TESTING A SOCIO-CULTURAL MODEL OF COLORECTAL CANCER SCREENING AMONG AFRICAN AMERICANS

DISSERTATION

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By

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ABSTRACT

Colorectal cancer is the third leading cause of cancer death for African Americans, but screening consistent with American Cancer Society guidelines remains underutilized. Many of the theoretical models currently used to explain preventive health behavior do not include social and cultural factors relevant to this population, such as adoption of mainstream cultural norms (acculturation), mistrust of health care systems, group-level perceptions of susceptibility, and social support. The purpose of this study is to test a sociocultural model of intention to be screened for colorectal cancer among African Americans. The model proposes that sociodemographic variables, social support, sociocultural factors, and perceived susceptibility are all predictors of the intention to undergo colorectal cancer screening for African Americans. The relationship between this set of variables and intentions is mediated by the perceived barriers and perceived benefits of screening. Data are presented on a sample of 198 African Americans recruited from churches, places of employment, and social/civic organizations in two large Midwestern cities. Structural equation modeling (LISREL) was used to test the model. The model exhibited good fit (RMSEA = .061) and socio-cultural variables added significantly to the prediction of intention to screen for colorectal cancer with perceived benefits and barriers as mediators. Specifically, individuals with more traditional acculturative strategies, less medical
mistrust, and more perceived group susceptibility reported more intention to be screened as a function of greater perception of benefits of screening. Younger individuals and those with greater access to health care also reported more intention as a function of less perceived barriers to screening. However, socioeconomic status, social support, and individual susceptibility did not have significant indirect effects through benefits and barriers. Post-hoc analyses examining the model in greater detail and testing interactions among socio-cultural predictors are presented along with information on the sample’s knowledge and past utilization of colorectal cancer screening. These results are discussed with reference to their implications for future research and interventions addressing African American colorectal cancer screening.
Dedicated to my parents, Betty and Que Purnell, whose love, encouragement, and active engagement has made this, and all things, possible.
No undertaking of this magnitude is possible without the support, guidance, and assistance of many individuals. Though these acknowledgments may not prove completely exhaustive, know that my gratitude extends to all who have contributed to the conception and completion of this work.

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CHAPTER 1

INTRODUCTION

African Americans have the highest mortality rate of any racial or ethnic group for all cancer sites combined, including the most prevalent: lung, colon and rectum, female breast, prostate, and cervix (ACS, 2005b; Ward et al., 2004). When the genders are considered separately, African American men have a 20% higher incidence rate of cancer and a 40% higher mortality rate than their White male counterparts (ACS, 2005b). African American women have a lower overall incidence rate but have a 20% higher mortality rate than White women (ACS, 2005b). One of the most important factors in eliminating cancer mortality disparities is addressing cancer prevention, particularly cancer screening. Results from the 2000 National Health Interview Survey (NHIS) suggest that lack of access to health care and health insurance coverage as well as recent immigration are the most prominent factors related to underutilization of the major cancer screening modalities (e.g., Pap test for cervical cancer, mammography for breast, fecal occult blood test and endoscopy for colorectal, and prostate specific antigen, or PSA, for prostate) (Swan, Breen, Coates, Rimer, & Lee, 2003). Other factors that have emerged as significant correlates of cancer screening include age, gender, race/ethnicity, socioeconomic status, and disability (Swan et al., 2003; Ward et al., 2004).
Despite continued challenges, there has been some progress in cancer screening rates in recent years. Most notably, data indicate that the gap between non-Hispanic White and African American women in mammography has been effectively closed, and rates are similar for Pap test (ACS, 2005b). However, other racial/ethnic groups, particularly those with large recent immigrant populations, continue to lag behind, as do those without access to care (ACS, 2005b; Ward et al., 2004). There is additional concern that the most vulnerable members of underserved communities (many of whom do not have regular telephone service) are not represented in large national surveys due to undersampling, and ethnic minority women’s self-report of mammography is unreliable when checked against medical records (Peek & Han, 2004). In fact, Peek and Han (2004) suggest that self-report mammography rates may need to be adjusted downward by as much as 25%-30%. Clearly, significant challenges exist even in areas where progress has been made, especially in the areas of access to care, health insurance coverage, and immigrant status.

_African Americans & Colorectal Cancer_

While there has been relative improvement in cancer screening rates, colorectal cancer screening remains underutilized. The American Cancer Society observes that “despite the availability of different screening methods and their life-saving potential, colorectal cancer screening is not widely used” (ACS, 2005b; p. 39). An estimated 16,090 new cases of colorectal cancer were expected to be diagnosed among African Americans in 2005, and already cancer at this site is the second most frequently diagnosed for African American women (after breast cancer) and the third most common for African American men (after prostate and lung cancer) (ACS, 2005a). Combined, colorectal cancer is the third
leading cause of cancer death among African Americans, and it is estimated that African Americans are as much as 40% more likely to die of the disease than Whites (ACS, 2005c).

Despite advancements in both detection and treatment of colorectal cancer, African Americans are consistently diagnosed at later stages of the disease, have much poorer survival, and have a greater likelihood of dying when diagnosed (Agrawal et al., 2005). No biological differences have been identified between African Americans and Whites to account for these disparities (Agrawal et al., 2005). However, there is evidence that African Americans do not receive the recommended surgical and adjuvant treatment (e.g., chemotherapy and radiation) available for colorectal cancer at the same rates as Whites (Ward et al., 2004). Several suggestions have been offered as explanations of this treatment disparity, including socioeconomic and access to care factors (Mandelblatt, Andrews, Kao, Wallace, & Kerner, 1996; Marcella & Miller, 2001); patient preferences for types of treatment related to cancer fatalism—the belief that once cancer is diagnosed it is always fatal (see Powe & Finnie, 2003); and biased or inadequate physician treatment for racial and ethnic minorities and those of lower socioeconomic status (Hodgson, Fuchs, & Ayanian, 2001; van Ryn & Burke, 2000). Whatever the causes may be, this lower quality of care is consistent with larger trends in health care disparities across diseases recently documented by the Institute of Medicine (IOM, 2003).

Colorectal Cancer Screening

Beginning at age 50, American Cancer Society guidelines for early detection of colorectal cancer recommend a) a fecal occult blood test (FOBT) or fecal immunochemical test (FIT) using a take-home kit every year, b) flexible sigmoidoscopy or double-contrast barium enema every 5 years, and d) colonoscopy every 10 years. The FOBT uses six
samples from three consecutive bowel movements collected at home to detect small amounts of blood in the stool. Use of this screening method reduces risk of death by up to 33% and reduces cancer incidence by 20% by detecting polyps later removed by colonoscopy (Pignone, Rich, Teutsch, Berg, & Lohr, 2002; Smith et al., 2002). The double-contrast barium enema procedure involves a radiological examination of the colon by inserting barium sulfate and air to fill and expand the colon. This less popular screening modality is not as sensitive as colonoscopy, for which patients are referred if an abnormality is found. During the more prevalent flexible sigmoidoscopy, a slender, flexible, hollow, lighted tube is inserted through the rectum into only the lower third of the colon called the sigmoid colon. Patients are generally awake and are sometimes able to view the procedure on a monitor. If a polyp or tumor is found, the patient is referred for colonoscopy so that the entire colon can be examined further. Patients are sedated for colonoscopy. During the procedure precancerous polyps can be removed, reducing mortality by 76-90% (Winawer et al., 1993). The physician passes a wire loop through the colonoscope (similar to, but longer than, the sigmoidoscope) to cut the polyp from the wall of the colon using an electric current. This ability makes increasing screening rates among African Americans one of the most important methods of reducing colorectal cancer disparities (Agrawal et al., 2005).

Because of their high risk profile, both the American Cancer Society (ACS, 2005c) and the American College of Gastroenterologists (Agrawal et al., 2005) have suggested that African Americans begin screening at age 45, earlier than the ACS general guidelines of age 50.

Correlates of colorectal cancer screening suggested in the literature include: a) inadequate access to and availability of regular health care services, b) lack of knowledge of cancer or lack of physician recommendation, c) negative attitudes (e.g., fatalism,
embarrassment, inconvenience), d) fear of the screening procedures, and e) mistrust of the health care system (Beeker, Kraft, Southwell, & Jorgensen, 2000; Greiner, Born, Nollen, & Ahluwalia, 2005; Harewood, Wiersema, & Melton, 2002; Seeff et al., 2004). Recent attention also has been paid to foreign birth as a potentially important risk factor for developing colorectal cancer (Choe, Koepsell, Heagarty, & Taylor, 2005). Among other problems, it is believed that those born outside of the United States face challenges with regard to language and access to health care that may account for observed disparities in screening and survival. There is also evidence of differential risk between various Asian sub-groups (e.g., Chinese, Japanese, Vietnamese, and South Asian Indians; Chien, Morimoto, Tom, & Li, 2005), suggesting that broad social categories such as race and ethnicity may mask differences within groups.

Several epidemiological studies using national, regional, and statewide representative samples have reported that African Americans are less likely to be screened for colorectal cancer than Whites (e.g., Breen, Wagener, Brown, Davis, & Ballard-Barbash, 2001; Cokkinides, Chao, Smith, Vernon, & Thun, 2003; Coughlin, Thompson, Seeff, Richards, & Stallings, 2002; Vlahov et al., 2005; Ward et al., 2004). Many of these studies cite access to a usual source of care and related socioeconomic factors as the strongest predictors of screening. However, Vlahov et al. (2005) report that the screening disparity (32.8% for African Americans vs. 48% for Whites; OR = .77) in the state of New York remained after controlling for age, gender, insurance, income, history of smoking, family history of cancer, and obesity. McMahon and colleagues found that African Americans enrolled in Medicare Part B in the state of Michigan received 28% fewer sigmoidoscopic examinations despite incidence rates of colorectal cancer 20% higher than Whites (McMahon, Wolfe, Huang,
Tedeschi, Manning, & Edlund, 1999). In another Medicare sample, Richards and Reker (2002) found that Blacks were 18% less likely to receive colonoscopy and 39% less likely to receive flexible sigmoidoscopy after controlling for age, sex, income, and access to care. It is important to note that other studies have found no disparity in screening. For example, Dolan et al. (2005) found that African American men in a study conducted at a Veterans Administration (VA) medical center were actually more likely than White men to receive colorectal screening procedures (36.3% vs. 28.9%, \( p = .03 \)). Both groups were also equally likely to receive a physician’s recommendation for screening. The authors attribute their findings to the equality of access in the VA system. Similar findings were reported by Christman et al. (2004) in their medical record review study of patients in eight Florida community health centers established to serve disadvantaged populations. Seeff et al. (2004) also noted equal rates of endoscopy for screening purposes in their evaluation of the NHIS data for 2000, though there was a disparity for endoscopy for non-screening purposes. Interpretation of this finding is attenuated by what the authors describes as a potential inflation of screening rates characteristic of self-report data. However, whether significant disparities in screening are reported or not, all studies agree with the ACS assessment that screening is seriously underutilized. This underutilization is of particular concern for African Americans given their high rates of colorectal cancer incidence and mortality.

Studies have also addressed barriers to screening among African Americans. In one focus group study (Holmes-Rovner, Williams, Hoppough, Quillan, Butler, & Given, 2002) African American men were convinced of the efficacy of screening but expressed worries about being subjected to medical experiments, poor quality of care, and distrust of the health care system as a function of their race. African American women in this study were
unconvinced of the efficacy of screening and raised the same concerns about race and quality of care. Whites in focus groups cited only minor system barriers and perceived the quality of care from doctors to be good. Another focus group study (Busch, 2003) with African American women reported that 62% of the participants had no knowledge of colorectal cancer or screening despite 70% of the sample being college educated, suggesting that barriers are not entirely determined by socioeconomic status. Fear of pain, expense, and finding a problem and concerns about embarrassment, time necessary for tests, and lack of transportation were all perceived as barriers to screening by the women, though they recognized that screening could prevent cancer or lead to early detection and treatment (Busch, 2003). Similar barriers were reported in a telephone survey study of African American church members, with the notable addition of lack of physician recommendation and difficulty of preparation (James, Campbell, & Hudson, 2002). In a related study, the importance of patient-provider communication and knowledge was demonstrated by data showing that African American churchgoers with more knowledge about colorectal cancer and better self-rated communication with physicians were more likely to be screened within the recommended guidelines than those who had less knowledge and poor communication (Katz et al., 2004). Fear and knowledge were the most prominent themes in another focus group study with African Americans recruited from a community health center, though mistrust and concerns about accuracy were also mentioned (Greiner, Born, Nollen, & Ahuwalia, 2005).

As the above review illustrates, much of the data in this area is drawn from epidemiological studies that compare African Americans to other groups or descriptive studies examining screening attitudes. These studies identify differences in screening rates
and offer valuable information about the most important themes for African Americans with regard to screening barriers. However, missing from the literature are studies that test culturally relevant, theory-based models of screening attitudes and behaviors among African Americans. The purpose of this study is to test such a model.

**Social and cultural considerations**

While most African American families have resided in the United States for several generations, African American subgroups differ to a large degree on variables such as acculturation, education, occupation, and income. While much of the literature focuses on African Americans of lower socioeconomic status, the majority (75%) of African Americans live above the poverty line, and most (80%) have some type of health insurance coverage (DeNavas-Walt, Proctor, & Lee, 2004). Rather than treat African Americans and other ethnic groups as homogenous, Vlahov and colleagues suggest that, “When race and ethnicity are viewed as multidimensional psychological and social constructs, our understanding is advanced of how ethnic identity, minority status, and culture affect screening practices” (Vlahov et al., 2005; p. 82). Studies of within-group differences offer the opportunity to further specify which African American subgroups are adopting colorectal cancer screening recommendations and to identify salient social and cultural factors that either facilitate or impede their adoption.

Theorists and researchers in African American psychology have consistently noted that traditional African American cultural values and assumptions emphasize a sense of collective destiny as well as an adaptive mistrust of mainstream institutions that have a history of racial discrimination (L. J. Myers, 1993; Parham, White, & Ajamu, 1999; Terrell & Terrell, 1981). Indeed, African Americans have been found to rely on social networks such
as extended family, social and fraternal organizations, and especially the Black Church in order to cope with the stress of persistent racism and racial discrimination in the larger society (Lincoln & Mamiya, 1990). There is some evidence that African Americans may also be more strongly influenced than Whites by their level of social support in obtaining colorectal cancer screening as well as performing other health behaviors (Crane, 1996; Kang & Bloom, 1993; Kang, Bloom, & Romano, 1994; Kinney, Bloor, Martin, & Sandler, 2005).

As was evident from several of the screening attitude studies reviewed above (e.g., Greiner et al., 2005; Holmes-Rovner et al., 2002) cultural mistrust also influences the health-related help-seeking attitudes and behaviors of some African Americans. Cultural mistrust refers to an often adaptive suspicion on the part of racial and ethnic minority group members in response to discrimination and other maltreatment (Terrell & Terrell, 1981; Whaley, 2001b). Researchers have shown that cultural mistrust has a significant impact on mental health help-seeking behavior (Whaley, 2001a), and there is evidence of its impact on general health care attitudes and behaviors (Voils et al., 2005). For example, Klonoff and Landrine (1997) found that distrust of Whites was related to less knowledge about AIDS transmission in an African American sample, and the belief that AIDS was created by the federal government as a form of genocide has been cited as a major barrier to HIV prevention efforts in African American communities (Guinan, 1993). More specific to cancer screening, several authors report that patient trust of physicians is one of the strongest correlates of adherence to medical recommendations and treatments even after controlling for relevant demographic factors (O’Malley, Sheppard, Schwartz, & Mandelblatt, 2004; Safran et al., 1998; Thom, Ribisl, Stewart, & Luke, 1999), and there is evidence that African Americans are more mistrustful of physicians and more dissatisfied with care than
Whites (LaVeist, Nickerson, & Bowie, 2000). Trust is a vital part of the physician-patient relationship, the quality of which has been linked to improved adherence to timely colorectal cancer screening (Katz et al., 2004). It has been suggested that much of the distrust of the medical establishment on the part of African Americans can be linked to the infamous legacy of the Tuskegee Syphilis Study, during which the natural course of the disease was studied by leaving hundreds of African Americans untreated (Corbie-Smith, 1999; Curran, 1973; R. M. White, 2005). A participant in a qualitative study by Greiner et al. (2005) sums up the sentiment held by many African Americans: “I don’t want them to use me as no guinea pig…as no experiment…” (p. 979). This more specific mistrust of health care professionals and institutions is accounted for by the construct of group-based medical mistrust, which is defined as the suspicion of mainstream health care systems and professionals as well as the treatment provided to an individual’s racial or ethnic group (Thompson, Valdimarsdottir, Winkel, Jandorf, & Redd, 2004). Thompson et al. have found poorer adherence to mammography to be related to group-based medical mistrust.

While social networks and cultural mistrust remain substantial factors in their lives, many African Americans have adopted more mainstream American modes of cultural expression that differ from traditional African American values and assumptions. The construct of African American acculturation refers to this process of embracing mainstream cultural values and behaviors (Landrine & Klonoff, 1996; Obasi, 2004; Snowden & Hines, 1999). Studies have shown a significant relationship between acculturation and health behaviors in Asian American and Latino/a populations (Abraido-Lanza, Chao, & Gates, 2005; Marks et al., 1987; Solis, Marks, Garcia, & Shelton, 1990; Tang, Solomon, & McCracken, 2001; Tang, Solomon, Yeh, & Worden, 1999), and more recently African
Americans (Ard, Skinner, Chen, Aickin, & Svetkey, 2005; Klonoff & Landrine, 2000; Landrine & Klonoff, 1996; Snowden & Hines, 1999). For example, Abraido-Lanza and colleagues (2005) found that acculturation was associated with a higher likelihood of receiving a mammogram and clinical breast exam among Latinas after controlling for sociodemographic factors such as income and education. As mentioned previously, the significant findings with respect to colorectal cancer risk for those born outside the United States makes acculturation an important area for future research. However, little research has examined African American acculturation, or cultural factors in general, as predictors of cancer screening attitudes and behaviors.

Experts in cancer screening research have called for theory-driven models to explain the complex health behavior processes involved in screening (Meissner et al., 2004). The use of theory-driven models in research with African Americans is made more difficult because cultural considerations often are not included. As Ashing-Giwa (1999) notes with respect to breast cancer research, the leading health behavior models may not reflect socio-cultural factors that are important to African Americans, such as a collectivistic or communalistic outlook, structural impediments to health care access, social influence, and negative attitudes about the health care system. There is a need for theory-driven models that are cognizant of important socio-cultural considerations in colorectal cancer screening research.

Existing Models

A familiar model used to examine preventive health behaviors is the Health Belief Model (Becker, 1974; Janz & Becker, 1984). The Health Belief Model (HBM) was originally formulated to explain the lack of adoption of readily available public health services in the 1950’s (Hochbaum, 1958; Rosenstock, 1960, 1974). It has since been used in scores of
studies investigating behavior related to several different diseases (e.g., cancer, HIV/AIDS) (Champion & Menon, 1997; Friedman, Neff, Webb, & Latham, 1998; Liau & Zimet, 2000; Maguen, Armistead, & Kalichman, 2000; Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996; Vadaparampil, Champion, Miller, Menon, & Skinner, 2003). Within the cancer screening literature, the HBM has been used effectively in the explanation of women’s decision to undergo mammography to screen for breast cancer, for example (Champion, 1995). Janz, Champion, and Strecher (2002), in their review of the HBM literature, describe the model as follows:

> [P]eople will take action to prevent, to screen for, or to control ill-health conditions if they regard themselves as susceptible to the condition, if they believe it would have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either their susceptibility to or the severity of the condition, and if they believe that the anticipated barriers to (or costs of) taking the action are outweighed by its benefits. (p. 47-48)

As suggested by this brief description, the primary constructs in the HBM are a) perceived susceptibility, b) perceived severity, c) perceived benefits, d) perceived barriers, e) cues to action, and f) self-efficacy. Perceived susceptibility refers to the subjective perception of the risk of contracting a health condition. Perceived severity involves one’s beliefs about the seriousness of a condition and its sequelae. Perceived benefits refer to beliefs about the efficacy of an action to reduce the risk or the seriousness of impact of a health condition, while perceived barriers are beliefs about the tangible and psychological costs of taking such action. Cues to action are strategies that activate one’s readiness to take action, such as educational campaigns and reminder systems for screening. Drawn from Social Cognitive
Theory (Bandura, 1977), self-efficacy refers to confidence in one’s ability to take action. Janz, Champion, and Strecher (2002), and others (Ronis, 1992; Witte, 1994) note that little research has focused on the relationship between these constructs. Instead, each construct has been treated as equal to and independent of the others. When comparing their ability to predict health behavior, the elements of the HBM model perform quite differently. Across all studies, it has been suggested that perceived barriers have been the strongest predictors of health behavior, and perceived severity has been the least powerful (Janz et al., 2002). There is also a difference between the prediction of preventive health behavior and sick-role behavior. Perceived susceptibility is a stronger predictor of the former, while perceived benefits are better predictors of the latter (Janz et al., 2002). Rather than use these constructs in isolation, it has been suggested that the HBM should be tested as a combination of interrelated constructs operating conditionally as well as directly on health behavior (Rosenstock, Strecher, & Becker, 1994). Though variability in measurement of these constructs has been a problem, the cancer screening literature has been cited as among the best in terms of HBM measurement. This is especially true in the work of Champion and colleagues (1995) to develop a measure for mammography. Studies using their scale to measure HBM constructs have been able to show that women who were adherent to mammography had higher perceived susceptibility and lower perceived barriers than non-adherent women (Champion, Skinner, & Foster, 2000).

Several researchers have also noted the need for socio-cultural specificity when measuring HBM constructs. For instance Champion and Scott (1997) found that when mammography scales based on the HBM were developed for African American women, unique issues related to scheduling a mammogram and understanding the procedure
surfaced. In a similar vein, Miller and Champion (Miller & Champion, 1997) found that African American women were more likely to fear radiation as a barrier to mammography and were more worried about getting breast cancer than White women. Champion and colleagues revised their scale to be culture-specific for African American women, and observed improvements in reliability and validity (Champion & Scott, 1997). Tang and colleagues (Tang, Solomon, & McCracken, 2000; Tang et al., 1999) have advocated for and developed a culture-specific measure of barriers in their work on cancer screening behaviors among Asian and Asian American women. Several factors represented in their new measure of so-called cultural barriers were predictive of both breast self-exam frequency and having ever had a Pap test (Tang et al., 1999). A global measure of acculturation was also predictive of cancer screening behavior. Overall, cultural factors did play a role in screening behavior, with young Asian American women observed to be less likely to have undergone a Pap test or breast self-exam. Cultural variables such as modesty about one’s body and sexuality, communication with one’s mother about gynecological health, health prevention orientation, and use of Western medicine were found to be related to lower screening rates (Tang et al., 1999).

These attempts to develop culturally specific measures of HBM constructs are helpful in understanding the cancer screening behaviors of racial and ethnic minority groups and highlight the need for culturally informed examination of cancer screening behavior. Also, Tang and colleagues’ additional findings with respect to acculturation (i.e., the less acculturated were also less likely to have initiated screening) further underscores the importance of this variable for explaining cancer screening behavior. However, further efforts are necessary to address the broader critique of Ashing-Giwa (1999) with respect to
structural impediments to screening, such as access to quality health care. Her suggestion about the importance of assessing individuals’ perceptions of the susceptibility of their racial or ethnic group in addition to individual susceptibility is also particularly important for the relatively more collectivist orientation of the African American population. More ecological models that place the individual’s decision to obtain screening within these larger social and cultural context of behavior are needed.

The Preventive Health Model (R. E. Myers et al., 1994) extends the Health Belief Model in ways congenial to the socio-cultural considerations necessary for study with African Americans. (See Figure 1.) It was formulated in order to account for the “societal determinants, individual determinants, and the health services system in relation to the production of observed patterns of health behavior” (R. E. Myers et al., 1994; p. 142). The model draws constructs from the Health Belief Model, the Theory of Reasoned Action, and Social Learning Theory to provide an integrated framework of health behavior. Background factors (i.e., sociodemographic and health-related variables), representation factors (i.e., HBM constructs regarding perception, but particularly salience and coherence of behavior), and social influence factors (i.e., norms, social support, and the doctor-patient relationship) are all thought to influence intention to engage in a preventive action. Intention, in turn, determines actual preventive action being taken. Background, representation, and social influence factors are also thought to influence preventive action directly. Another part of the model is what are called program factors, which are interventions by health professionals to influence preventive health behavior. These program factors are thought to influence action directly and through intentions. In a structural analysis of the model applied to colorectal cancer screening, R. E. Myers et al. (1994) found that self-efficacy, salience and
coherence, and intervention were predictive of intention and adherence to screening in men, and age and salience and coherence were predictive for women. It is unclear how many African Americans participated in the study, as the authors only report that 22% of subjects were “nonwhite.” Comparisons by racial group also were not performed. However, the inclusion of societal and social influence factors in addition to the HBM constructs in the Preventive Health Model allows for an exploration of colorectal cancer screening behavior consistent with socio-cultural considerations important to African Americans. It provides a conceptual framework within which more specific within-group considerations can be added.

Present Study

The purpose of the present study is to test a theory-based model (see Figure 2) of colorectal cancer screening behaviors in African Americans that includes factors associated with screening in the extant literature as well as culturally relevant variables. Consistent with the review of the literature above and with constructs included in the Preventive Health Model, this conceptual model proposes that sociodemographic variables, social support, socio-cultural factors, and perceived susceptibility are all predictors of the intention to undergo colorectal cancer screening for African Americans. The relationship between this set of variables and intentions is mediated by the perceived barriers and perceived benefits of screening, constructs drawn from the Health Belief Model and found to be associated with preventive health behavior.

The sociodemographic variables included in the model are those that have been consistently associated with adherence to colorectal cancer screening guidelines recommended by the American Cancer Society (2005b). These objective barriers to
colorectal cancer screening include access to health care, younger age, lower socioeconomic status, and female gender. Objective barriers are thought to predict perceived barriers to screening as measured by standardized measures of attitudes and beliefs regarding colorectal cancer screening.

As discussed previously, social support has also been associated with cancer screening and other health behaviors in studies with African Americans (Crane, 1996; Kang & Bloom, 1993; Kang et al., 1994; Kinney et al., 2005) and has been included in the model. Socio-cultural factors include group-based medical mistrust as well as African American acculturation. As noted previously, both of these constructs have been linked to health behaviors among African Americans, though the latter has received less attention with respect to cancer. Perceived susceptibility is also included in this model, consistent with the Health Belief Model and related findings. Notably, in the conceptual model presented here, both individual susceptibility and group susceptibility are assessed. This is to test Ashing-Giwa’s (1999) suggestion that the collectivistic cultural orientation of the African American community may make individuals more motivated to undertake preventive health behaviors if they perceive a threat to their ethnic group in addition to feeling some level of personal threat. Greater social support, lower levels of mistrust, higher levels of acculturation, and high individual and group susceptibility are thought to predict more perceived benefits of colorectal cancer screening. Perceived benefits are measured similarly to barriers, including attitudes and beliefs.

Four main hypotheses are represented in this model: 1) Perceived Barriers mediates the relationship between objective Sociodemographic barriers and Screening Intentions; Perceived Benefits mediates the relationship between 2) Social Support and Screening
Intentions; 3) Socio-cultural factors and Screening Intentions; 4a) Individual Susceptibility and Screening Intentions; and 4b) Group Susceptibility and Screening Intentions. These mediation hypotheses require several more specific statistical tests (see Figure 3). These tests are hypothesized to show that Perceived Benefits mediates the relationship between Social Support, Cultural Mistrust, Acculturation, Individual Susceptibility, Group Susceptibility, and Screening Intentions. Perceived Barriers is hypothesized to mediate the relationship between Access to Health care, Socioeconomic Status, Age, and Gender and Screening Intentions.
CHAPTER 2

METHOD

Participants and Procedures

Prior to recruitment of participants, the study was approved by the Institutional Review Board for research with human subjects. Following this approval, a letter was sent to the leaders of churches, social and fraternal organizations, and places of employment in two large Midwestern cities (see Appendix A). A total of 12 entities were contacted. The letter explained the purpose of the study and asked that the leader designate a contact person with whom researchers could coordinate further recruitment efforts and the day of administration. Of the 12 leaders contacted, 10 designated a contact person. Of the 10 organizations designating a contact person, 4 were churches, 3 were social/fraternal groups, and 3 were work places. Though information was provided through an initial communication, repeated attempts to reach the contact person at one of the churches were unsuccessful, resulting in the participation of only 3 churches. Thus, 9 groups ultimately participated.

Once the contact person was identified, he or she was provided with an informational sheet that described the study and his or her role in recruitment. Contact persons were asked to aid in coordinating the date, time, and appropriate available space for
the day of administration (e.g., church sanctuary, meeting rooms, etc.). Sample announcements to be read at services or meetings and inserted in bulletins or newsletters were also provided (see Appendix B) along with a flyer appropriate for recruitment of middle-aged African American participants (see Appendix C).

On the day of administration, participants were given a questionnaire packet (including color pictures of the various screening tests; see Appendix D) in a group format. Researchers and research assistants briefly explained the purpose of the study and reviewed instructions for answering the questionnaire packet. Upon receipt of their completed questionnaires packets, participants were compensated ($15) for their participation and given a debriefing sheet further explaining the study.

Two hundred three ($N = 203$) African American adults, age 45 and above, were recruited. Individuals with a personal history of cancer at any site or chronic colorectal disease (e.g., Crohn’s disease or ulcerative colitis), currently treated for life-threatening disease or severe mental disorder (e.g., schizophrenia, dementia, Alzheimer’s disease), and pregnant women were excluded. Four individuals ($n = 4$) were excluded from the sample due to a personal history of chronic colorectal disease. One ($n = 1$) was excluded due to failure to meet the age criterion. This left an effective $N$ of 198.

Of this sample, 65% were women, almost half (48%) were married, and the average age was 59.7 years ($SD = 9.9$ years). See Table 1 for sample descriptive data. The majority of the sample (83%) had completed at least some post-secondary education, and 45% had a household income of $50,000 or greater. A quarter of the sample (25%) had a household income of less than $30,000. Four individuals (2%) did not provide household income information. In terms of employment, the majority of the sample (56%) was employed at
least part-time, followed by 35% who were retired, 5% who were retired but working part-time, and an additional 5% who were unemployed or disabled. Two individuals (1%) did not provide employment information. Nearly all of the sample (91%) had health insurance coverage, which is higher than the national average of 80% for African Americans (DeNavas-Walt, Proctor, & Lee, 2004). Most of the sample (94%) also had someone they thought of as their regular physician or health care provider.

Measures

Acculturation. Measurement of Acculturation Strategies for People of African Descent (MASPAD; Obasi, 2004) is a 46-item measure of acculturation strategies used by people of African descent assessed along the dimensions of beliefs and behaviors. Responses are rated on a 6-point Likert scale from 1 = strongly disagree to 6 = strongly agree. The scale can be scored both bi-dimensionally (Traditionalist vs. Assimilationist) and multi-dimensionally. For this study only the bi-dimensional scoring was used. A sample Assimilationist item is, “My individual success is more important than the overall success of the Black community.” A Traditionalist item is, “I behave in ways that are consistent with people of African ancestry even if other cultural groups do not accept it.” Obasi (2004) found that low scores on the traditionalist beliefs and traditionalist behaviors subscales were associated with past use of mental health services. There was also evidence that individuals with a more traditionalist belief system who had higher levels of psychological distress also had less confidence in mental health professionals. Coefficient alpha reliability estimates are reported by Obasi as follows: Traditionalist subscale (.80 to .87); Assimilationist subscale (.75 to .81). In the present study, the coefficient alpha was .86 for the Traditionalist subscale and .66 for the Assimilationist subscale. Further investigation of the item-total correlations for
the assimilation subscale suggested that two items dealing with religion (i.e., “I consider myself to be a religious person” and “My beliefs are largely shaped by my religion”) should be reverse-scored ($r = -0.07$ and $-0.05$ respectively) and that alpha could be increased with the deletion of a particularly poorly correlated item (i.e., “Verbal agreements do not mean as much to me as written contracts do”; $r = -0.02$). With these modifications, the Assimilationist subscale alpha increased to .70.

*Cultural mistrust.* The Group-Based Medical Mistrust Scale (GBMMS; Thompson et al., 2004) is a 12-item instrument that measures suspicion of mainstream health care systems and health care professionals as well as the treatment provided to individuals of the respondent’s ethnic or racial group. Responses are rated on a 5-point Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*, and scores range from 12 to 60. Principal components analysis revealed three factors: Suspicion, Group Disparities in Health Care, and Lack of Support from Health Care Providers. Women with no previous mammogram or long-term lapse in mammography had significantly higher GBMMS scores compared to adherent women or women with mammography in the past 5 years (Thompson et al., 2004). Coefficient alpha reliability for the total scale is reported as .83, and split-half reliability as .75. In the present study, coefficient alpha was .88 for the total scale, .89 for Suspicion, .87 for Disparity, and .60 for Support. As a limitation of this scale, Thompson et al. noted the implicit assumption that health care professionals differ from respondents in terms of race and ethnicity. In order to clarify the relationship between mistrust of health care per se and mistrust of health care professionals of a particular racial or ethnic background (or institutions in which that group predominates), an item to assess the racial/ethnic background of the primary physician or health care provider was included.
Social support. The Abbreviated Duke Social Support Index (DSSI-11; Koenig et al., 1993) is an 11-item measure of social interaction and subjective social support intended for brief assessment of older individuals. It is based on the original 35-item Duke Social Support Index (Landerman, George, Campbell, & Blazer, 1989), which has been used extensively in cross-sectional and longitudinal studies of aging. For the social interaction subscale, one item asks respondents to give the number of persons living within one hour on whom they can depend or to whom they feel close. This item was labeled social network in the present study. The remaining three items, labeled social interaction, ask about time spent in person, on the telephone, and in groups with important individuals in the past week. These items are rated on a scale of frequency from 0 = None to 7 = Seven or more. Subjective social support items are rated on a 3-point Likert scale from 1 = Hardly ever, very dissatisfied to 3 = Most of the time, satisfied. Factor analysis of the DSSI-11 revealed a single factor, though the authors recommend correlating social interaction and subjective social support subscales with health outcome variables (Koenig et al., 1993). The 11-item version performs at a level comparable to the full 35-item version, as evidenced by correlations of similar magnitude between social interaction and subjective social support subscales with mental distress, psychiatric outpatient visits, nonpsychiatric medical outpatient visits, and hospitalizations. Cronbach’s alpha for the 7-item subjective social support subscale was reported as .75 for the health elderly and .71 for the sick elderly. This scale had an coefficient alpha of .77 in the present study.

Screening attitudes and intentions. The Colorectal Cancer Screening Questionnaire (CCSQ; Vernon et al., 1997) consists of a set of scales to measure factors related to general colorectal cancer screening adherence based on the Health Belief Model and Social
Cognitive Theory. The present study uses scales assessing perceived susceptibility, barriers (worries), benefits (salience and coherence), intention to be screened, and self-efficacy following the suggestions of the authors about items that performed satisfactorily in their original analyses. Responses are rated on a 4-point Likert scale from 1 = *Strongly agree* to 4 = *Strongly disagree*. Coefficient alphas for relevant scales ranged from .64 to .91. Perceived susceptibility items were modified for this study to account for group-level perceptions of susceptibility (e.g., “I believe African Americans are very likely to develop colorectal cancer or polyps”). For scales used in the present study coefficient alpha was as follows: Salience and Coherence (general benefits – $\alpha = .88$); Individual Susceptibility ($\alpha = .85$); Group Susceptibility ($\alpha = .94$). The Worries (general barriers) and Intention scales are both two-item scales, and therefore estimating coefficient alpha is not possible.

The Scales to Measure Benefits and Barriers of Colorectal Cancer Screening (SMBCC; Rawl et al., 2001) is a set of six scales based on the Health Belief Model to measure benefits and barriers to three specific tests for colorectal cancer screening: fecal occult blood test, sigmoidoscopy, and colonoscopy. The scales use the framework developed for applying the Health Belief Model to breast cancer screening (Champion, 1995; Champion & Menon, 1997; Champion & Scott, 1997). Responses are rated on a 5-point Likert scale from 1 = *Strongly agree* to 5 = *Strongly disagree*. A sample benefit item is, “The treatment for colorectal cancer may not be as bad if the cancer is found early.” A sample barrier item is, “I do not have the time to do a colonoscopy.” Cronbach’s alphas for the six scales ranged from .65 to .77. In this study coefficient alpha was as follows: Benefits of FOBT ($\alpha = .63$); Barriers of FOBT ($\alpha = .81$); Benefits of sigmoidoscopy ($\alpha = .75$); Barriers of sigmoidoscopy ($\alpha = .88$); Benefits of colonoscopy ($\alpha = .82$); Barriers of colonoscopy ($\alpha = .82$).
.91). Due to particularly low item-total correlation for the item “Since the fecal occult blood test can be done at home, I don’t have to make an additional doctor's appointment” ($r = .18$; with all other $r$s ranging from .29 to .55), this item was deleted from the Benefits of FOBT scale for analyses in this study. With this modification, alpha for Benefits of FOBT increased to .68.

Screening Utilization. The Measures for Ascertaining Use of Colorectal Cancer Screening (MACCS; Vernon et al., 2004) is a set of standardized items developed by a National Cancer Institute work group consisting of colorectal cancer screening experts. Following a brief description of the test, knowledge is assessed first (e.g., “Before these tests were described, had you ever heard of sigmoidoscopy?”). This is followed by items assessing whether the respondent has ever had the test (e.g., “Have you ever had a sigmoidoscopy?”); the number of tests within recommended limits (e.g., “How many sigmoidoscopic examinations have you had in the last 10 years?”); the date of the last test (e.g., “When was your most recent sigmoidoscopy?” and “What was the month and year of your most recent sigmoidoscopy?”); and the reason for the most recent test (e.g., “Why did you have your most recent sigmoidoscopy?”). For items assessing knowledge of tests and whether the respondent has “ever had” them, responses are yes, no, and not sure/don’t know. On the “how many” item for the fecal occult blood test, respondents write in how many tests they have done in the past five years (1 to 5). For sigmoidoscopy and colonoscopy, respondents indicate whether they have done these tests once, twice, or more than twice in the past 10 years. The item about time since the most recent fecal occult blood test has responses ranging from A year ago or less to More than 5 years ago; respondents may also choose Not sure/don’t know. The same item for sigmoidoscopy and colonoscopy gives a range from A
year ago or less to More than 10 years ago, consistent with longer intervals in the American Cancer Society guidelines. Again, Not sure/don’t know is an option. Finally, reasons for the most recent test responses include: a) part of a routine examination or checkup, b) because of a symptom or health problem, c) follow-up of an earlier abnormal test, and d) not sure/don’t know. The present study adapts these items from interview to self-administration format.

Sociodemographics. Participants were asked to provide information on the following sociodemographic indicators: age, gender, education, marital/partner status, individual and household income, occupation, and employment status. These items were adapted based on the suggestions of experts in measurement with elderly ethnic minority populations (Skinner, Teresi, Holmes, Stahl, & Stewart, 2002).

Access to Care. Participants were asked the following access to care questions adapted in part from the Behavioral Risk Factor Surveillance System (BRFSS; CDC, 2004): a) “Do you have any kind of health care coverage (e.g., employer-provided health insurance, HMO, or government plans such as Medicare or Medicaid)?” b) “Do you have one person you think of as your personal doctor or health care provider?” c) “Has your doctor or any other health care professional ever recommended that you be tested for colorectal cancer (i.e., blood stool home kit, sigmoidoscopy, or colonoscopy)?”

Data Analysis

Descriptive statistics were computed for the sample, and correlations between study variables were also examined. Covariance structure modeling was used to examine relationships between objective barriers (e.g., access, age, SES), socio-cultural variables (e.g., social support, medical mistrust, acculturation), perceived barriers and benefits of screening,
and intention to be screened. Latent variables in the model served as predictors, outcome, and mediators of indirect relationships. Manifest variables were also treated as latent variables where appropriate, as in the case of unidimensional scaling (i.e., age and the single index social support scale). The hypothesized model was tested using LISREL 8.51 (Jöreskog & Sörbom, 2001). Sample size was adequate, with the N of 198 conforming to the general factor model rule of thumb calling for 2 participants for every parameter estimated (Gorsuch, 1983).

All latent variables were measured with multiple indicators. In specifying the model, Access, Age, SES, Perceived Individual Susceptibility, Perceived Group Susceptibility, Social Support, Traditional Acculturative Strategy, and Medical Mistrust were specified as exogenous latent variables (i.e., variables not receiving causal input from other variables). Access was measured by health care coverage, regular physician, and recommendation for screening. Age was a manifest variable treated as a latent variable with a single indicator. SES was measured by education, household income, and occupation. Perceived Individual Susceptibility was measured by the three susceptibility items on the CCSQ (i.e., “I believe the chance I will develop colorectal polyps is high,” “I think it is very likely that I will develop colorectal cancer or polyps,” and “I believe the chance I might develop colorectal cancer is high”). Perceived Group Susceptibility was measured by these same items modified to replace “I” with “African Americans” (e.g., “I believe African Americans have a higher chance of developing colorectal cancer than other groups”). Social Support was also a manifest variable treated as a latent variable with a single indicator. Traditional Acculturative Strategy was measured by three parcels of items from the MASPAD Traditionalist subscale. Parceling was carried out consistent with the recommendations of Kishton and
Widaman (1994). Assimilation was not included because of the instability of its measurement model. Medical Mistrust was measured by the Suspicion, Disparity, and Support subscales of the GBMMS.

The outcome variable, Intention, was specified as an endogenous latent variable measured by intention to undergo FOBT, sigmoidoscopy, and colonoscopy from the SMBCC. Perceived Barriers and Perceived Benefits were positioned as mediators between the objective barrier and socio-cultural variables respectively. Perceived Barriers was measured by barriers to FOBT, sigmoidoscopy, and colonoscopy. Perceived Benefits was measured by benefits of FOBT, sigmoidoscopy, and colonoscopy. This model reflects full mediation of the relationship between objective barriers and screening intentions by perceived barriers and full mediation of the relationship between perceived susceptibility, social support, medical mistrust, and acculturation and intentions by perceived benefits. Though gender was hypothesized as an additional predictor of intentions through perceived barriers, it was not significantly correlated with any of the indicators of the outcome variable. Therefore, it was not included in the model.

Model estimation was carried out using the raw data as input, in which only 2.3% of values overall were missing. In order to utilize data from individuals with incomplete data, the covariance matrix was estimated using the EM algorithm procedure to obtain starting values for full information maximum likelihood (FIML) estimation of model parameters. To provide a metric for the latent constructs and to identify the measurement model, one indicator loading for each latent variables was set to 1.0 in the unstandardized solution. Direct and indirect (mediated by Perceived Barriers and Perceived Benefits) effects were estimated along with their standard errors. The Sobel test (Sobel, 1982) was used to test the
significance of each indirect effect ($p < .05$). Of particular note in the present study were the indirect effects of the latent variables representing social support, medical mistrust, group susceptibility, and acculturation. LISREL provides output that includes parameter estimates of indirect effects in the model with their associated standard errors. The test statistic $z$ is equal to the parameter estimate divided by its standard error. A $z$ of 1.96 or greater is considered significant at the $\alpha = .05$ level, and indicates that the variable being examined has a significant indirect effect with respect to the outcome. This statistic was examined in the case of each predictor.

The root mean square error of approximation (RMSEA; Steiger, 1990; Steiger & Lind, 1980) was used to estimate model fit, or the ability of the model to explain the covariances between variables. Values of RMSEA below .05 are suggestive of close fit, between .05 and .08 of reasonably close fit, and .10 or greater of poor or unacceptable fit (Browne & Cudeck, 1992). RMSEA considers both fit and parsimony.
CHAPTER 3

RESULTS

Preliminary analyses

History and knowledge descriptives

Eleven percent (11%) of the sample reported a personal history of colorectal polyps. With regard to family history, 20% had a blood relative (e.g., grandparents, parents, siblings) diagnosed with colorectal cancer, 12% with colorectal polyps, and 8% with irritable bowel disease of other colorectal or colon disease (e.g., ulcerative colitis or Crohn’s disease).

The sample was relatively knowledgeable about the different types of colorectal cancer screening. Most (85%) had heard of colonoscopy, followed by FOBT (70%), barium enema (64%), and sigmoidoscopy (48%).

Past screening utilization

Table 2 reports the utilization of colorectal cancers screening across the four modalities assessed. Only the subsample aged 50 and older (N = 163) is included because they were most likely to have received recommendations for screening. Guidelines calling for African Americans to begin screening at age 45 (ACS, 2005c; Agrawal et al., 2005) were still quite recent when data was collected. Both the proportion who had ever been screened and who had received a timely screening consistent with American Cancer Society guidelines
are reported. Beginning at age 50, American Cancer Society guidelines for early detection of colorectal cancer recommend a) a fecal occult blood test (FOBT) or fecal immunochemical test (FIT) using a take-home kit every year, b) flexible sigmoidoscopy or double-contrast barium enema every 5 years, and d) colonoscopy every 10 years. The more liberal estimate of at least 1 to 2 years ago is reported for the FOBT to allow for reasonable approximation in the self-report. The subsample was most likely to have received colonoscopy (64%). It was least likely to have ever undergone sigmoidoscopy (28%). Timely use of screening was again most likely to have occurred with colonoscopy, with 64% of the sample reporting the test at least once in the past 10 years. This is contrasted sharply with the proportion reporting timely adherence to the other three modalities. The percentages of adherent individuals did not exceed 30% for FOBT, sigmoidoscopy, or barium enema. Interestingly, barium enema, which is no longer widely used, was the most likely to have been used in line with ACS guidelines, with 26% reporting it in the last 5 years.

Correlations between predictors and mediators/outcomes

The correlations between predictors and mediators (i.e., perceived benefits and barriers) and outcomes (i.e., intention to be screened) are presented in Table 3. Older age was only modestly associated with the perception of fewer barriers to colonoscopy and the intention to be screened in general. Gender was not significantly correlated with any of the mediator or outcome measures. Overall, SES was positively associated with perceived benefits of colonoscopy and screening in general and with intention to undergo colonoscopy and screening in general (rs range from .16 to .34). SES variables were also consistently associated with less perception of barriers to both test-specific and general screening (rs range from -.15 to -.40). With respect to access to health care, insurance coverage was
significantly related to less perception of barriers to colonoscopy \((r = -0.22)\) and screening in general \((r = -0.18)\) and to colonoscopy \((r = 0.15)\) and general \((r = 0.16)\) intention. Having a regular physician or other health care provider was positively associated with general perception of benefits \((r = 0.15)\) and intentions \((r = 0.21)\). Presence of a regular provider was also negatively associated with perception of both test-specific and general barriers to screening \((r_s\) range from \(-0.20\) to \(-0.22)\). As with the SES measures, having a doctor’s recommendation for screening was associated with perception of more benefits and with greater intention to be screened using colonoscopy and in general. However, a physician recommendation was negatively associated with perceiving barriers to FOBT and colonoscopy. All of these relationships were in the expected directions.

The Suspicion subscale of the medical mistrust measure was consistently associated with mediators and outcomes. Suspicion was negatively related to all perceived benefits \((r_s\) range from \(-0.16\) to \(-0.34)\) and all intention \((r_s\) range from \(-0.15\) to \(-0.19)\) except intention to undergo sigmoidoscopy \((r = -0.11, \text{ns})\). Among the strongest correlations of all were those between suspicion and perceived barriers to screening \((r_s\) range from \(0.24\) to \(0.43)\). In addition, the Support subscale was negatively associated with general benefits and positively associated with all test-specific barriers. The full medical mistrust scale was significantly correlated in the same directions as above with most benefits and all barriers, but not with intention. Size of the social network was only significantly related to less perceived general barriers and greater intention to undergo colonoscopy. The measure of social interaction was not associated with any of the mediator or outcome variables. However, subjective satisfaction with social support was positively related to perceived benefits \((r_s\) range from \(0.17\) to \(0.31)\) and colonoscopy and general intention \((r = 0.18\) and \(0.21\) respectively). Subjective satisfaction was
negatively related to perceived barriers (rs range from -.17 to -.23) except general barriers. Total social support was only consistently related to less perceived barriers, though it was also related to general benefits and intention for colonoscopy. The Traditional subscale of the acculturation measure was consistently, positively related to greater perceived benefits (rs range from .26 to .31) and intention to be screened (rs range from .20 to .37). Being more traditional was also negatively associated with perceived barriers of sigmoidoscopy (r = -.22) and colonoscopy (r = -.15). Being more assimilated was associated with less perceived benefits of colonoscopy and general screening (r = -.16 and -.33 respectively) and more perceived barriers (rs range from .27 to .40). Assimilation was also negatively associated with intention to be screened (rs range from -.17 to -.29). Perceived individual susceptibility to colorectal cancer was only positively associated with general barriers to screening (r = .36), but perceived susceptibility for African Americans as a group was positively related to benefits of screening (rs range from .25 to .31) and intention to undergo FOBT and screening in general. All correlations were in the expected directions with the exception of the acculturation variables, whose directions were the reverse of those hypothesized.

Primary analyses

The LISREL test of the hypothesized model is presented graphically in Figure 4 and includes standardized estimates of parameters in the measurement and structural models. With an RMSEA of .061 (90% C.I.: .053; .070), the model exhibited reasonably close fit. Because gender was not significantly correlated with any of the mediator or outcome variables, it was not included in the model.
Hypothesis 1

The direct paths were significant from Access to Perceived Barriers ($t = -2.78$) and from Age to Perceived Barriers ($t = 2.14$), but not from SES to Perceived Barriers ($t = -1.27$). The path from Perceived Barriers to Screening Intentions was also significant ($t = -6.20$). As hypothesized, the indirect effects were significant from Access (Sobel’s $z = 2.59$) and Age (Sobel’s $z = -2.05$) through Perceived Barriers to Intentions, supporting the view that Perceived Barriers mediates the relationship between objective sociodemographic barriers and Screening Intentions. Contrary to prediction, SES (Sobel’s $z = 1.25$) did not have a significant indirect effect on Screening Intentions through Perceived Barriers. These results suggest that having greater access to health care positively impacts screening intentions through less perception of barriers, and that older age negatively impacts screening intentions through more perception of barriers.

Hypothesis 2

With respect to the second hypothesis, that Perceived Benefits mediates the relationship between Social Support and Screening Intentions, the direct path from Social Support to Perceived Benefits was not significant ($t = .48$) nor was the indirect effect (Sobel’s $z = .48$) on Screening Intentions. However, the path from Perceived Benefits to Screening Intentions was significant ($t = 3.04$). This hypothesis was not supported.

Hypothesis 3

The third hypothesis tested was whether Perceived Benefits mediates the relationship between socio-cultural factors and Screening Intentions. The direct path from Traditional Acculturative Strategy to Perceived Benefits was significant ($t = 3.81$), as was the direct path from Medical Mistrust to Perceived Benefits ($t = -3.69$). The indirect effects from
Traditional Acculturative Strategy and Medical Mistrust through Perceived Benefits to Screening Intentions were both significant (Sobel’s $z = 2.42$ and $-2.39$ respectively). This supports Hypothesis 3 and suggests that being more traditional positively impacts screening intentions through more perception of benefits, while having more mistrust negatively impacts screening intentions through less perception of benefits. While the hypothesis of mediation was supported, the direction of the effect for Traditional Acculturative Strategy was contrary to prediction. More traditional individuals were expected to perceive fewer benefits and be less inclined to screen for cancer; instead the opposite was found.

*Hypothesis 4a*

The final hypothesis was tested in two parts. The first test (Hypothesis 4a) was to determine whether Perceived Benefits mediates the relationship between Individual Susceptibility and Screening Intentions. The direct path between Individual Susceptibility and Perceived Benefits was not significant ($t = -.18$), nor was the indirect effect (Sobel’s $z = -.18$) on Screening Intentions. Hypothesis 4a was not supported.

*Hypothesis 4b*

The second test determined whether Perceived Benefits mediates the relationship between Group Susceptibility and Screening Intentions. The direct path from Group Susceptibility to Perceived Benefits was significant ($t = 4.30$), as was the indirect effect on Screening Intentions (Sobel’s $z = 2.53$). This supports Hypothesis 4b, and suggests that perception of susceptibility for African Americans as a group positively impacts screening intentions through the perception of more benefits of screening.
Post-hoc and ancillary analyses

Post-hoc covariance structure analyses

Because the pattern of correlations (see Table 3) revealed associations beyond those hypothesized in the original model (i.e., sociodemographic variables with benefits and sociocultural variables with barriers), follow-up analyses were conducted to test models where all predictors were mediated by Perceived Barriers and Perceived Benefits separately.

Figure 5 graphically presents the mediation model for Perceived Barriers. The model exhibited close fit, with an RMSEA of .056 (90% C.I.: .046; .065). In this model, only the direct paths from SES and Medical Mistrust to Perceived Barriers were significant ($t = 2.98$ and 2.30 respectively). The direct path from Perceived Barriers to Screening Intentions was also significant ($t = -7.21$). The indirect effects of SES and Medical Mistrust through Perceived Barriers to Screening Intentions were significant as well (Sobel’s $z = 2.82$ and -2.23). This suggests that, when accounting for all predictor variables, higher SES positively impacts screening intentions through less perception of barriers, and greater mistrust negatively impacts intentions through more perception of barriers.

Figure 6 presents the mediation model for Perceived Benefits. This model also exhibits close fit, with an RMSEA of .055 (90% C.I.: .044; .064). The direct paths from Group Susceptibility, Medical Mistrust, and Traditional Acculturative Strategy to Perceived Benefits were significant ($t = 3.58$, -2.19 and 3.56 respectively). The direct path from Perceived Benefits to Screening Intentions was also significant ($t = 5.55$). The indirect effects of Group Susceptibility, Medical Mistrust, and Traditional Acculturative Strategy through Perceived Benefits to Screening Intentions were significant (Sobel’s $z = 3.09$, -2.07, and 3.08 respectively). This suggests that, when accounting for all predictor variables,
perceiving more group susceptibility and being more traditional has a positive impact on screening intentions through more perception of benefits. However, greater mistrust has a negative impact on intentions through less perception of benefits.

*Hierarchical regression analyses testing interactions*

Planned exploratory hierarchical multiple regression analyses were performed to test for potential interactions between predictors of note in their associations with mediator and outcome variables. The following interactions were tested: a) Traditional Acculturative Strategy × Medical Mistrust; b) Physician’s Ethnicity × Medical Mistrust; c) Group Susceptibility × Medical Mistrust; and d) Group Susceptibility × Traditional Acculturative Strategy. Each interaction was the final step in regression analyses with general benefits of screening, general barriers of screening, and general intention to be screened as the dependent variables. A total of 12 regression analyses were performed. Sociodemographic and access to health care variables significantly correlated with the dependent variables (\(p < .05\); see Table 3) were entered as controls. Table 4 summarizes the regression analyses in which the interaction term was significant.

*General benefits.* For all general benefits models, variables were entered in the following order: step 1) education, household income, and occupation; step 2) regular physician and physician recommendation; step 3) predictor A; step 4) predictor B; step 5) A × B interaction. The model testing the Group Susceptibility × Traditional Acculturative Strategy interaction was significant \(F(8, 168) = 5.66, p < .001\), and accounted for 22% of the variance (total adjusted \(R^2 = .18\)) in perceived general benefits of screening. The interaction step was significant \((p < .05)\), accounting for 3% of the variance. Figure 7 presents the interaction graphically and reveals that those who perceive high group susceptibility also
perceive greater benefits in screening. However, for those who perceive low group susceptibility, individuals who are also more traditional perceive greater benefits than individuals who are less traditional. In other words, individuals who perceive less group susceptibility and are also less traditional perceive the least benefit of screening.

The general benefits model testing the Group Susceptibility × Medical Mistrust interaction was also significant $F(8, 182) = 8.00, p < .001$, and accounted for 27% of variance in perceived general benefits. The interaction step was significant ($p < .01$), accounting for 4% of the variance. Figure 8 presents this interaction graphically. It shows that those with low levels of mistrust are more likely to perceive benefits than those with high levels of mistrust, but that perception of high group susceptibility makes both groups more likely to perceive benefits. Individuals high in mistrust and low in their perception of group susceptibility perceive the least benefit of screening.

*General barriers.* The order for general barriers was: step 1) education and occupation; step 2) regular physician and physician recommendation; step 3) predictor A; step 4) predictor B; step 5) A × B interaction. None of the general barriers models testing interactions were significant.

*General intention.* Variables were entered in the following order for all general intention models: step 1) age; step 2) education, occupation, and household income; step 3) health insurance, regular physician, and physician recommendation; step 4) predictor A; step 5) predictor B; step 6) A × B interaction. The general intention model testing the Physician Ethnicity × Medical Mistrust interaction was significant $F(10, 175) = 2.55, p < .01$, and accounted for 13% of the variance (total adjusted $R^2 = .08$) in screening intention. The interaction step was significant ($p < .05$), accounting for 3% of the variance. Figure 9
presents the interaction, showing that overall individuals with an African American physician express greater intent to be screened relative to individuals with physicians who are not African American. Though it shows some decline, this intent remains fairly stable even in the face of high levels of medical mistrust. However, for individuals with non-African American physicians, high levels of mistrust are associated with less intent to be screened. In fact, these individuals expressed the least intent to be screened.

Finally, the general intention model testing the Group Susceptibility × Traditional Acculturative Strategy interaction was significant $F(10, 164) = 6.69, p < .001$, and accounted for 30% of the variance (total adjusted $R^2 = .26$) in perceived general benefits of screening. The interaction step was significant ($p < .001$), accounting for 9% of the variance. Figure 10 presents this interaction. While individuals who perceived low levels of group susceptibility expressed slightly more intent to be screened at high levels of traditionalism, individuals who perceived high levels of group susceptibility expressed considerably more intent at high levels of traditionalism.

In summary, perceiving high group susceptibility while being both more traditional and less mistrustful was associated with perception of greater benefits to screening in general. More general intent to be screened was associated with perceiving high group susceptibility while being more traditional. Intent was also associated with having low levels of mistrust while also having an African American physician.

Correlations between predictors and knowledge and past utilization

Table 5 presents the correlations between the study predictors and both knowledge and past utilization of colorectal cancer screening. As with the knowledge and utilization data reported above, only data from the subsample 50 and older is reported here. However,
the pattern of correlations was similar when the entire sample was included. The only significant correlation with age was a small relationship ($r = .18, p < .05$) between older age and having ever had FOBT. The only significant gender correlation revealed that women were somewhat more likely ($r = .21, p < .05$) to have undergone barium enema screening. In terms of the variables assessing SES, the strongest and most consistent relationships were with knowledge and past utilization of colonoscopy. Overall higher educational attainment, greater household income, and higher status occupation were associated with more knowledge of colonoscopy, and to a lesser degree, with past utilization of colonoscopy. Education and occupation were also related to knowledge and use of FOBT. Surprisingly, the variables measuring access to health care did not show strong relationships with either knowledge or past utilization. However, this may be due to the relatively low variability especially in health insurance coverage and regular physician status, both of which were reported by nearly the entire sample. One exception was the significant, positive relationship between health insurance and past utilization of colonoscopy ($r = .19, p < .05$). A physician’s recommendation of screening was also positively correlated with knowledge of colonoscopy ($r = .18, p < .05$) and with past utilization of all tests except barium enema ($r_s$ range from .17 to .28).

Among the socio-cultural variables, the measure of medical mistrust and its subscales (particularly Suspicion) were related to knowledge and utilization, but in a negative direction. This was especially true for utilization of all tests except sigmoidoscopy, which may be accounted for by the relatively few individuals who had undergone this test. Knowledge of colonoscopy and barium enema were also significantly and negatively related to medical mistrust. Size of the social network was not related to knowledge or past utilization of any
of the tests. The level of social interaction was only significantly related to FOBT knowledge \((r = .16, p < .05)\) and utilization \((r = .22, p < .05)\). Satisfaction with social support was related to knowledge of all but sigmoidoscopy and only utilization of FOBT. In terms of acculturation, the only significant relationship was between greater assimilation and less knowledge of the barium enema screening test. Neither one’s individual nor group perception of susceptibility was related to knowledge or past utilization.
<table>
<thead>
<tr>
<th></th>
<th>% (M)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (range: 45-93)</td>
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<tr>
<td>Gender</td>
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<tr>
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<tr>
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<tr>
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<td></td>
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<tr>
<td>High school</td>
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<tr>
<td>Some college</td>
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<td></td>
</tr>
<tr>
<td>College</td>
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<tr>
<td>Graduate</td>
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<td>Household Income =/&gt; $50,000</td>
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<td>Retired</td>
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<td>Occupation</td>
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<td></td>
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<tr>
<td>Homemaker</td>
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<td></td>
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<tr>
<td>Unskilled labor</td>
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<td></td>
</tr>
<tr>
<td>Semi-skilled labor</td>
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<tr>
<td>Skilled craftsperson</td>
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<tr>
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<tr>
<td>Clerical/sales</td>
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<td></td>
</tr>
<tr>
<td>Technical/semi-professional</td>
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<tr>
<td>Small business owner</td>
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<tr>
<td>Mid-level management</td>
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<tr>
<td>Senior management/professional</td>
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<tr>
<td>Healthcare</td>
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<tr>
<td>Health insurance coverage</td>
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<td></td>
</tr>
<tr>
<td>Regular physician/health care provider</td>
<td>94%</td>
<td></td>
</tr>
<tr>
<td>Physician recommendation of colorectal screening</td>
<td>75%</td>
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</tr>
<tr>
<td>Women who had ever had mammogram</td>
<td>98%</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Means, Standard Deviations, and Frequencies of Sample Characteristics (N = 198)
Table 2. Colorectal Cancer Screening Utilization for Individuals ≥ 50 (N = 163)

<table>
<thead>
<tr>
<th>Screening Test</th>
<th>Utilization (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever had FOBT</td>
<td>52%</td>
</tr>
<tr>
<td>FOBT at least 2 years ago</td>
<td>21%</td>
</tr>
<tr>
<td>Ever had sigmoidoscopy</td>
<td>28%</td>
</tr>
<tr>
<td>Sigmoidoscopy at least in last 5 years</td>
<td>16%</td>
</tr>
<tr>
<td>Ever had colonoscopy</td>
<td>64%</td>
</tr>
<tr>
<td>Colonoscopy at least in last 10 years</td>
<td>64%</td>
</tr>
<tr>
<td>Ever had barium enema</td>
<td>41%</td>
</tr>
<tr>
<td>Barium enema at least in last 5 years</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Benefits of FOBT</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Age</td>
<td>.04</td>
</tr>
<tr>
<td>Gender</td>
<td>-.03</td>
</tr>
<tr>
<td>Education</td>
<td>.06</td>
</tr>
<tr>
<td>Hs. Income</td>
<td>.12</td>
</tr>
<tr>
<td>Occupation</td>
<td>.06</td>
</tr>
<tr>
<td>Insurance</td>
<td>.09</td>
</tr>
<tr>
<td>Reg. MD</td>
<td>.08</td>
</tr>
<tr>
<td>MD Rec.</td>
<td>.11</td>
</tr>
<tr>
<td>Suspicion</td>
<td>-.17</td>
</tr>
<tr>
<td>Disparity</td>
<td>-.12</td>
</tr>
<tr>
<td>Support</td>
<td>-.06</td>
</tr>
<tr>
<td>GBMMS</td>
<td>-.14</td>
</tr>
<tr>
<td>Soc. Ntwk.</td>
<td>.01</td>
</tr>
<tr>
<td>Soc. Inx.</td>
<td>.02</td>
</tr>
<tr>
<td>Soc. Supp.</td>
<td>.22</td>
</tr>
<tr>
<td>Total Supp.</td>
<td>.05</td>
</tr>
<tr>
<td>Tradition</td>
<td>.26</td>
</tr>
<tr>
<td>Assimilation</td>
<td>-.04</td>
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<tr>
<td>Ind. Suscep.</td>
<td>.08</td>
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<tr>
<td>Grp. Suscep.</td>
<td>.30</td>
</tr>
</tbody>
</table>

Notes: bold = p < .05; FOBT = fecal occult blood test; sigmoid. = sigmoidoscopy; colonoscp. = colonoscopy; Hs. Income = household income; Insurance = health insurance coverage; Reg. MD = regular doctor or health professional; MD Rec. = doctor recommendation of colorectal cancer screening; GBMMS = Group-Based Medical Mistrust Scale; Soc. Ntwk. = size of social network; Soc. Inx. = frequency of social interaction; Soc. Supp. = subjective social support; Total Supp. = total Duke Social Support Index score; Tradition = traditionalist subscale of MASPAD; Assimilation = assimilationist subscale of MASPAD; Ind. Suscep. = perceived individual susceptibility; Grp. Suscep. = perceived group susceptibility

Table 3. Correlations between Predictors and Mediators/Outcomes (N = 198)
<table>
<thead>
<tr>
<th>Step and Predictor</th>
<th>Statistics by Step</th>
<th>Statistics by Predictor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TR²</td>
<td>R²</td>
</tr>
<tr>
<td><strong>Outcome: General Benefits (N = 169)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Education</td>
<td>.09</td>
<td>.09**</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td>.02</td>
</tr>
<tr>
<td>2. Regular physician</td>
<td>.12</td>
<td>.03</td>
</tr>
<tr>
<td>Physician recommendation</td>
<td>.12</td>
<td>.03</td>
</tr>
<tr>
<td>3. Group susceptibility</td>
<td>.15</td>
<td>.03*</td>
</tr>
<tr>
<td>4. Traditional acculturative strategy</td>
<td>.19</td>
<td>.04**</td>
</tr>
<tr>
<td>5. Group Susceptibility × Traditional</td>
<td>.22</td>
<td>.03*</td>
</tr>
<tr>
<td><strong>Outcome: General Benefits (N = 165)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Education</td>
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<td>.11**</td>
</tr>
<tr>
<td>Household income</td>
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<td></td>
</tr>
<tr>
<td>Occupation</td>
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<td>.01</td>
</tr>
<tr>
<td>2. Regular physician</td>
<td>.13</td>
<td>.02</td>
</tr>
<tr>
<td>Physician recommendation</td>
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<td>.02</td>
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<tr>
<td>3. Group susceptibility</td>
<td>.18</td>
<td>.05**</td>
</tr>
<tr>
<td>4. Medical mistrust</td>
<td>.23</td>
<td>.05**</td>
</tr>
<tr>
<td>5. Group Susceptibility × Medical Mistrust</td>
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<td>.04**</td>
</tr>
<tr>
<td><strong>Outcome: General Intention (N = 176)</strong></td>
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<td></td>
</tr>
<tr>
<td>1. Age</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>2. Education</td>
<td>.08</td>
<td>.07**</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td>.03</td>
</tr>
<tr>
<td>3. Insurance</td>
<td>.10</td>
<td>.01</td>
</tr>
<tr>
<td>Regular physician</td>
<td>.10</td>
<td>.01</td>
</tr>
<tr>
<td>Physician recommendation</td>
<td>.10</td>
<td>.01</td>
</tr>
<tr>
<td>4. Physician ethnicity</td>
<td>.11</td>
<td>.01</td>
</tr>
<tr>
<td>5. Medical mistrust</td>
<td>.11</td>
<td>.00</td>
</tr>
<tr>
<td>6. Physician ethnicity × Medical Mistrust</td>
<td>.13</td>
<td>.03*</td>
</tr>
<tr>
<td><strong>Outcome: General Intention (N = 165)</strong></td>
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</tr>
<tr>
<td>1. Age</td>
<td>.06</td>
<td>.06**</td>
</tr>
<tr>
<td>2. Education</td>
<td>.11</td>
<td>.05*</td>
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<tr>
<td>Household income</td>
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<td>.11</td>
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<tr>
<td>Occupation</td>
<td></td>
<td>.02</td>
</tr>
<tr>
<td>3. Insurance</td>
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<td>.03</td>
</tr>
<tr>
<td>Regular physician</td>
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<td>.03</td>
</tr>
<tr>
<td>Physician recommendation</td>
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<td>.03</td>
</tr>
<tr>
<td>4. Group susceptibility</td>
<td>.14</td>
<td>.00</td>
</tr>
<tr>
<td>5. Traditional acculturative strategy</td>
<td>.21</td>
<td>.07**</td>
</tr>
<tr>
<td>6. Group Susceptibility × Traditional</td>
<td>.30</td>
<td>.09**</td>
</tr>
</tbody>
</table>

Note: * p < .05 ** p < .01; reduced N’s due to missing data.

Table 4. Hierarchical Multiple Regressions of Interactions Predicting Benefits and Intention
<table>
<thead>
<tr>
<th></th>
<th>Know of FOBT</th>
<th>Know of sigmoid.</th>
<th>Know of colonoscp.</th>
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Notes: **bold** = p < .05; FOBT = fecal occult blood test; sigmoid. = sigmoidoscopy; colonoscp. = colonoscopy; BA = barium enema; Hs. Income = household income; Insurance = health insurance coverage; Reg. MD = regular doctor or health professional; MD Rec. = doctor recommendation of colorectal cancer screening; GBMMS = Group-Based Medical Mistrust Scale; Soc. Ntwk. = size of social network; Soc. Intx. = frequency of social interaction; Soc. Supp. = subjective social support; Total Supp. = total Duke Social Support Index score; Tradition = traditionalist subscale of MASPAD; Assimilation = assimilationist subscale of MASPAD; Ind. Suscp. = perceived individual susceptibility; Grp. Suscp. = perceived group susceptibility

Table 5. Correlations between Predictors and Knowledge and Utilization for Individuals ≥ 50 (N = 163)
CHAPTER 4

DISCUSSION

The purpose of this study was to test a theory-based, socio-cultural model of colorectal cancer screening among African Americans. Overall, the hypothesized model was supported by the data, revealing that perceived barriers to screening mediates the relationship between age and access to care and screening intentions and perceived benefits mediates the relationship between medical mistrust, traditional acculturative strategy, and group susceptibility and screening intentions. These patterns suggest that: a) more access to care positively impacts screening intentions through less perception of barriers; b) older age negatively impacts screening intentions through more perception of barriers; c) being more traditional and perceiving more group susceptibility positively impacts screening intentions through more perception of benefits; and d) having more medical mistrust negatively impacts screening intentions through less perception of benefits. Only SES, social support, and individual susceptibility did not have an indirect effect through the mediators in the hypothesized model. However, when all predictors were mediated by barriers in the post-hoc analysis, the indirect effect of SES emerged as significant along with medical mistrust. Traditional acculturative strategy, medical mistrust, and group susceptibility also had significant indirect effects through benefits alone in the post-hoc analysis. Planned
exploratory analyses revealed significant interactions between predictors in their relationship to benefits and intention. Being both more traditional and less mistrustful related to greater perception of benefits of screening in general, while perceiving higher group susceptibility and being more traditional was associated with general intention to be screened. Being less mistrustful and having an African American physician was also related to greater intent.

In terms of knowledge and past utilization, the sample was relatively knowledgeable and reported undergoing timely colonoscopy at rates higher than the national average while use of FOBT, sigmoidoscopy, and barium enema was roughly comparable to data reported in national epidemiological studies (ACS, 2005b; Seeff et al. 2004; Seef, Shapiro, & Nadel, 2002). The high colonoscopy utilization rates may be due to inflation sometimes characteristic of self-report data, but rates are difficult to compare because national surveys and various studies use different time intervals and terminology (e.g., colonoscopy, endoscopy, proctoscopy) to determine timely adherence to screening. The matter of comparability is further complicated by the different schedules of screening recommended for the various tests. What is clearer from correlation analyses in the present study is that SES and medical mistrust are associated with both knowledge and use of colorectal cancer screening. These relationships are consistent with previous research (Beeker, Kraft, Southwell, & Jorgensen, 2000; Greiner, Born, Nollen, & Ahluwalia, 2005; Harewood, Wiersema, & Melton, 2002; Seeff et al., 2004) and lend support to the notion that SES and access to care alone do not explain screening behavior for African Americans (Vlahov et al., 2005).

To place the findings for the main analyses in context, they must be compared to similar studies in the literature where intention to be screened for colorectal cancer was the
outcome. In their longitudinal examination of the stability of intention over time, Watts, Vernon, Myers and Tilley (2003) also found benefits (e.g., salience and coherence) positively predictive and barriers negatively predictive of strong intention to undergo screening. Perceived susceptibility and less perceived barriers to screening were also predictive of an increase in intention from baseline. Myers et al. (1994) found similar results with respect to benefits (e.g., salience and coherence and self-efficacy) of screening being related to intention. Both studies were tests of the Preventive Health Model (Myers et al., 1994). The Watts et al. study involved only White male automotive workers, and the Myers et al. study describes 22% of its sample simply as “nonwhite”. Therefore, comparisons with these studies and the present study must be made with caution. In studies with more clearly African American samples or subsamples (e.g., Greiner, Born, Nollen, & Ahuwalia, 2005; Holmes-Rovner et al., 2002), however, the concerns about racial discrimination and mistrust of the health care system are certainly reinforced by this study’s finding that mistrust was a consistent predictor of perceived benefits, perceived barriers, and intention to be screened.

The present study extends the existing cancer screening literature by considering socio-cultural factors within a theoretical framework. In addition, the socio-cultural and other factors included were modeled as latent variables with multiple indicators drawn from standardized measures of constructs. This effectively reduced the error of measurement and allowed for a more comprehensive model than manifest variables alone would have afforded. Also, while past studies have identified important factors that impact colorectal cancer screening among African Americans, they have often been subsumed by the broad categories of barriers and benefits, consistent with the Health Beliefs Model. The design of this study assumed that there were objective sociodemographic and socioeconomic barriers
to screening that likely predicted the perception of barriers and that there were social and
cultural factors that potentially disposed African Americans to perceive benefits in screening.
Post-hoc analyses also examined all predictors mediated by benefits and barriers with some
significant findings. By separating these proposed socio-culturally relevant antecedents from
more generic perceived benefits and barriers, it was possible to propose potential
mechanisms—though actual causation cannot be inferred from the particular analyses
undertaken.

These potential mechanisms reflect the complexity of cancer screening behavior in
line with the suggestions made by Meissner and colleagues for improvements in cancer
screening research. In light of the model’s complexity, its fit to the data was also noteworthy
and suggests that the proposed socio-cultural relationships were worthy of consideration.
Beyond these methodological issues, this study also informs the cancer screening and health
disparities literatures by drawing attention to medical mistrust, traditional acculturative
strategy, group susceptibility, and, to some extent, physician ethnicity, as determinants of
screening among African Americans. While age, access to health care, and SES were also
significant contributors to perceived barriers and intention to be screened in the main and
post-hoc analyses, they have received more attention in the colorectal cancer screening
literature (e.g., ACS, 2005b; ACS, 2005c; Cokkinides, Chao, Smith, Vernon, & Thun, 2003). One of the aims of this study was to highlight some of the within-group differences that
would allow for a determination of which African Americans were more or less likely to be
screened for colorectal cancer. In many respects that aim was met.

First, it was evident that mistrust alone and in conjunction with both group
susceptibility and physician ethnicity was associated with attitudes towards screening,
intention to be screened, knowledge, and past utilization. While some have suggested that the damaging legacy of the Tuskegee medical experiments has had a lasting influence on African American medical mistrust, a recent study examining the Tuskegee effect by Brandon, Isaac, and LaVeist (2005) concluded that broader historical and personal experiences more likely have a stronger impact. Whether the source of mistrust is historical or personal, it seems clear that interventions must be designed to address mistrust. The research of Katz et al. (2004) suggests that the most important target area for intervention is the communication between patients and their physicians. When such communication was perceived as satisfactory and knowledge was good among African Americans, screening was more likely. Medical school and continuing education efforts training physicians to build and maintain rapport with their African American patients may be necessary. Increasing the number of African American physicians who treat African American patients may also have a positive effect on colorectal cancer screening rates in this population given the “buffering” of mistrust that African American physician ethnicity had on screening intention in this study.

The proposals for training and communication notwithstanding, it will be difficult to reverse mistrust. Cultural mistrust is viewed as an adaptive response to past and ongoing discrimination (Parham, White, & Ajamu, 1999; Terrell & Terrell, 1981). It seems unlikely that mistrust will recede unless experiences and perceptions of discrimination also decrease. In a recent study of older African Americans with chronic illness, over 95% reported some exposure to societal racism, including being discriminated against at work, being followed by clerks or security guards while shopping, and having their own or their group’s intelligence or industriousness called into question, among other experiences (Moody-Ayers, Stewart,
The acute and chronic impact of such experiences on mistrust and health more generally (see Gee, 2002; Ren, Amick, & Williams, 1999 for discussion of relationship between discrimination and health) make broad systemic intervention imperative in order to address health disparities. One promising approach in this area is the use of patient navigators. Patient navigators are culturally-sensitive health professionals or trained community members who help individuals to “navigate” the medical system in order to reduce barriers to care and disparities across the spectrum of cancer from prevention to treatment and follow-up (Dohan & Schrag, 2005). Because of the flexibility of their role, navigators are often able to define and counteract barriers in real-time interactions with patients. Navigation programs have been disseminated and supported by both the American Cancer Society and the National Cancer Institute (Dohan & Schrag, 2005). Though research on the effectiveness of this strategy is in its infancy, a recent prospective clinical trial found that a patient navigator system successfully increased the colorectal cancer screening rates for African Americans and Hispanics in a low-income neighborhood health care setting (Jandorf, Gutierrez, Lopez, Christie, & Itzkowitz, 2005).

The examination of acculturation provided some interesting results that ran contrary to predictions. The traditionalist strategy proved to be related to more perceived benefits and intention to be screened rather than less. Traditionalism also interacted with group susceptibility to predict more benefits and intention. Though relatively little has been published on African American acculturation and health behavior, studies with other ethnic groups have reported a negative relationship between acculturation and preventive health behavior (e.g., Abraido-Lanza, Chao, & Gates, 2005; Tang, Solomon, & McCracken, 2001). A possible explanation for the discrepancy is that acculturation is a qualitatively different
process for African Americans than for Latinos and Asian Americans. African Americans as an ethnic group draw their heritage primarily from Africans brought to the Americas as slaves during the 16\textsuperscript{th} through 19\textsuperscript{th} centuries (Franklin & Moss, 2000). Acculturation in the sense familiar to most social scientists refers to a process of adaptation when an individual or group encounters a new culture, as in immigration to a new country. However, for historical reasons involving discrimination and segregation, African Americans often engage in a more complex negotiation between the cultural norms of predominantly African American communities and the larger, dominant culture. Acculturation in this sense means something closer to adaptation to the larger culture that surrounds one’s subculture. The assumption of this study was that individuals who adopted the concern with health status and prevention of the larger culture would be more likely to perceive benefits in screening and to express intent to be screened. This was based on previous research linking more traditional acculturation status to negative health behaviors such as smoking and lower fruit and vegetable intake (Ard, Skinner, Chen, Aickin, & Svetkey, 2005; Klonoff & Landrine, 2000; Landrine & Klonoff, 1996; Snowden & Hines, 1999). Just the opposite was found.

It is also possible that the traditionalist acculturative strategy was a proxy for racial/ethnic identity in this sample. Many of the items address fidelity to one’s ethnic identity (i.e., being of African descent) and adherence to cultural norms (e.g., respect of elders, focus on collective destiny, and participation in cultural activities). Though much of the research has been done with adolescents and young adults, there is some evidence that positive racial/ethnic identity is related to greater psychological well-being and less risky health behaviors, such as alcohol consumption (Caldwell, Sellers, Bernat, & Zimmerman, 2004; Caldwell, Zimmerman, Bernat, Sellers, & Notaro, 2002; Rowley, Sellers, Chavous, &
Sellers and colleagues have suggested that positive aspects of racial identity act as protective factors and influence the resilience of African American youth who face discrimination or other negative experiences (Caldwell, Seller, Bernat, & Zimmerman, 2004). The same protective role may be operating with the espousal of traditional African American beliefs and behaviors and positive attitudes towards preventive health behaviors. This may suggest that interventions targeting African Americans could benefit from making positive African American identity salient for participants in ways more explicit than racial matching in educational materials or health providers. However, more research is needed to determine the relationship between acculturation, ethnic/racial identity, and screening attitudes and behaviors.

The examination of perceived susceptibility at the group level was suggested by Ashing-Giwa (1999) in her analysis of the socio-cultural relevance of behavior change models for breast cancer in African American women. She suggested that perceptions of group susceptibility may be important in the decision to be screened for many African Americans with a collectivist cultural orientation. Not only was this assumption supported by data from the present study, but group susceptibility was predictive of perceived benefits and intention to be screened while individual susceptibility was not. This finding seems most relevant to the health communication of colorectal cancer risk and targeted intervention with African American communities. Even at higher levels of mistrust and lower levels of traditional acculturation, individuals who perceived more group susceptibility also perceived more benefits. In the latter case, they also expressed greater intention to be screened. Targeting these individuals with messages about the incidence and mortality rates for African Americans as a group may be more compelling than messages about individual
risk. However, it should be noted that neither individual nor group susceptibility was related to past utilization. Still, intervention along the lines of group susceptibility seems to be a promising potential approach to augment efforts to target African Americans with cancer prevention messages that are culturally relevant. Targeting (which focuses on groups) may be more effective than tailoring (focusing on the individual) in interventions with African Americans.

Indeed, this study’s findings taken together might positively influence interventions to encourage African Americans to be screened for colorectal cancer by revealing different profiles for individual African Americans along the dimensions of medical mistrust, acculturation, and group susceptibility. Some preliminary assessment measuring these constructs in a particular population could aid in more efficient delivery of patient navigation programs, targeted educational and motivational materials, and other interventions. Individuals who are particularly mistrustful or perceive low group susceptibility could be targeted for education and intervention, while traditional individuals could be targeted with messages that emphasize the salience of their group membership, for example.

It is also important to address the non-significant findings for SES, social support, and individual susceptibility in the hypothesized model. As noted above, SES did have a significant indirect effect on intention through barriers in the post-hoc model. Benefits as an additional mediator seems to have attenuated this relationship in the hypothesized model. SES variables were consistently negatively correlated with almost all barrier measures but positively related only to colonoscopy and general benefits and intention. Therefore, it is likely that SES plays a significant role that the hypothesized model was not able to account for statistically while the post-hoc model did. Social support has also been linked to African
American cancer screening in other studies (Crane, 1996; Kang & Bloom, 1993; Kang, Bloom, & Romano, 1994; Kinney, Bloor, Martin, & Sandler, 2005). However, these studies typically focused on actual adherence to screening rather than intention to be screened. It is possible that intention relates to social support differently than adherence. However, there were significant correlations between satisfaction with support and both benefits and barriers. A more health-specific social support measurement scheme may clarify the role of this construct in African American cancer screening behavior. Could be that a measure of social support more specific to health behavior (e.g., “My friends and family inquire about my health”) would yield significant findings. Finally, the non-significant findings with respect to individual susceptibility may be explained by fear. The work of Powe and others demonstrates that African Americans experience cancer fatalism, or the belief that cancer inevitably leads to death, at rates higher than other groups (Powe & Finnie, 2003). It is possible that perception of individual susceptibility triggers fears of having cancer and makes one less likely to perceive benefits of screening. This supposition is supported in part by the only significant correlation for individual susceptibility with general barriers to colorectal cancer screening ($r = .36$). The role of individual perception of susceptibility in cancer fatalism and cancer screening more broadly for African Americans warrants further study. It should be noted, however, that cancer fatalism may be more significant for low-SES African Americans than those of higher socioeconomic status (Powe & Finnie, 2003).

**Limitations**

As with any study, this study has limitations that must be noted. First, though this sample was community-based, it was a convenience sample taken from the Midwestern region of the United States. Therefore, African Americans were willing to take the
questionnaire may differ from the larger African American community. Results also may not
generalize to African Americans who are not members of groups from which participants
were recruited or who are unemployed. There may also be important regional differences
that were not reflected in the sample. The sample’s relatively high socioeconomic status and
access to care (53% with college degree or more; 44% with household income above
$50,000; 91% with health insurance; and 94% with regular physician or other health care
provider) also places it above national norms. However, this sample may be more
representative of African Americans in general than samples in studies with predominantly
low-income African Americans whose results are often erroneously generalized to the larger
African American population.

Another limitation was the cross-sectional design of this study. As mentioned
previously, casual inferences cannot be made from cross-sectional data because it is not
possible to determine the temporal ordering of constructs under investigation. Longitudinal
studies examining the model are needed to further specify this temporal ordering. It should
be noted, however, that a follow-up study is planned to ascertain respondents’ attempts to
educate themselves regarding colorectal cancer screening, talk to their doctors about
screening, and to obtain screening in the 4 to 6 months following the initial questionnaire
administration.

Future Directions

Several of the next steps are suggested by the results, implications, and limitations
discussed above. First in terms of design and methodology, longitudinal tests are needed to
determine relationships over time and to prospectively examine predictors’ influence on
adherence to screening. Samples that include more African Americans without access to
health care and/or health insurance are also needed for such studies. A socio-cultural model testing adherence may reveal significant differences between the relationship of relevant predictors with intention and adherence. As the goal is to increase actual screening in order to reduce mortality, it is essential to identify these differences.

The results themselves also suggest several questions to be answered by future research. For instance, mistrust was a pervasive theme in the present study, but its impact on screening attitudes appeared to be mitigated by the presence of an African American physician and perceptions of high group susceptibility. Future studies might investigate what other factors potentially blunt the impact of mistrust on screening behavior. Studies that tease out the role of physician ethnicity in communication and trust as they impact screening are also needed. The present study only examined the African American vs. non-African American dichotomy, but it would be interesting to explore whether more or less mistrust is evident for physicians of more specific racial and ethnic groups (e.g., African American vs. Caucasian; African American vs. Asian or Asian American).

Positive identification with the traditional values of one’s cultural group also impacted the perception of screening. However, African American racial and ethnic identity are multidimensional constructs (Helms, 1995; Phinney, 1996; Sellers, 1998) and may be related to acculturation. It will be important to clarify the similarities and differences between these constructs conceptually and to empirically examine relationships with screening in more detail by dimension. Certain aspects of acculturation and social identity may play different roles, or no role at all, in the cancer screening behavioral process. Determining more clearly the relationship between individual and group susceptibility is certainly an additional area of future investigation.
The findings with respect to group susceptibility have obvious, testable implications for intervention, but could also inform more basic research on how the framing of susceptibility messages could impact screening attitudes and behaviors for African Americans. This work would no doubt draw upon psychological theory and research on judgment and decision making, particularly Kahneman and Tversky’s (1981) work, which addresses differential outcomes based on how decisions are framed. Both applied and basic research could test whether messages framed at the group and individual levels produce different attitudinal and behavioral outcomes.

There are also other aspects of African American social and cultural experience that could be included in future studies on colorectal cancer screening. Racial and ethnic identity and cancer fatalism are examples that have already been mentioned. There is also growing interest in the role of religion and spirituality in the cancer screening behavior of African Americans and evidence that spiritual and religious beliefs have some significant influence on such behavior (Powe & Finnie, 2003; Underwood & Powell, 2006). However, as the conceptualization and measurement of spirituality and religion continue to mature (see Hill & Pargament, 2003), a more sophisticated understanding of their impact—both positive and negative—on this particular aspect of health may be possible. As in other areas of psychological inquiry, the opportunities to apply research advances to African Americans and other ethnic minority groups have yet to be fully seized. Some explicit examination of perceived discrimination may also be relevant to future cancer screening studies given the prominent role of mistrust. For example, it seems plausible that those who report and perceive more racial discrimination in general and in medical settings are also more likely to be mistrustful. But is personal experience with discrimination a necessary condition for
medical mistrust or does discrimination have a more direct impact on screening behavior independent of mistrust? It may also be important to investigate how various forms of coping with discrimination differentially impact cancer screening.

Finally, future research should investigate mental health predictors such as anxiety, stress, and depression and their impact on colorectal cancer screening for African Americans. Though fear has been cited as an important barrier to screening, research on clinically significant anxiety and affective disorders as well as sub-clinical disruptions of functioning may yield important findings and contribute to building comprehensive models of African American colorectal cancer screening behavior. Mental health variables are likely to be related to social and cultural factors such as mistrust and perceptions of susceptibility as well.

Conclusion

This study was designed to test a socio-cultural model of colorectal cancer screening among African Americans. Drawing on existing theory and research, a model was proposed that took into account the current understanding of cancer screening behavior in this population and relevant social and cultural factors that had not received as much scrutiny. Several of the model’s hypotheses were supported by the data, and additional analyses pointed to the importance of medical mistrust, traditional acculturative strategy, and group susceptibility. With this knowledge it is possible to distinguish between members of this diverse high-risk group and to target various subgroups for intervention. The hope is that this research will inform future interventions and spur future research in this area. More importantly, it is hoped that this study will inform individual African Americans who must make very real decisions about their health in a society and health care system many continue
to experience as hostile to their interests. Realistic assessments and responses to these societal conditions may be the only effective remedy to the cancer and other health disparities that the nation faces.
LIST OF REFERENCES


APPENDIX A

LETTER TO GROUP LEADERS
Dear community leader:

Thank you for considering participation in our research study on colon cancer screening in African Americans. Colon cancer is the second most diagnosed cancer in African American women and the third most diagnosed in men. However, not enough African Americans over the age of 50 are currently being screened.

The purpose of this study is to determine why some African Americans decide to be screened for colon cancer and others do not. Your members’ responses to a questionnaire that addresses these issues will ultimately help health care professionals communicate with individuals in the African American community about colon cancer screening and help to prevent illness and death from this serious disease.

To aid in the recruitment of participants in group, we are asking that leaders take the following steps:

- Send a letter on church/organization letterhead giving your permission to recruit participants for the study (see attached sample letter of support).
- Identify a contact person (include their name, address, phone number, and email in letter of support) with whom we will coordinate participant sign-up and the date, time, and place of the questionnaire administration.
- Make available space for researchers to administer the questionnaire in a group setting before or after meetings.

The questionnaire has 188 items and will take between 45 and 90 minutes to complete. To participate, individuals must be at least 45 years old. Individuals who cannot participate include those with 1) a personal history of cancer of any type, 2) chronic colon or colorectal health problems, 3) other life-threatening disease, 4) serious mental health problems (Alzheimer’s, dementia, schizophrenia), or 5) women who are pregnant. Participants will be compensated $10 for their time on the day of administration and an additional $5 for filling out a follow-up postcard. If you have any questions or concerns at any time about this research project, please feel free to contact me at (614) 203-9350 and purnell.16@osu.edu or Dr. Barbara Andersen at (614) 292-4236 and andersen.1@osu.edu. Thank you very much for your consideration.

Sincerely,

Jason Purnell, M.A     Barbara Andersen, Ph.D.
Doctoral Candidate     Professor
APPENDIX B

SAMPLE ANNOUNCEMENTS
Sample bulletin/newsletter announcement:

“Cancer is a serious threat to the African American community. African Americans are more likely to get most of the major types of cancer and to die from them than any other group in the United States. But there is something that you can do. By simply answering a questionnaire developed by researchers at Ohio State University, you can help cancer specialists understand what leads people in our community to have tests done that can prevent cancer or aid in treatment. Your responses can also help health care professionals to communicate more effectively with our community about cancer screening. You will also be paid $15 for your time. You must be 45 or older, with no personal history of cancer, no life-threatening illness or serious mental health problems, and not currently pregnant to participate. If you fit this description and are interested in this opportunity to help, please see (contact person) or call (phone). Thank you.”

Sample live announcement:

“Cancer is a serious threat to the African American community, and African Americans are more likely than any other group to get this disease. You can help in efforts to prevent cancer in our community by simply answering a questionnaire developed by researchers at Ohio State University. You will also be paid $15 for your time. You must be 45 or older, with no personal history of cancer, no life-threatening illness or serious mental health problems, and not currently pregnant to participate. If you fit this description and are interested in this opportunity to help, please see (contact person) or call (phone). Also see the announcement in the bulletin/newsletter.”
APPENDIX C

RECRUITMENT FLYER
You Can Help in the Fight Against Cancer

Cancer impacts the African American community more than any other group. You may know friends or relatives who have suffered or died from this disease. It can make you feel powerless.

There is something that you can do to help.

Researchers at Ohio State University are asking individuals from [church or group name] to participate in a study looking at what leads people to have screening tests done to check for colon cancer.

All you have to do is fill out a questionnaire that asks about your attitudes and health practices [during meeting or after church]. [Place, date, and time]

You will receive $15 for your time and an additional $5 for filling out a follow-up postcard that will be mailed to you later.

Eligibility requirements:
• You must be age 45 or older
• No personal history of any type of cancer
• No chronic colon disease
• No serious mental health problems or life-threatening physical health problems
• Not pregnant

For more information:
Contact [group contact person name and info] or contact researcher, Jason Purnell, at (614) 292-8429 or purnell.16@osu.edu
APPENDIX D

QUESTIONNAIRE AND PICTURES OF SCREENING TESTS
Sociodemographics

1. Age (years): __________ (AGE)

2. Date of birth: __________ (BIRTH)

3. Gender: Male = 1         Female = 2   (GENDER)

4. What is your highest level of education?   (EDUC)
   - Less than 7th grade = 1
   - Junior high (9th grade) = 2
   - Partial high school (10th or 11th grade) = 3
   - High school graduate/GED = 4
   - Partial college (at least one year) = 5
   - College education = 6
   - Graduate degree = 7

5. What is your current marital status?   (MARR)
   - Single or never married = 1
   - Married = 2
   - Separated or divorced = 3
   - Widowed = 4

6. Are you currently living with a spouse, partner, or significant other?   (SO)
   - No = 0
   - Yes = 1
7. What was your *individual* income for the previous year? (INCOM)

- 0 to $9,999 = 1
- $10,000 to $19,999 = 2
- $20,000 to $29,999 = 3
- $30,000 to $39,999 = 4
- $40,000 to $49,999 = 5
- $50,000 to $59,999 = 6
- $60,000 to $69,999 = 7
- Greater than $70,000 = 8

8. What was your *household* income for the previous year? (HSINCOM)

- 0 to $9,999 = 1
- $10,000 to $19,999 = 2
- $20,000 to $29,999 = 3
- $30,000 to $39,999 = 4
- $40,000 to $49,999 = 5
- $50,000 to $59,999 = 6
- $60,000 to $69,999 = 7
- Greater than $70,000 = 8

9. What is your current employment status? (EMP)

- Unemployed = 1
- Retired = 2
- Disabled = 3
- Employed part-time = 4
- Employed full-time = 5

10. For most of your working years, what has been/was your occupation? (OCCP)

- Homemaker = 1
- Farm laborer, day laborer = 2
- Unskilled worker, service worker = 3
○ Machine operator, semi-skilled worker = 4
○ Skilled manual worker, craftsman, police and fire services, enlisted military and non-commissioned officers = 5
○ Clerical/sales, small farm owner = 6
○ Technician, semi-professional, supervisor, office manager = 7
○ Small business owner, farm owner, teacher, low-level manager, salaried worker = 8
○ Mid-level manager or professional (for example: architect, engineer, accountant, attorney), mid-sized business owner, military officer = 9
○ Senior manager or professional (for example: physician, college professor, minister), owner or CEO of a large business = 10
Health History and Behaviors
Adapted from Behavioral Risk Factor Surveillance Survey (BRFSS; CDC, 2004)

11. Do you have any form of health care coverage (for example: employer-provided health insurance, HMO, or government plans such as Medicare or Medicaid?) (COVER)
   ○ No = 0
   ○ Yes = 1
   ○ Don’t know/not sure = 2 (Recode 2 = 0)

12. Do you have one person you think of as your personal doctor or health care provider? (REGMD)
   ○ No = 0
   ○ Yes = 1
   ○ Don’t know/not sure = 2 (Recode 2 = 0)

13. If you answered “Yes” to #13, what is the race/ethnicity of your personal doctor or health care provider? (MDETHN)
   ○ African American/Black
   ○ Asian/Asian American (for example: Chinese, Japanese, Indian, etc.)
   ○ European American/White/Caucasian
   ○ Hispanic/Latino
   ○ Other
   ○ Don’t know/not sure

14. Has your doctor or any other health care professional ever recommended testing for colorectal or colon cancer (for example, with a blood stool home kit, sigmoidoscopy, or colonoscopy)? (MDREC)
   ○ No = 0
   ○ Yes = 1
   ○ Don’t know/not sure = 2 (Recode 2 = 0)
15. Have you ever been diagnosed with colorectal or colon cancer? (COLCANC)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

16. Have you ever had colorectal polyps (unusual growths in the colon or rectum)? (COLPOLP)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

17. Have you ever been diagnosed with inflammatory bowel disease (such as ulcerative colitis or Crohn’s disease) or any other colorectal or colon disease? (COLDIS)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

18. Have any of your blood relatives (grandparents, parents, siblings, etc.) ever been diagnosed with colorectal or colon cancer? (FAMCANC)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

19. Have any of your blood relatives (grandparents, parents, siblings, etc.) ever had colorectal polyps (unusual growths in the colon or rectum)? (FAMPOLP)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)
20. Have any of your blood relatives (grandparents, parents, siblings, etc.) ever been diagnosed with inflammatory bowel disease (such as ulcerative colitis or Crohn’s disease) or any other colorectal or colon disease? (FAMDIS)

○ No = 0
○ Yes = 1
○ Don’t know/not sure = 2 (Recode 2 = 0)

Questions 22 through 24 are for women only. Men skip to 25.

21. Have you ever had a mammogram (an X-ray image of your breast to check for cancer)? (EVERMAMM)

○ No = 0
○ Yes = 1
○ Don’t know/not sure = 2 (Recode 2 = 0)

22. If you answered “Yes” to #22, how many mammograms have you had in the past 5 years? (TESTMAMM)

☐ (enter number from 1 to 5)
○ Don’t know/not sure

23. When did you have your most recent mammogram? (LASTMAMM)

○ A year ago or less
○ Between 1 and 2 years ago
○ Between 2 and 5 years ago
○ More than 5 years ago
○ Don’t know/not sure
24. How many persons living within one hour of you do you feel you can depend upon or feel very close to? (DSSI1)

☐ (enter number)

25. How many times during the past week did you spend some time with someone who does not live with you? (For example, you went to see them or they came to visit you, or you went out together.) (DSSI2)

☐ None = 0
☐ Once = 1
☐ Twice = 2
☐ Three times = 3
☐ Four = 4
☐ Five = 5
☐ Six = 6
☐ Seven or more = 7

26. How many times did you talk to someone—friends, relatives, or others—on the telephone in the past week? (Either you called them or they called you.) (DSSI3)

☐ None = 0
☐ Once = 1
☐ Twice = 2
☐ Three times = 3
☐ Four = 4
☐ Five = 5
☐ Six = 6
☐ Seven or more = 7

27. About how often did you go to meetings of social clubs, religious meetings, or other groups that you belong to in the past week? (DSSI4)

☐ None = 0
☐ Once = 1
28. Does it seem that your family and friends understand you? (DSSI5)
   - Hardly ever =1   Some of the time =2   Most of the time =3

29. Do you feel useful to your family and friends? (DISSI6)
   - Hardly ever =1   Some of the time =2   Most of the time =3

30. Do you know what is going on with your family and friends? (DSSI7)
   - Hardly ever =1   Some of the time =2   Most of the time =3

31. When you are talking with your family and friends, do you feel you are being listened to? (DSSI8)
   - Hardly ever =1   Some of the time =2   Most of the time =3

32. Do you feel you have a definite role or place in your family and among your friends? (DSSI9)
   - Hardly ever =1   Some of the time =2   Most of the time =3

33. Can you talk about your deepest problems with your family and friends? (DSSI10)
   - Hardly ever =1   Some of the time =2   Most of the time =3

34. How satisfied are you with the kinds of relationships you have with your family and friends? (DSSI11)
   - Very dissatisfied=1 Somewhat dissatisfied =2   Satisfied =3
Colon Cancer Screening

Below are questions that ask you about three different types of tests that are used for colorectal cancer screening: a) stool blood test or fecal occult blood test (FOBT), b) flexible sigmoidoscopy, and c) colonoscopy. These tests can tell you and your doctor whether or not you have colorectal cancer, an abnormal growth in your colon or rectum (see pictures). There are descriptions and diagrams of each type of test before each set of questions.

Stool blood test (also known as FOBT)

The following questions are about the stool blood test, also known as fecal occult blood test, or FOBT. This is a test to check for colon cancer. It is done at home using a set of three cards to determine whether the stool contains blood. You place a sample of your stool or fecal matter on a card from three separate bowel movements and return the cards to be tested (see picture). The following section is about the stool blood or fecal occult blood test.

Measures for Ascertaining Use of Colorectal Cancer Screening (MACCS; Vernon et al., 2004)

35. Before this test was described, had you ever heard of a fecal occult or stool blood test? (HEARFOBT)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

If you answered “no” or “don’t know/not sure” for #36, please skip to #42. If you answered “yes” please continue.

36. Have you ever had a stool blood test using a “home” test kit? (EVERFOBT)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)
If you answered “no” or “don’t know/not sure” for #37, please skip to #42. If you answered “yes” please continue.

37. How many home stool blood tests have you done in the last 5 years?
   (TESTFOBT)
   □ (enter number from 1 to 5)
   ○ Don’t know/not sure = 0

38. When did you do your most recent home stool blood test?
   (LASTFOBT)
   ○ A year ago or less = 4
   ○ Between 1 and 2 years ago = 3
   ○ Between 2 and 5 years ago = 2
   ○ More than 5 years ago = 1
   ○ Don’t know/not sure = 0

39. If you did your most recent test within the past year, what was the month and year? (If it has been longer than a year since your last test, please skip to #41) (DATEFOBT)
   Month  Year
   □□□□

40. Why did you do your most recent home stool blood test?
   (WHYFOBT)
   ○ Part of a routine examination or checkup = 1
   ○ Because of a symptom or health problem = 2
   ○ Follow-up of an earlier abnormal test = 3
   ○ Don’t know/not sure = 0
Scales to Measure Benefits and Barriers of Colorectal Cancer Screening, FOBT subscale
(SMBC; Rawl et al., 2001)

The following questions ask about your attitudes towards the stool blood or fecal occult blood test. Read each statement and decide how much you agree or disagree with it. Fill in the appropriate circle. (Strongly agree = 1; Agree = 2; Unsure = 3; Disagree = 4; Strongly disagree = 5)

41. A fecal occult blood test will help find colorectal cancer early. (FINDFOBT)

42. A fecal occult blood test will decrease my chances of dying from colorectal cancer. (DIEFOBT)

43. A fecal occult blood test will help me not worry as much about colorectal cancer. (WORRFOBT)

44. Since the fecal occult blood test can be done at home, I don’t have to make an additional doctor’s appointment. (HOMEFOBT)

45. I am afraid to have a fecal occult blood test because I might find out something is wrong. (FEARFOBT)

46. A fecal occult blood test is embarrassing. (EMBFOBT)

47. I do not have time to do a fecal occult blood test. (TIMEFOBT)

48. The cost would keep me from having a fecal occult blood test. (COSTFOBT)

49. I do not need to do a fecal occult blood test because I have no problems. (PROBFOBT)

50. I do not know how to do a fecal occult blood test. (HOWFOBT)

51. I do not have the privacy to do a fecal occult blood test. (PRIVFOBT)
52. Collecting a stool sample to do a fecal occult blood test is unpleasant for me. (UNPLFOBT)

53. I intend to do a fecal occult blood test. (INTDFOBT)

54. I do not intend to do a fecal occult blood test. (NOFOBT)

**Sigmoidoscopy and Colonoscopy**

The following questions are about sigmoidoscopy and colonoscopy, two other tests to check for colon cancer. Both tests examine the colon using a narrow, lighted tube that is inserted in the rectum. Sigmoidoscopy only examines the lower part of the colon (see picture), while colonoscopy examines the entire colon (see picture).

With *sigmoidoscopy*, you are awake during the test. You are able to drive yourself home, and you are able to resume your normal activities after the test. This section is about sigmoidoscopy. Fill in the appropriate circle.

Measures for Ascertaining Use of Colorectal Cancer Screening (MACCS; Vernon et al., 2004)

55. Before this test was described, had you ever heard of sigmoidoscopy? (HEARSIGM)

   - No = 0
   - Yes = 1
   - Don’t know/not sure = 2 (Recode 2 = 0)

   If you answered “no” or “don’t know/not sure” for #56, please skip to #62. If you answered “yes” please continue.

56. Have you ever had a sigmoidoscopy? (EVERSIGM)

   - No = 0
   - Yes = 1
   - Don’t know/not sure = 2 (Recode 2 = 0)

   If you answered “no” or “don’t know/not sure” for #57, please skip to #62. If you answered “yes” please continue.
57. How many sigmoidoscopic examinations have you had in the last 10 years? (TESTSIGM)
   ○ 1 = 1
   ○ 2 = 2
   ○ More than 2 = 3
   ○ Don’t know/not sure = 0

58. When did you have your most recent sigmoidoscopy? (LASTSIGM)
   ○ A year ago or less = 4
   ○ Between 1 and 5 years ago = 3
   ○ Between 5 and 10 years ago = 2
   ○ More than 10 years ago = 1
   ○ Don’t know/not sure = 0

59. If you had your most recent test within the past year, what was the month and year? (DATESIGM)
   Month  Year

60. Why did you do your most recent sigmoidoscopy? (WHYSIGM)
   ○ Part of a routine examination or checkup = 1
   ○ Because of a symptom or health problem = 2
   ○ Follow-up of an earlier abnormal test = 3
   ○ Don’t know/not sure = 0

Scales to Measure Benefits and Barriers of Colorectal Cancer Screening, sigmoidoscopy subscale (SMBCC; Rawl et al., 2001)

The following questions ask about your attitudes towards sigmoidoscopy. Read each statement and decide how much you agree or disagree with it. Fill in the appropriate circle. (Strongly agree = 1; Agree = 2; Unsure = 3; Disagree = 4; Strongly disagree = 5)

61. A sigmoidoscopy will help find colorectal cancer early. (FINDSIGM)
62. A sigmoidoscopy will decrease my chances of dying from colorectal cancer. *(DIESIGM)*

63. A sigmoidoscopy will help me not worry as much about colorectal cancer. *(WORRSIGM)*

64. I am afraid to have a sigmoidoscopy because I might find out something is wrong. *(FEARSIGM)*

65. A sigmoidoscopy is embarrassing. *(EMBSIGM)*

66. I do not have time to do a sigmoidoscopy. *(TIMESIGM)*

67. The cost would keep me from having a sigmoidoscopy. *(COSTSIGM)*

68. I do not need to do a sigmoidoscopy because I have no problems. *(PROBSIGM)*

69. I feel anxious about having a sigmoidoscopy because I don’t really understand what will be done. *(ANXSIGM)*

70. Having a sigmoidoscopy is painful. *(PAINSIGM)*

71. Having to follow a special diet and take a laxative or enema would keep me from having a sigmoidoscopy. *(DIETSIGM)*

72. I intend to undergo sigmoidoscopy. *(INTDSIGM)*

73. I do not intend to undergo sigmoidoscopy. *(NOSIGM)*
Remember that colonoscopy is the test that examines your entire colon to check for colorectal cancer. With colonoscopy, you are given medicine through a needle in your arm to make you sleepy, or sedated. You need someone to drive you home after the test, and you may need to take the rest of the day off from your usual activities. The following section is about colonoscopy:

Measures for Ascertaining Use of Colorectal Cancer Screening (MACCS; Vernon et al., 2004)

74. Before this test was described, had you ever heard of colonoscopy? (HEARCOLO)
   - No = 0
   - Yes = 1
   - Don’t know/not sure = 2 (Recode 2 = 0)
   If you answered “no” or “don’t know/not sure” for #75, please skip to #81. If you answered “yes” please continue.

75. Have you ever had a colonoscopy? (EVERCOLO)
   - No = 0
   - Yes = 1
   - Don’t know/not sure = 2 (Recode 2 = 0)

   If you answered “no” or “don’t know/not sure” for #76, please skip to #81. If you answered “yes” please continue.

76. How many colonoscopies have you had in the last 10 years? (TESTCOLO)
   - 1 = 1
   - 2 = 2
   - More than 2 = 3
   - Don’t know/not sure = 0

77. When did you have your most recent colonoscopy? (LASTCOLO)
   - A year ago or less = 4
Between 1 and 5 years ago
Between 5 and 10 years ago
More than 10 years ago
Don’t know/not sure

78. If you had your most recent test within the past year, what was the month and year? (If it has been longer than a year since your last test, please skip to #80) (DATECOLO)

Month Year

79. Why did you do your most recent colonoscopy? (WHYCOLO)

Part of a routine examination or checkup
Because of a symptom or health problem
Follow-up of an earlier abnormal test
Don’t know/not sure

Scales to Measure Benefits and Barriers of Colorectal Cancer Screening, colonoscopy subscale (SMBCC; Rawl et al., 2001)

The following questions ask about your attitudes towards colonoscopy. Read each statement and decide how much you agree or disagree with it. (Strongly agree = 1; Agree = 2; Unsure = 3; Disagree = 4; Strongly disagree = 5)

80. A colonoscopy will help find colorectal cancer early. (FINDCOLO)

81. A colonoscopy will decrease my chances of dying from colorectal cancer. (DIECOLO)

82. A colonoscopy will help me not worry as much about colorectal cancer. (WORRCOLO)

83. I am afraid to have a colonoscopy because I might find out something is wrong. (FEARCOLO)

84. A colonoscopy is embarrassing. (EMBCOLO)
85. I do not have time to do a colonoscopy. (TIMECOLO)
86. The cost would keep me from having a colonoscopy. (COSTCOLO)
87. I do not need to do a colonoscopy because I have no problems. (PROBCOLO)
88. I feel anxious about having a colonoscopy because I don’t really understand what will be done. (ANXCOLO)
89. Having a colonoscopy is painful. (PAINCOLO)
90. Having to follow a special diet and take a laxative or enema would keep me from having a colonoscopy. (DIETCOLO)
91. I am afraid to have a colonoscopy because of the possibility there may be bleeding or tearing of the colon. (COMPCOLO)
92. Transportation problems would keep me from having a colonoscopy. (TRANCOLO)
93. I intend to undergo colonoscopy. (INTDCOLO)
94. I do not intend to undergo colonoscopy. (NOCOLO)
95. Finding colorectal cancer early will save my life. (SAVELIFE)
96. The treatment for colorectal cancer may not be as bad if the cancer is found early. (TREATBAD)
Barium enema, or a lower gastrointestinal series, is another test to check for colon cancer. X-rays are taken of the colon after barium or barium and air are given by enema (see picture). The day after the test, you asked to drink a lot of liquids and to take laxatives. No solid food is permitted. The following section is about barium enema.

Measures for Ascertaining Use of Colorectal Cancer Screening (MACCS; Vernon et al., 2004)

97. Before this test was described, had you ever heard of barium enema or lower gastrointestinal series? (HEARBARM)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

If you answered “no” or “don’t know/not sure” for #97, please skip to next page. If you answered “yes” please continue.

98. Have you ever had a barium enema? (EVERBARM)

- No = 0
- Yes = 1
- Don’t know/not sure = 2 (Recode 2 = 0)

If you answered “no” or “don’t know/not sure” for #98, please skip to next page. If you answered “yes” please continue.

99. How many barium enemas have you had in the last 10 years? (TESTBARM)

- 1 = 1
- 2 = 2
- More than 2 = 3
- Don’t know/not sure = 0

100. When did you have your most recent barium enema? (LASTBARM)

- A year ago or less = 4
○ Between 1 and 5 years ago
○ Between 5 and 10 years ago
○ More than 10 years ago
○ Don’t know/not sure

101. If you had your most recent test within the past year, what was the month and year? (DATEBARM)

Month  Year

102. Why did you do your most recent colonoscopy? (WHYBARM)

○ Part of a routine examination or checkup
○ Because of a symptom or health problem
○ Follow-up of an earlier abnormal test
○ Don’t know/not sure
General questions
Colorectal Cancer Screening Questionnaire (CCSQ; Vernon et al., 1997)

The following statements are about colorectal cancer screening in general, including any and all of the tests mentioned above. Read each statement, and decide how much you agree or disagree with it. Fill in the appropriate circle.

103. Going through screening is an important thing for me to do. (IMPORTNT)

104. I believe that colorectal screening can help to protect my health. (PROTECT)

105. I intend to undergo colorectal screening. (INTEND)

106. I think the benefits of colorectal screening outweigh any difficulty I might have in going through the tests. (BENEFITS)

107. Doing colorectal cancer screening makes sense to me. (SENSE)

108. I do not intend to go through colorectal screening. (NOINTEND)

109. Members of my immediate family think I should go through colorectal screening. (FAMILY)

110. Going through colorectal screening would be difficult for me to do. (DIFFCLT)

111. Finding time to go through colorectal screening would be difficult for me to do. (TIMEDIFF)

112. I think going through colorectal screening would be an easy thing to do. (EASY)

113. Arranging my schedule to go through colorectal screening is an easy thing to do. (SCHEDESY)

114. I believe that the chance I will develop colorectal polyps is high. (POLPHI)
115. I think it is very likely that I will develop colorectal cancer or polyps. (CANCPOLP)

116. I believe the chance I might develop colorectal cancer is high. (CANCHI)

117. I am afraid of having an abnormal screening test result. (FEARABN)

118. I am worried that screening will show that I have colorectal cancer or polyps. (HAVECANC)

119. I am bothered by the possibility that screening might be physically uncomfortable. (UNCOMF)

120. I think that when colorectal polyps are found and removed, colorectal cancer can be prevented. (PREVENT)

121. I believe that when colorectal cancer is found early, it can be cured. (CURED)

122. I want to do what members of my immediate family think I should do about colorectal screening. (FAMTHINK)

123. I believe that if I had a normal screening test result, I wouldn’t have to worry about developing colorectal cancer. (NORMAL)

124. I believe African Americans have a higher chance of developing colorectal polyps than other groups. (GRPPOLP)

125. I believe African Americans are very likely to develop colorectal cancer or polyps. (GRPCAPL)

126. I believe African Americans have a higher chance of developing colorectal cancer than other groups. (GRPCANC)
Health Care Attitudes
Group-Based Medical Mistrust Scale (GBMMS; Thompson et al., 2004)

These questions ask about your beliefs about the care you and other people of your racial and ethnic group receive from doctors, nurses, and other staff people in the health care system. Please read the following statements. Indicate how strongly you agree or disagree with the following statements. (Strongly agree = 5; Agree = 4; Undecided = 3; Disagree = 2; Strongly disagree = 1)

127. Doctors and health care workers sometimes hide information from patients who belong to my ethnic group. (GBMMS1)

128. Doctors have the best interests of people of my ethnic group in mind. (GBMMS2)

129. People of my ethnic group should not confide in doctors and health care workers because it will be used against them. (GBMMS3)

130. People of my ethnic group should be suspicious of information from doctors and health care workers. (GBMMS4)

131. People of my ethnic group cannot trust doctors and health care workers. (GBMMS5)

132. People of my ethnic group should be suspicious of modern medicine. (GBMMS6)

133. Doctors and health care workers treat people of my ethnic group like “guinea pigs.” (GBMMS7)

134. People of my ethnic group receive the same medical care from doctors and health care workers as people from other groups. (GBMMS8)

135. Doctors and health care workers do not take the medical complaints of people of my ethnic group seriously. (GBMMS9)

136. People of my ethnic group are treated the same as people of other groups by doctors and health care workers. (GBMMS10)
137. In most hospitals, people of different ethnic groups receive the same kind of care. (GBMMS11)

138. I have personally been treated poorly or unfairly by doctors or health care workers because of my ethnicity. (GBMMS12)
Cultural Attitudes
Measurement of Acculturation Strategies
for People of African Descent (MASPAD; Obasi, 2004)

Answer each question as honestly as you possibly can by identifying the response that best reflects your agreement or disagreement with each item. There are no right or wrong answers. Provide only one response to each item. (Strongly disagree = 1; Disagree = 2; Slightly Disagree = 3; Slightly Agree = 4; Agree = 5; Strongly Agree = 6)

139. I take a great deal of pride in being a person of African ancestry (African, African American, Black Cuban, Black Brazilian, Trinidadian, Jamaican, etc.) (MASPAD1)

140. If I have children, I will/did give them an African naming ceremony. (MASPAD2)

141. I do not feel connected to my African heritage. (MASPAD3)

142. If I have children, I will/did raise them to be American first and person of African ancestry second. (MASPAD4)

143. I was raised to maintain cultural practices that are consistent with people of African descent. (MASPAD5)

144. I have difficulty accepting ideas held by the Black community. (MASPAD6)

145. I tend to generate friendships with people from different racial and cultural backgrounds. (MASPAD7)

146. I was raised to treat my elders with respect. (MASPAD8)

147. Everyone has an equal opportunity to be financially successful in this country. (MASPAD9)

148. I am comfortable putting on “the mask” in order to fit in. (MASPAD10)
149. Despite facing potential discrimination, it is important to me to maintain my cultural beliefs. (MA$\text{SPAD11}$)

150. I behave in ways that are consistent with people of African ancestry even if other cultural groups do not accept it. (MA$\text{SPAD12}$)

151. The way that I behave in public (work, school, etc.) is different than how I behave at home. (MA$\text{SPAD13}$)

152. I consider myself to be a spiritual person. (MA$\text{SPAD14}$)

153. I do not take things from the Earth without giving back to it. (MA$\text{SPAD15}$)

154. I consider myself to be a religious person (Christian, Muslim, etc.). (MA$\text{SPAD16}$)

155. It is vital for me to be actively involved in the Black community. (MA$\text{SPAD17}$)

156. The word “communalistic” describes how I interact with other people. (MA$\text{SPAD18}$)

157. I prefer to be around people who are not Black. (MA$\text{SPAD19}$)

158. I participate in many social events where few Blacks are in attendance. (MA$\text{SPAD20}$)

159. I actively support Black-owned businesses. (MA$\text{SPAD21}$)

160. People should modify many of their values to fit those of their surroundings. (MA$\text{SPAD22}$)

161. I express different cultural values in order to fit in. (MA$\text{SPAD23}$)

162. I was encouraged by my family to support Black-owned businesses. (MA$\text{SPAD24}$)
163. My beliefs are largely shaped by my religion (Christianity, Islam, etc.). (MASPAD25)

164. Most of my closest friends and past romantic partners are from a variety of cultural groups. (MASPAD26)

165. I prefer entertainment (movies, music, plays, etc.) that highlights Black talent. (MASPAD27)

166. I buy products that are made by people of African ancestry (African, African American, Black Cuban, Black Brazilian, Trinidadian, Jamaican, etc.) (MASPAD28)

167. I do not purchase products from Black-owned businesses. (MASPAD29)

168. I believe festivals maintain spiritual and physical balance in my community. (MASPAD30)

169. I perform various rituals for my departed ancestors. (MASPAD31)

170. I see no problem assimilating into other cultural values in order to be financially successful. (MASPAD32)

171. People of African descent should know about their rich history that began with the birth of humanity. (MASPAD33)

172. I am actively involved in an African spiritual system. (MASPAD34)

173. Verbal agreements do not mean as much to me as written contracts do. (MASPAD35)

174. I do not own products that were made by people of African descent. (MASPAD36)

175. I use words from an African language when participating in my spiritual practices. (MASPAD37)

176. People in America should only speak English. (MASPAD38)
177. I will probably marry/did marry someone who is not Black.  (MASPAD39)

178. Members of my culture should have an appreciation for African art and music. (MASPAD40)

179. My individual success is more important than the overall success of the Black community. (MASPAD41)

180. I expose myself to various forms of media (television, magazines, newspapers, Internet, etc.) in order to keep up with current events that impact my community. (MASPAD42)

181. Blacks should not obtain reparations for being descendants of enslaved Africans since we are all reaping benefits of slavery today. (MASPAD43)

182. I choose not to speak out against injustices that impact people of African descent. (MASPAD44)

183. In embracing my culture, I can also recognize the dignity and humanity of other cultural groups. (MASPAD45)
Picture #1: Fecal occult blood test
Image from www.intelihealth.com

Picture #2: Sigmoidoscopy
Image from www.hopkins-gi.nts.jhu.edu

Picture #3: Sigmoidoscopy vs. colonoscopy
Image from www.bodyandhealth.canada.com

Picture #4: Barium enema

Colonoscopy examines the entire length of the colon; sigmoidoscopy examines only the lower third.
Background Factors:
- Demographic characteristics
- Medical history
- Past health behavior

Representation Factors:
- Severity
- Susceptibility
- Curability
- Worry (barriers)
- Salience and coherence (benefits)

Social Influence Factors:
- Social norms
- Physician-patient relationship
- Health locus of control

Program factors:
- Promotional communication

Intention to engage in preventive action

Preventive action

Figure 1. Preventive Health Model (Myers et al., 1994)
Figure 2. African American Colorectal Cancer Screening Conceptual Model
Figure 3. Hypothesized Structural Model
Figure 4. Standardized LISREL Estimates of Hypothesized Model Parameters (N = 198)
Figure 5. Standardized LISREL Estimates of Post-Hoc Perceived Barriers Model Parameters ($N = 198$)
Figure 6. Standardized LISREL Estimates of Post-Hoc Perceived Benefits Model Parameters (N = 198)
Figure 7. Group Susceptibility × Traditional Acculturation Predicting General Benefits
Figure 8. Group Susceptibility × Medical Mistrust Predicting General Benefits
Figure 9. Physician Ethnicity × Medical Mistrust Predicting General Intention
Figure 10. Group Susceptibility × Traditional Acculturation Predicting General Intention