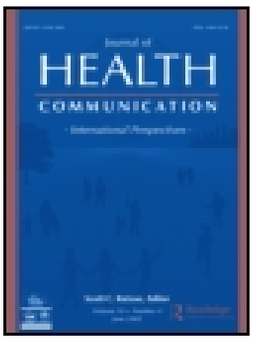

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A Comparison Between Caucasians and African Americans in Willingness to Participate in Cancer Clinical Trials: The Roles of Knowledge, Distrust, Information Sources, and Religiosity

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This study aims to (a) examine the roles of knowledge, distrust in medical professionals, information sources, and 2 dimensions of religiosity (i.e., religious activity and religious belief) in influencing willingness to participate (WTP) in cancer clinical trials and to (b) compare the results for Caucasians and African Americans in order to inform future recruitment. An online survey was fielded via a Knowledge Networks panel with a nationally representative sample including 478 Caucasians and 173 African Americans. The results showed that distrust in medical professionals was a strong barrier to WTP for both ethnic groups, whereas factual knowledge about trial procedures was not associated with WTP for either ethnic group. Seeking trial information from doctors was positively associated with WTP for Caucasians; seeking trial information from hospitals was positively associated with WTP for African Americans. More interestingly, levels of religious activity negatively predicted WTP for Caucasians but positively predicted WTP for African Americans. Self-reported religious belief was not associated with WTP for either ethnic group. In sum, although distrust is a common barrier to WTP, the influence of preferred information sources and religious activity on WTP varies as a function of ethnicity.

Clinical trials (CTs) are essential to the development of new methods of screening, preventing, diagnosing, and treating disease (National Cancer Institute, 2014). Consequently, the accrual of participations in CTs is critical for trials to produce valid and generalizable results. Unfortunately, enrollment in CTs is less than 5% of all adults diagnosed with chronic diseases who are eligible to enroll (Mills et al., 2006). With respect to cancer CTs, O'Hanlon (2013) reported that only 2% to 4% of African American cancer patients participated in CTs, which was significantly lower than the average rate of participation across all ethnic groups. Increasing the willingness of African Americans to participate in cancer CTs is important for a number of reasons, including the fact that certain malignancies and the incidence of late-stage cancer diagnoses are more common among African Americans and that the behavior of drugs may vary as a function of racial differences (O'Hanlon, 2013).

Previous studies have examined a variety of barriers to CT participation. The barriers are typically grouped into cognitive barriers, such as knowledge about CTs (Tanner, Kim, Friendman, Foster, & Bergeron, 2014); psychological barriers, such as distrust of physicians and medical researchers (Sengupta et al., 2000); financial barriers, such as costs involved in participation (Kim, Tanner, Friedman, Foster, & Bergeron, 2015); logistic barriers, such as transportation problems and having family/work responsibilities (Ford et al., 2008); and structural barriers, such as lack of awareness and accessibility (Kim et al., 2015). Among these barriers, lack of knowledge and distrust in medical researchers are the most notable across ethnic groups (Byrne, Tannenbaum, Gluck, Hurley, & Antoni, 2014). Therefore, the present study includes knowledge and distrust as the baseline predictors of willingness to participate (WTP).

Our study makes two unique contributions to the literature on CT participation. First, although previous studies have reported a positive relationship between seeking health information and awareness of CTs (e.g., Langford, Resnicow, & An, 2010), few efforts have been made to test the direct effect of seeking CT-related information on WTP. A variety of sources are available to individuals seeking relevant information to assist with their health decision making (Dutta-Bergman, 2003). This study explores the effects on individuals' WTP of seeking trial information from doctors, interpersonal relationships, and the Internet as well as organizational sources such as churches and hospitals. A comparison of Caucasians and African Americans might suggest distinct channels for delivering messages to different ethnic groups in future recruitment.

The second contribution is a more refined examination of a cultural factor—religiosity—in influencing CT participation. Religiosity has been identified as hindering African Americans' participation in CTs because it is associated with a belief that one should not interfere with God's will, or fatalism (Advani et al.,

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2003; Sengupta et al., 2000). However, recent research has cautioned against potential misinterpretations of religious beliefs (Germino et al., 2011) and different roles that the two distinct dimensions of religiosity—religious belief and religious activity—play in influencing health outcomes (Chatters, Taylor, & Lincoln, 2001). Therefore, the present study tests the associations between the two dimensions of religiosity and WTP and explores whether these relationships vary as a function of ethnicity.

Knowledge and Distrust

Lack of knowledge and distrust in medical professionals are the most notable barriers to CT participation (Byrne et al., 2014). There are different forms of CT knowledge that facilitate participation, such as awareness of available CTs (Langford et al., 2010) and knowledge about the need for and benefits of CTs (Ejiogu et al., 2011). This study focuses on factual knowledge about CT procedures, as understanding of the process of CTs plays an important role in CT participation (Frank, 2004). Knowledge about CT procedures can encourage participation by alleviating uncertainties and concerns about the process and helping participants become more confident about exactly what they are participating in (Tanner et al., 2014). Research has shown that people who considered participating in a CT had higher scores on knowledge about the manner in which randomized CTs were conducted than people who were not prepared to join a CT (Ellis, Butow, Tattersall, Dunn, & Houssami, 2001; Sabesan et al., 2011). The awareness of possibly getting free drugs in the process of CTs was also found to facilitate CT participation (Byrne et al., 2014).

In addition, distrust in medical professionals is such a central barrier that it has been repeatedly identified in the literature (Yancey, Ortega, & Kumanyika, 2006). African Americans in particular have historical reasons to distrust medical research because of the infamous Tuskegee study (O' Hanlon, 2013). Given the established findings on the roles of knowledge and distrust in influencing participation in CTs, we hypothesize the following:

Hypothesis 1: Knowledge about trials is positively related to WTP in a CT.

Hypothesis 2: Distrust in medical professionals is negatively related to WTP in a CT.

We also explore whether these relationships vary as a function of ethnicity:

Research Question 1: Is the relationship between knowledge and WTP different for Caucasians and African Americans?

Research Question 2: Is the relationship between distrust in medical professionals and WTP different for Caucasians and African Americans?

Seeking Information About CTs

Communication scholars have argued a significant linkage between health information seeking and relevant health behavior (Johnson, 2009; Tardy & Hale, 1998). Active information-seeking processes may lead individuals to be more attentive and receptive to any information they acquire, resulting in attitude formation and behavioral change (Johnson & Case, 2012). Seeking CT-related information is an important process to increase awareness of trial availability and eligibility. Given the opportunity to participate in a trial, an individual needs additional information about the risks and benefits involved in the trial to decide whether he or she is willing to participate in it (Tanner et al., 2014).

Seeking health information from different sources is likely to have different outcomes. The underlying mechanisms are that, first, different sources provide different quantities of relevant information. Families may not be as influential as doctors in one's WTP in CTs simply because families may have limited experiences and can offer little information. Second, different sources may emphasize differently the benefits and risks of CTs, and these differences may influence individual decisions. For instance, the use of news media negatively affected behavioral intention to vaccinate because the emphasis on objectivity by providing balanced information may have increased uncertainty surrounding a controversial health issue (Lee & Kim, 2015). In contrast, seeking information from doctors did not affect intention to vaccinate because doctors may have tried not to express their preferences and left the decision to patients (Lee & Kim, 2015). Doctors, the Internet, family, and friends are important information sources that increase awareness of CTs (McComas et al., 2010; Yang et al., 2010). An examination of seeking trial information from different sources and its influence on WTP can inform future message construction and channel selection.

In addition, organizations are important, yet less studied, information sources that may influence rates of participation in CTs (Byrne, Kornfeld, Vanderpool, & Belanger, 2012). A recent study examined the National Cancer Institute's information system and demonstrated a substantial number of people calling in for information about cancer CTs (Byrne et al., 2012). Moreover, the literature on CT recruitment campaigns has suggested the importance of local churches as information channels in engaging prospective participants, as they provide trustworthy regional networks to disseminate CT information (Derose et al., 2000; Germino et al., 2011). Therefore, the following research questions are proposed:

Research Question 3: What is the relationship between seeking CT information from different sources (i.e., doctors, Internet, family, friends, and different organizations) and an individual's WTP?

Research Question 4: Is the relationship between seeking information from different sources and WTP distinct for Caucasians and African Americans?

Religiosity

Religiosity is characterized by "an organized system of beliefs, practices, rituals, and symbols" (Holt, Haire-Joshu,

Lukwago, Lewellyn, & Kreuter, 2005, p. 84). Some researchers have identified religiosity as a barrier to participation in CTs because of fatalistic views about disease outcomes (Yancey et al., 2006). For example, the religious belief "God would determine whether or not they would die from their cancer" was associated with decreased WTP for both African Americans and Caucasians, but African American patients were more likely to hold such a belief than Caucasian patients (Advani et al., 2003).

Although the research summarized here supports the prediction that religiosity will negatively affect WTP in CTs, potential misinterpretations of religious beliefs (Germino et al., 2011) and the multidimensionality of religiosity (Chatters et al., 2001) provide a different perspective in speculating about the role of religiosity in WTP. First, those outside a religious tradition may interpret beliefs that God is in control and that God is the ultimate healer as passivity toward dealing with one's health problem. However, for many people who have high levels of religiosity, a strong faith in God's control is compatible with active approaches to coping with diseases such as seeking medical treatment and participating in medical research (Germino et al., 2011). For them, God is a resource provider or a supportive partner who helps to handle a health problem (Pargament et al., 1999). In this sense, God is not to replace but to encourage medical treatment. Thus, WTP can be positively associated with faith in God as people consider whether their participation in medical research is consistent with their religious beliefs.

Second, religiosity is a multidimensional construct (Chatters et al., 2001), although previous research has operationalized it as the belief "God would determine whether or not they would die from their cancer" (Advani et al., 2003) or the activity "praying" (Linden et al., 2007). Chatters and colleagues (2001) conceptualized religiosity as a two-dimensional construct: religious activity (e.g., service attendance, watching religious television, and prayer) and religious belief (e.g., perceived connections to God). A recent study examined the factor structure of religiosity and found that the two-factor model (i.e., religious belief and religious activity) was the best among the alternative measurement models (Roth et al., 2012). Previous literature has shown that religious belief was a stronger predictor than religious activity of health care involvement, such as mammography utilization among breast cancer patients (Holt, Lukwago, & Kreuter, 2003). However, few studies so far have examined the direct effects of the two dimensions of religiosity on individuals' WTP in CTs. Therefore, this study proposes the following research questions:

Research Question 5: Does an individual's religious belief influence his or her WTP in a CT?

Research Question 6: Is the relationship between religious belief and WTP different for Caucasians and African Americans?

Research Question 7: Does an individual's religious activity influence his or her WTP in a CT?

Research Question 8: Is the relationship between religious activity and WTP different for Caucasians and African Americans?

Method

Study Participants

This study collected data between November 2012 and February 2013 through a monthly online survey of a nationally representative sample of adults living in the United States, the Annenberg National Health Communication Survey (ANHCS). Knowledge Networks chooses participants through a random selection of telephone numbers, including mobile phone numbers, and recruits survey respondents with a random-digit dialing procedure. To ensure the representativeness of the survey population, potential respondents with no Internet access were provided with a choice of either a computer with Internet access or WebTV that allowed respondents to answer questions on their television screens (Murphy, Cody, Frank, Glik, & Ang, 2009). The Knowledge Networks panel's characteristics were within a few percentage points of other national estimates (i.e., the National Health Interview Survey, the U.S. Census Bureau's Current Population Survey) on most sociodemographic parameters (Murphy et al., 2009).

ANHCS is a cross-sectional survey based on the Knowledge Networks panel. Since 2005, ANHCS has been sent to 250 to 300 individuals per month recruited through Knowledge Networks. Of the people who are reached by telephone, roughly 70% agree to join the panel, and 90% who are invited to take a survey do so. In the core section of ANHCS, respondents are asked about their sociodemographic attributes and their health status. From November 2012 through February 2013, a module with survey questions was added to assess the respondents' WTP in CTs, religious belief, and religious activity; information sources that respondents might consult for CT-related information; and a number of barriers to participating in CTs. Table 1 provides demographic information about the respondents included in the analysis.

Measures

An individual's knowledge about CTs was measured with four dichotomous (true/false) questions tapping factual information about CT enrollment and procedures (Sabesan et al., 2011). Questions were "People who take part in clinical trials may be randomly assigned to a control condition who would not receive the experimental treatment," "People who take part in clinical trials may not be told whether they get the new experimental treatment until the end of the trial," "The manufactures of the new drug typically provide them to the hospitals conducting the clinical trial free of charge," and "An informed consent form is required to present eligibility, procedures, potential risks and benefits of participating in a clinical trial." A score of 1 was given for a correct answer, and 0 was given for an incorrect answer. These four dichotomous measures were combined into a single index (Kuder–Richardson formula 20 = .69) representing how knowledgeable an individual was about CTs.

Distrust in medical professionals was measured using the Corbie-Smith Distrust Index (Corbie-Smith, Thomas, & St. George, 2002). Respondents were asked to rate statements on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample statements were "My doctor would not

ask me to participate in medical research if he or she thought it would harm me" and "I feel that my doctors may have given me treatment as part of an experiment without my permission." Cronbach's alpha was .83.

Seeking information from different sources was measured by asking participants to indicate where they would go for information if they decided to look into CT-related information. Response options included "friends," "family," "doctor, nurse or other health providers," "research hospitals," "Internet," "church," "organizations dedicated to my health condition (e.g., American Cancer Association)" (Byrne et al., 2012; Langford et al., 2010).

Religious belief was measured by a series of items adapted from Sengupta et al. (2000), each measured on a separate 5-point Likert scale ranging from 1 (*not at all*) to 5 (*totally*). Sample items were "How spiritual do you consider yourself?" and "How connected do you feel to God, your Creator, or some other Higher Power?" Cronbach's alpha was .96. Religious activity was measured by asking participants to indicate how frequently in the past 12 months they read religious materials, watched religious programs on TV, listened to religious programs on radio, participated in informal religious support groups, prayed at mealtime and at bedtime, and attended religious services (Chatters et al., 2001). The response options on a 5-point scale ranged from 1 (*never*) to 5 (*almost every day*). Cronbach's alpha was .86.

WTP in CTs was measured by three items asking respondents to indicate what they would do in response to a hypothetical situation in which they had been diagnosed with an aggressive form of cancer (Brown & Topcu, 2003). They were asked to indicate the likelihood of their WTP in CTs under three conditions: (a) Participation might improve the length of their life, (b) participation might improve the quality of their life, and (c) participation could ultimately help others. Responses were given on a scale of 1 to 10, with 1 (*not at all likely*) to 10 (*extremely likely*). The three items were combined to measure participants' WTP in CTs. Cronbach's alpha was .89.

Control variables included sociodemographic variables, previous participation in CTs, and a set of questions about barriers to CT participation. On a scale from 1 (*not a barrier at all*) to 10 (*a major barrier*), participants were asked to indicate how much of a barrier each of the following would be to their participation in a CT: not knowing about CT opportunities, not knowing about one's eligibility, difficulty understanding the protocols, having to pay for the costs involved in a CT, getting to and from treatment, and taking time off work/family responsibilities.

Table 1. Sociodemographics, cancer experience, and previous participation in a clinical trial

Characteristic	General (n = 898)	Caucasians (n = 478)	African Americans (n = 173)
Age			
18–29	15.4	11.9	15.0
30–44	23.7	20.7	20.8
45–59	29.5	27.8	37.0
60+	31.4	39.5	27.2
Gender			
Male	47.1	44.1	45.7
Female	52.9	55.9	54.3
Ethnicity (n = 898)			
White	53.2		
Black	19.3		
Hispanic	23.3		
2+ ethnicities	2		
Other	2.2		
Education			
Less than high school	11.1	6.3[a]	13.9[a]
High school	25.8	24.3	30.6
Some college	34.2	33.9	34.7
College degree or higher	28.8	35.6[a]	20.8[a]
Household income			
<$20,000	16.6	12.1[a]	24.3[a]
$20,000–$29,999	10.5	8.8[a]	17.3[a]
$30,000–$39,999	10.9	8.6	12.1
$40,000–$59,999	16.4	17.6	13.3
$60,000–$79,999	15.9	16.3	13.9
>$80,000	29.7	36.6[a]	19.1[a]
Had cancer experience (family)	12.4	13.4	15.0
Had cancer experience (self)	5.5	7.1	3.5
Previous participation in a clinical trial	16.9	20.3[a]	10.4[a]

Note. Percentages with superscripts differ significantly (p < .05) between Caucasian and African American respondents.

Results

Preliminary Analysis

A total of 898 respondents completed the online survey. Of the 898 respondents, 53.2% (n = 478) were Caucasians and 19.3% (n = 173) were African Americans. Table 1 presents additional descriptive characteristics of the respondents. As shown in Table 2, Caucasian respondents (M = 7.91, SD = 2.23) had significantly higher levels of WTP than African American respondents (M = 7.16, SD = 2.81), $t(196) = 2.85$, $p < .01$. African American respondents showed higher levels of religious belief, religious activity, and distrust in medical professionals than Caucasian respondents: religious belief, $t(281) = 7.03$, $p < .001$; religious activity, $t(222) = 9.12$, $p < .001$; distrust in medical professionals, $t(187) = 2.66$, $p < .01$.

With respect to information sources to which respondents would go for trial information, Figure 1 illustrates the percentages of Caucasian and of African American respondents who would seek information from seven different sources. Among the seven information sources, Caucasian respondents were more likely to rely on their doctors and the Internet, whereas African American respondents were more likely to rely on their churches: doctors, $\chi^2(1) = 4.65$, $p < .05$; the

Table 2. A comparison of Caucasians and African Americans on important variables

Variable	Caucasians (n = 478)		African Americans (n = 173)	
	M	*SD*	*M*	*SD*
Willingness to participate in a clinical trial	7.91[a]	2.23	7.16[a]	2.81
Religious belief	3.13[a]	1.17	3.84[a]	0.96
Religious activity	2.23[a]	1.09	3.26[a]	1.16
Knowledge	3.22[a]	1.3	2.60[a]	1.4
Distrust	1.77[a]	0.7	2.00[a]	0.96

Note. Means with superscripts differ significantly ($p < .05$).

Internet, $\chi^2(1) = 14.36$, $p < .001$; churches, $\chi^2(1) = 16.40$, $p < .001$.

Results for Research Questions and Hypotheses

Multiple regression models were run with WTP as the dependent variable for Caucasian and African American respondents separately. Hypotheses 1 and 2 and Research Questions 1 and 2 examined the effects of knowledge and distrust on WTP in CTs and whether the effects differed for Caucasians and African Americans. Findings in Table 3 show that knowledge was not significantly associated with WTP for Caucasians (β = .04, $p > .05$) or for African Americans (β = .12, $p > .05$). Therefore, knowledge was not positively related to WTP (Hypothesis 1), and the relationship was not different for Caucasians and African Americans (Research Question 1). Distrust was negatively associated with WTP for Caucasians (β = –.19, $p < .01$) and African Americans (β = –.26, $p < .05$). Therefore, distrust was negatively related to WTP (Hypothesis 2), and the relationship presented the same pattern for Caucasians and African Americans (Research Question 2).

Table 3. Willingness to participate in a CT by sociodemographics, religiosity, knowledge, distrust, and information sources

Variable	Caucasians	African Americans
Control variables		
Age	0.09	0.18
Gender	0.02	0.01
Education[a]		
High school	0.05	−0.05
Some college	0.14	−0.03
College	0.15	−0.04
Household income	0.04	0.18
Previous participation in CTs	0.11[†]	0.19[†]
Not knowing about CTs	−0.05	−0.20[†]
Not knowing about eligibility	−0.04	−0.09
Difficulty understanding the protocols	−0.06	−0.08
Paying for the costs	−0.08	−0.03
Transportation	−0.03	−0.06
Taking time off work/family	−0.04	−0.09
Knowledge and distrust		
Knowledge	0.04	0.12
Distrust	−0.19**	−0.26*
Information sources		
Friend	−0.09	−0.17
Family	−0.04	0.12
Internet	0.11[†]	0.03
Doctor	0.14*	−0.03
Church	0.09	−0.07
Research hospital	0.01	0.28*
Health organization	0.03	0.10
Religiosity		
Religious belief	0.10	−0.16
Religious activity	−0.18*	0.31*
R^2	0.18	0.40

Note. Coefficients reported are standardized betas. CT = clinical trial.
[a]Less than high school is the reference.
[†]$p < .10$. *$p < .05$. **$p < .01$.

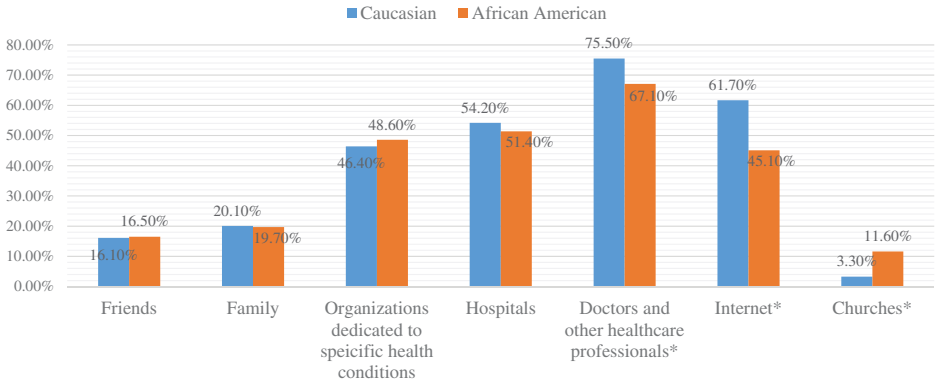

Fig. 1. A comparison of Caucasians and African Americans on information sources related to clinical trials. Asterisks indicate significant differences between Caucasians and African Americans.

Research Questions 3 and 4 asked whether reliance on different information sources was associated with WTP and whether the relationship differed as a function of ethnicity. The results from Table 3 show that seeking information from doctors ($\beta = .14$, $p < .05$) was positively associated with WTP for Caucasians, and seeking information from hospitals ($\beta = .28$, $p < .05$) was positively associated with WTP for African Americans. Therefore, the influential information sources varied for the different ethnic groups.

Research Questions 5–8 assessed whether religious belief and religious activity were associated with WTP and whether the relationships varied for different ethnic groups. The results indicated that religious belief was not associated with WTP for either Caucasian or African American respondents (Research Questions 5 and 6). Religious activity was negatively associated with WTP for Caucasian respondents ($\beta = -.18$, $p < .05$), whereas it was positively associated with WTP for African American respondents ($\beta = .31$, $p < .05$). Therefore, there was a relationship between religious activity and WTP (Research Question 7), and the relationship varied for Caucasians and African Americans (Research Question 8).

Discussion

The present study examined the roles of knowledge, distrust, information sources, and religiosity in influencing individuals' WTP and explored whether the results vary between two ethnic groups: Caucasians and African Americans. The results showed that distrust in medical professionals was negatively associated with WTP, and the negative relationship held for African Americans and Caucasians. This finding echoes what has been concluded in the preexisting research on barriers to CT recruitment (Mills et al., 2006). It also reinforces the critical role of distrust in undermining individuals' WTP in CTs.

Knowledge about CTs was not significantly associated with WTP for either ethnic group. The nonsignificant finding for knowledge could be explained in a few ways. First, qualitative studies have suggested that being informed about placebo conditions and the randomization process could create concerns among potential participants (Mills et al., 2006). Therefore, factual knowledge about CT procedures may resolve and raise concerns and fears at the same time, leaving its role inconclusive. Second, factual knowledge may not be as important as subjective knowledge in influencing WTP. A recent study found that what really mattered was whether individuals believed that they were knowledgeable, not their factual knowledge about CTs (Kim et al., 2015). Nevertheless, it is possible that one's factual knowledge about CT procedures is a determining factor in making an actual decision to participate rather than a general WTP (Kim et al., 2015). Future research is encouraged to quantitatively examine different types of knowledge about CTs on WTP and actual participation in CTs.

We found that participants' preferred sources of information about CTs were associated with WTP and varied by ethnicity. Doctors and hospitals appeared to be the influential information sources for Caucasians and African Americans, respectively. Doctors have remained the most preferred and trusted information source for Caucasians (Nguyen & Bellamy, 2006). Moreover, participation in a CT is more a product of positive doctor–patient relationships and doctors' personal influence (McComas et al., 2010). Research has shown that Caucasian cancer patients generally consider their doctors more supportive and informative than African Americans do (Gordon et al., 2006). It is possible that doctors are more likely to propose and discuss CTs with Caucasian patients, and in turn trust in doctors makes doctors an influential information source for Caucasians. For African American respondents, hospitals being an influential source suggests that African Americans rely on the health care system for CT information. However, they may trust general institutions more than individual doctors. African Americans frequently reported that doctors would less fully explain research participation to them, and they felt reluctant to ask their doctors questions (Braunstein, Sherber, Schulman, Ding, & Powe, 2008). Thus, information from hospitals, which might include newsletters, workshops, and information from nurses and other nondoctor staff, may be an important resource despite the relationship between doctors and African American people.

Although African Americans were more likely to seek trial information from churches, church was not a significant information source in predicting WTP. It might be the case that African Americans trust their churches and would turn to them for health information, yet their churches do not provide effective information to encourage WTP in CTs. As reported in Langford and colleagues (2010), African American participants who reported greater trust in religious organizations for health information were less likely to know about CTs. Findings from the present study further demonstrate that churches may be a promising yet relatively little used information channel for promoting CTs (Derose et al., 2000; Germino et al., 2011; Stanton et al., 2013).

Last, this study revealed different roles of the two dimensions of religiosity in influencing individuals' WTP as a function of ethnic background. Religious belief was not a significant predictor of WTP for either ethnic group. The nonsignificant role of religious belief is inconsistent with results obtained by Advani and colleagues (2003). This apparent inconsistency could be explained by Advani and colleagues' use of a single-item measure of religious belief, "God would determine whether they would be cured or die," versus the multiple indicators of an individual's religiousness used in the current study. Our nonsignificant finding for religious belief suggests a need for a more refined operationalization of the concept.

Future research should integrate the literature on religious coping to capture the effects of religious beliefs. Four religious coping approaches were theorized with increasing levels of individual control: deferring, pleading, self-directing, and collaborating (Pargament, Feuille, & Burdzy, 2011). In the deferring approach, the individual turns the entire situation over to God completely. In the pleading approach, the individual requests God's direct intervention in the situation to bring about a desired outcome. In the self-directing approach, the individual sees himself or herself as the locus of action and responsibility and God as giving resources he or she needs to handle the situation. In the collaborative approach, the individual perceives God as a supportive partner who shares responsibility in the situation. The

four religious coping approaches suggest different beliefs about the relationship between an individual and God. In addition to measuring the general connection between an individual and God, questions about specific relationships between an individual and God may help to capture the effects of religious belief. For example, it might be useful to measure an individual's beliefs in God being an ultimate healer, God being a request fulfiller, God being a source to provide resources to deal with problems, and God being a supportive partner in problem solving (Enzinger, Zhang, Weeks, & Prigerson, 2014). Such a refined measure might help to distinguish subgroups of people among whom religious belief may or may not play a significant role in encouraging participation in CTs.

In contrast, religious activity was associated with lower levels of WTP for Caucasians, whereas it was associated with higher levels of WTP for African Americans. The negative relationship between religious activity and WTP for Caucasians could be explained by the possibility that religious activity would crowd out outlets for CT-related information and direct individuals' attention away from CTs. For Caucasians, levels of religious activity were not associated with seeking CT information from doctors but were positively associated with seeking information from churches ($r = .21$, $p < .001$). As is known from the analysis of information sources and WTP, doctors were critical information sources positively predicting WTP, whereas churches were not. This implicitly suggests that Caucasians with high levels of religious activity may turn to less effective information sources and be less aware of CTs.

The positive relationship between religious activity and WTP for African Americans could be explained in a couple of ways. Unlike for Caucasians, engagement in religious activity may invite additional access to CT-related information for African Americans. Religious activity presents a broad range of religious participation, including watching and listening to religious programs on TV and radio, participating in informal religious support groups, and so on (Chatters et al., 2001). CT recruitment strategies increasingly use religion-based activities as promising venues to raise awareness of CTs in the African American population. A few studies have used radio advertisements during the gospel hour specifically targeted at African Americans (Lindenstruth, Curtis, & Allen, 2006) and used educational brochures at informal religious gatherings such as Black religious salons (Newlin et al., 2006). It might be that African Americans are unintentionally exposed to CT-related information while they are performing religious activities. Future research should directly examine the influence of unintended exposure to CT-related information in various religious activities on WTP among African Americans. Alternatively, African Americans with high levels of religious activity may happen to be the ones who are open to medical researchers and tend to actively participate in health care systems in general. Research has shown that for African Americans, religious activities have a positive effect on health care practices, including cancer screening (Kang & Bloom, 1993) and doctor visits (Aaron, Levine, & Burstin, 2003). Participation in CTs may be considered a specific form of health care practice. Future research should examine the mechanisms underlying the discovered positive relationship.

There are a few limitations to the current study. First, the use of an online survey population may have excluded technology-averse or low-literacy respondents. Although WebTV provided to participating households reduced some of the traditional digital divide, undoubtedly some older and/or nonliterate adults were unable or unwilling to use any electronic device (Murphy et al., 2009). However, similar biases occur with most random-digit telephone research (Krosnick & Chang, 2001). Second, response bias is "a systematic tendency to respond to a range of questionnaire items on some basis other than the specific item content" (Paulhus, 1991, p. 17). People's self-reported measures may involve systematic biases that obscure the measurement of content variables. The most prominent response biases are the tendencies to provide socially desirable answers, to acquiesce, and to use extreme ratings (Paulhus, 1991). Caucasians and African Americans may show different types and degrees of response biases. Future research is encouraged to control the influence of response bias by measuring socially desirable responding, acquiescence, and extremity response bias.

Third, the measure of CT-related information seeking involved an intentional question rather than actual seeking behavior. The reason is that respondents in the current sample may have never looked for CT-related information before. Future research may examine the influence of the actual usage of different sources for general health information seeking on individuals' WTP in CTs. An alternative study design is to screen respondents, select those who have ever looked for CT-related information, and then measure their actual information-seeking behavior. Moreover, the measure of WTP involved a hypothetical situation of having cancer. It is acknowledged that WTP in a hypothetical situation may differ from that in a real situation. Only 5.5% of the respondents reported that they had cancer experience. Our respondents were currently free of cancer and thus might not have felt the immediate relevance of or a strong motivation to participate in a cancer CT. Thus, the results of the study might have differed had respondents been recruited from a cancer registry. Future research is encouraged to replicate the findings with respondents who face a real situation of having cancer.

Conclusion

The accrual of participation in CTs is critical. The present study examined two notable barriers (i.e., lack of knowledge and distrust) found in the extant literature on participation in CTs. It contributes to the literature by having investigated the roles of preferred information sources and two dimensions of religiosity in influencing one's WTP in CTs. The study found that although distrust was a common barrier to WTP across the two ethnic groups, the role of factual knowledge about CT procedures was not significant. The influences of preferred information sources and religiosity vary as a function of ethnicity. The health care system appeared to be an important

CT-related information source, with doctors and hospitals being influential sources for Caucasians and African Americans, respectively. The findings can inform future recruitment campaigns in terms of channel selection and message design. More interestingly, the two dimensions of religiosity showed distinct effects, such that religious belief was not a significant predictor of WTP, whereas religious activity was a negative predictor for Caucasians and a positive predictor for African Americans. The findings call for more scholarly attention to the operationalization of religious belief and to the positive potential of religious activity for engaging prospective African American participants in CTs.

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