in the present

sample was high overall and had little variability (mean of 38.15 out of 40, SD = 2.74). It is unknown whether religiosity would have had a moderating effect upon the cognitive responses if the sample had more variability. Further, it is unknown whether the same pattern of results would have emerged had the study been conducted outside of churches, or even in non-Christian churches (all in the present sample were Christian). If such an approach were taken, this may present an ethical issue of presenting a spiritually-based intervention to individuals who may or may not consider themselves spiritual or religious. This provides a rationale for conducting spiritually-based interventions within the context of a church setting. However, future research is warranted to explore the spiritually-based approach to health communication among other demographic subgroups. It is likely that not every eligible woman in each church participated in the study, which raises the possibility that the study participants may not have been truly representative of these church populations. Finally, while it is difficult to estimate specifically how representative the churches were of the African American community in the area, the participating churches represented the major denominations in the area (Baptist and Methodist), and were moderate in socioeconomic strata as opposed to the highest or lowest strata.

Conclusion/Implications

Mammography screenings in the African American community can be increased in part by education and health communication. Education and preventive services will help decrease the number of African American women dying from breast cancer. The church-based approach has shown some effectiveness, but it could be improved and made more relevant to women's lives if the health message was supported by existing culturally-relevant spiritual beliefs. This spiritually-based approach may be an improvement over existing secular church-based health education programs in that it may be more culturally- and personally-relevant for the recipients, and the content was developed based on community participation. The results of this study suggest that a more culturally-relevant message may indeed be more effective in terms of some of the types of cognitive processing that such a message stimulates.

The results of this trial may be of interest and benefit to several groups. African American communities may build this approach into their existing health ministries, or use it as a framework or model on which to build a health ministry in the church. Social scientists may see benefit in conducting a cognitive response analysis on their health communication interventions, including those that are culturally-relevant, and what can be learned by analyzing the types of thoughts that their programs are stimulating in their participants. Health communities may see an opportunity to make these types of educational programs more effective for this priority population. Physicians may need to become more aware that many patients place a high importance on spirituality and view it as inextricably connected with their health.

If church-based health communication interventions become more effective by taking a spiritually-based approach, increased behavior change may result, for example in the present example mammography. However, in terms of methodology, increased use of spiritually-based programs may require a more community-based approach to intervention

development, in that it is truly the community members themselves that are most in touch with the nature of the spiritual themes that should be included in such an intervention, rather than researchers. This approach also warrants rigorous message pre-testing, to ensure that messages are appropriate and acceptable, and not offensive in any way to the priority population.

In conclusion, the spiritually-based approach has shown some promise in the type of cognitive elaboration that it has stimulated, relative to a secular (non-spiritual) approach. This suggests that it may be a more effective approach than secular programs, and that this may be a function of the spiritually-based approach being more personally-relevant for program recipients, and cause them to critically assess their own health behaviors. Future studies should examine the spiritually-based approach with behavioral outcomes such as actual breast cancer screening, and with other health-related behaviors including prevention behaviors such as diet and physical activity.

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Table 1

Independent t-tests comparing mean number of cognitive responses by study group

	Spiritually-based mean (SD)	**Secular mean (SD)**	**t (df=106)**	**p-value**
Total positive	3.94 (2.41)	3.76 (2.76)	−0.36	.72
Total negative	0.68 (1.54)	0.67 (1.20)	−0.03	.98
Total neutral	0.43 (1.34)	0.51 (1.05)	0.33	.75
Positive minus negative	3.26 (3.07)	3.09 (2.95)	−0.30	.77
Total thoughts	5.06 (3.21)	4.95 (3.08)	−0.18	.85

Table 2

Chi square analyses comparing study groups on coded cognitive responses

Type of thought		Spiritually-based	Secular	χ^2	p-value
Personal connection	**Yes**	42.2%	23.9%	20.39	.000
	No	57.8%	76.1%		
Self-assessment	**Yes**	21.6%	8.8%	17.22	.000
	No	78.4%	91.2%		
Spiritually-based	**Yes**	6.7%	1.5%	9.51	.002
	No	93.3%	98.5%		
Behavioral intention	**Yes**	1.9%	2.6%	0.31	.577
	No	98.1%	97.4%		
Health locus of control	**Yes**	6.7%	4.4%	1.37	.242
	No	93.3%	95.6%		