Published in final edited form as:
Patient Educ Couns. 2008 August ; 72(2): 276–282. doi:10.1016/j.pec.2008.03.021.

Association between temporal orientation and attitudes about *BRCA*1/2 testing among women of African descent with family histories of breast cancer

Tiffany A. Edwards[a,*], **Hayley S. Thompson**[a], **Naa Oyo A. Kwate**[b], **Karen Brown**[a], **Margaret M. McGovern**[a], **Andrea Forman**[a], **Nidhi Kapil-Pair**[a], **Lina Jandorf**[a], **Dana H. Bovbjerg**[a], and **Heiddis B. Valdimarsdottir**[a]

a *Mount Sinai School of Medicine, New York, NY, United States*

b *Mailman School of Public Health, Columbia University, New York, NY, United States*

Abstract

Objective—Previous studies have identified specific attitudes (pros and cons) about *BRCA* testing held by women of African descent that are associated with decisions to participate in testing. These testing attitudes may be determined, in part, by temporal orientation, or how one perceives the significance of events and the consequences of their actions in terms of past, present, and future. The current study explored the relationship between temporal orientation and pros and cons of *BRCA* testing among 140 women of African descent with a family history suggestive of a genetic mutation predisposing to breast cancer.

Methods—Participants completed measures of temporal orientation and genetic testing attitudes.

Results—Multivariate analyses indicated that future orientation was positively associated with perceived pros of testing. Additional analyses revealed significant associations between temporal orientation and specific item subsets related to the negative and positive impact of testing on family and personal control over one's health.

Conclusion—These results support an association between temporal orientation and attitudes about *BRCA* testing among women of African descent with family histories of breast cancer.

Practice implications—Findings support exploration of temporal orientation in future research on *BRCA* testing decisions among women of African descent and this construct's importance in developing decision aids and tailoring genetic counseling.

Keywords

Cancer; Breast cancer; BRCA1/2 testing; Black women; Temporal orientation; Health attitudes

1. Introduction

Approximately 5–10% of newly diagnosed breast cancer cases are due to deleterious mutations in the *BRCA*1 and *BRCA*2 genes [1]. Estimates suggest that individuals with these gene alterations have up to an 85% lifetime risk of developing breast cancer and up to a 60% lifetime risk of developing ovarian cancer [2,3]. The availability of genetic counseling and testing for breast and ovarian cancer susceptibility has increased in recent years and may provide

*Corresponding author at: Mount Sinai School of Medicine, 1425 Madison Avenue, Box 1130, New York, NY 10029-6574, United States. Tel.: +1 212 659 5411; fax: +1 212 849 2564. E-mail address: E-mail: tiffany.edwards@mssm.edu (T.A. Edwards).

individuals with cancer risk information which may affect screening and treatment decisions. Interestingly, research has found that although women of African descent at high risk for having a *BRCA* mutation report a high level of interest and intention to participate in genetic counseling and testing [4], participation rates remain lower relative to white women [2].

Some authors argue that participation rates may be related to attitudes about *BRCA* testing, including perceived advantages (pros) and disadvantages (cons). A number of studies report that women of African descent report more favorable attitudes concerning the benefits of genetic testing, relative to white women, including, the potential prevention of cancer, reduction of uncertainty, reassurance, and the ability to make informed cancer screening and treatment decisions [5,6]. However, genetic testing has also been found to provoke a number of concerns for women of African descent, including concerns about confidentiality and anticipation of negative emotional reactions [5], concern for family members [6], and concerns about the potential for abuse of testing results [7]. For all of these findings, racial differences remained even when controlling for socioeconomic status.

There is a growing body of research focusing on the social and cultural context of *BRCA* testing attitudes endorsed by women of African descent. Several researchers have noted that certain worldviews and cultural factors, such as communalism, religion, spirituality, and temporal orientation may influence perceived advantages and disadvantages of cancer prevention and control behaviors, including interest and participation in genetic testing [3]. Of these factors, "temporal orientation or how one perceives the significance of events and the consequences of their actions in terms of past, present, and future implications" ([3], p. 108), has been shown to have significant influence on health-related decision making [8].

A number of researchers have asserted that temporal orientation is associated with worldview and cultural values. For example, Graham [9] describes the Anglo cultural perception of time as linear and able to be separated into distinct parts – past, present, and future – where the future represents a new and different set of situations for which one can prepare. He posits that in non-Anglo cultures, time is perceived to be more circular as opposed to linear; experiences are cyclical; and people expect a future that is much like the past. Thus, a focus on the needs and concerns of the present is more practical than a focus on the future. Jones [10] argues a similar point by suggesting that institutional racism encountered by those growing up Black in the U.S. has served to provide disconfirming evidence that one has any direct influence on future outcomes. As a result, some African Americans may be less future-oriented and more present-oriented. The notion that a present orientation may be more salient in African American culture is supported by the findings of one study which found that African Americans were more present-oriented than White Americans in relation to their daily experiences with managing hypertension [8].

In a recent review of the literature on the relationship between preventive health behaviors and temporal orientation, Chapman [11] suggests that one explanation for many individuals' non-adherence to cancer prevention and control behaviors is that they are present-oriented and place greater value on immediate costs or disadvantages of these behaviors and less value on their future benefits (p. S41). For example, a woman who is more present-oriented may focus on the immediate costs of having a mammogram, such as time away from work, the inconvenience of re-scheduling responsibilities, or anticipated discomfort. Less attention is paid to the benefits of mammography that are often delayed, such as earlier detection of cancer that may lead to improved treatment and survival outcomes. For a woman who is present-oriented, the costs may be perceived as too great and may lead her to delay or even avoid screening altogether, particularly in the absence of symptoms. Thus, understanding the value that an individual places on immediate costs versus delayed benefits of cancer control behaviors is imperative in understanding participation, or lack thereof, in these behaviors.

BRCA testing attitudes may be similarly informed by temporal orientation to the extent that many of the benefits of genetic testing, such as its influence on breast cancer screening decisions over time, are also delayed. Therefore, individual's who are more present-oriented may be less likely to recognize the benefits of testing; thus, less likely to participate. Researchers have begun to examine temporal orientation and its association to *BRCA* genetic testing decisions. In a recent study, Levy et al. [12] found that future time orientation was significantly higher in women who participated in genetic counseling for *BRCA*1/2 testing. The authors discussed how a behavior like counseling for predictive genetic testing, which they described as being explicitly related to future risk, would more likely be associated with future orientation. Similarly, Hughes and colleagues [3] reported that among women of African descent at high risk for a *BRCA*1/2 gene alteration, future orientation was higher among test acceptors relative to test decliners. These authors noted that temporal orientation likely influences the perception of advantages and disadvantages of genetic testing. Levy et al. [12] further suggested "…a person who places high value on the present (compared to the future) will perceive relatively lower benefits from preventive health behavior than a person who places a relatively high value on the future…" (p. 955). Conversely, those who place a high value on the future may be expected to perceive greater benefits from preventive health behavior. Although the aforementioned authors were able to show that a relationship does exist between temporal orientation and genetic counseling and test acceptance, no studies to date have explored the association between temporal orientation and perceived genetic testing attitudes, which the authors argue likely influence counseling and test participation decisions. The current study will attempt to further tease apart the assumptions made by Levy et al. [12], by examining this association.

Therefore, the current study aims to explore the association between temporal orientation and *BRCA* testing attitudes in a sample of women of African descent with a family history suggestive of a genetic mutation predisposing to breast cancer. Exploration of this association within this group is important as temporal orientation may be a culturally salient factor likely influencing testing attitudes. Based upon prior research with similar populations, we hypothesize that future orientation will be associated with greater endorsement of perceived pros of *BRCA* testing and lower endorsement of perceived cons, while present orientation will be associated with greater endorsement of perceived cons of *BRCA* testing and lower endorsement of perceived pros.

2. Methods

2.1. Participants

Participants were 140 women of African descent with a personal and/or family history suggestive of a hereditary cancer syndrome. Family history eligibility criteria was assessed using standard *BRCA1/2* risk probability models, namely, the Myriad Model, Penn Model, and BRCApro [13–15]. Participants whose family histories suggested that the cancer in their family might be inherited based upon *any* of these models were recruited for participation into the study. Among the sample, 39% had 1 relative; 38% had 2 relatives; and 23% had 3 or more relatives affected with breast or ovarian cancer. Women were considered ineligible if they were under the age of 18, non-English speaking, pregnant, unable to provide informed consent, or had previously undergone genetic counseling for hereditary breast/ovarian cancer. Eligible participants were offered genetic counseling and testing at no charge.

2.2. Procedure

This study is part of a larger longitudinal program of research evaluating the impact of standard genetic counseling (SGC) versus culturally tailored genetic counseling (CT-GC) on *BRCA*1/2 decision making and psychobehavioral outcomes. The present study utilized a community

based recruitment effort, relying largely upon physician referral and participant initiation. The majority of participants in the sample were recruited following women's initiation of contact with the study team based on physician referral or community outreach. Therefore, the total number of women referred to the study is unknown. Of the 154 eligible women who contacted the study team, 14 declined participation.

Eligible participants were first scheduled for a baseline telephone interview. All interviews were conducted by telephone by trained research assistants from Mount Sinai School of Medicine, Department of Genetics and Genomic Sciences. Consent forms were mailed to those women interested in participation and a baseline interview was scheduled. During the baseline interview, questions related to demographic and medical characteristics, time orientation, and *BRCA* testing attitudes were included. Colored answer key cards were mailed to participants to assist in answering the questionnaires over the telephone. Following completion of the baseline interview, participants were given the option of pursuing genetic counseling and testing for *BRCA1* and *BRCA2*. All study procedures and documents were approved by the Mount Sinai School of Medicine Institutional Review Board. For our purposes, we focused solely on information obtained during the baseline telephone interview pertaining to temporal orientation and *BRCA* testing attitudes.

2.3. Measures

2.3.1. Sociodemographic and medical information—Basic sociodemographic and medical information was obtained from each participant, including age, marital status, education, income, health insurance coverage, and breast cancer history.

2.3.2. Temporal orientation—A previously validated scale [16] was used to assess individual's tendency to think and act according to consequences that are primarily present (e.g., "There's no sense in thinking about the future before it gets here") or future oriented (e.g., "I often think about how my actions today will affect my health when I am older"). The scale consists of 10-items, which are divided into two, 5-item subscales, one measuring present and the other measuring future time orientation (possible range: 5–20). Participants indicated the extent to which they agreed or disagreed with each item using a Likert scale ranging from 1 (strongly agree) to 4 (strongly disagree). The internal consistency for the present (α = .62) and future scales (α = .67) were moderate.

2.3.3. Genetic testing pros and cons—This 23-item measure was developed by the research team to assess perceived pros and cons of genetic testing for breast cancer susceptibility. Items were based on our previous research [17,7], as well as that of others [6, 18,19]. Participants indicated the extent to which they agreed or disagreed with each question using a Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Nine items (α = .76) assessed the pros of genetic testing (possible range: 9–45) and 14 items (α = .81) assessed the cons of testing (possible range: 14–70). The pro scale included three subsets: (1) surveillance behaviors (e.g., "Knowing that I carry the gene mutation would motivate me to perform breast self-examination more frequently"); (2) family related pros (e.g., "My genetic test results could give my family members useful information about their risk of getting cancer"); and (3) personal control (e.g., Knowing whether I had the gene mutation would increase my sense of personal control); while the con scale included four subsets: (1) anticipation of negative emotional reaction (e.g., "Knowing that I carry the gene mutation would leave me in a state of hopelessness and despair"); (2) confidentiality concerns (e.g., "If I were found to carry the gene mutation, I would worry that the results would not stay confidential"); (3) stigma related to testing (e.g., "If I were found to carry a gene mutation for cancer, it would cause others to view me negatively"); and (4) family related cons (e.g., "If I underwent genetic testing for cancer, I would be concerned about the effect it would have on

my family"). The internal consistencies of each of the seven subsets of items in the current sample are as follows: surveillance behaviors (α = .72); family related pros (α = .84); negative emotional reaction (α = .69); confidentiality concerns (α = .70); stigma related to testing (α = .73); family related cons (α = .65); and personal control (α = .66).

3. Results

3.1. Demographic characteristics

As shown in Table 1, participants included a wide age range, with a mean age of 45.6 years. A little over half of the participants reported greater than $35,000 in annual income, two-thirds reported greater than a high school education (some college, college graduate, or post-graduate degree), one-third of the participants were married, and a little over three-quarters of the participants reported some form of medical insurance. Of the participants in the present study, a little over half of the women were African American while the remainder self-identified as African Caribbean. Among the participants in this study, greater than half reported a personal history of breast cancer. Of those affected, the mean age of onset was 43.4 years.

3.2. Genetic testing pros and cons

Endorsements of perceived pros and cons were descriptively analyzed by tabulating the percentages of women who agreed or strongly agreed with each of the pros (Table 2) and cons (Table 3). A majority of women (>80%) reported agreement with 6 of the 9 pro items, with the remaining three items receiving agreement from greater than half of the women. Three of the 14 con items, all of which addressed effects of testing on family, received >50% agreement among the women.

3.3. Temporal orientation and demographic characteristics

Among the demographic characteristics, age was found to be significantly associated with temporal orientation. Older age was found to be associated with present-orientation, whereas younger age was associated with future-orientation (r = .26, p = .002 and r = −.20, p = .02, respectively). An ANOVA revealed a significant association between personal history and temporal orientation. Women with a personal history of breast cancer had higher present-orientation scores compared to those women without a personal history ($F(1,135)$ = 11.84, p = .001). There were no significant associations found between demographic characteristics and pro and con total scores.

3.4. Temporal orientation and genetic testing pros and cons

Simultaneous multiple regression was used to assess the association between temporal orientation and pro and con total scores while adjusting for age and personal history of breast cancer. As can be seen in Table 4, results revealed a significant association for future orientation. Consistent with our hypothesis, future orientation was positively related to the pro total score (β = .271, S.E. = .09, p = .002). Interestingly, neither future nor present orientation was significantly related to the con total score as hypothesized.

Additional analyses were performed at the item subset level to determine which subsets were related to present and future orientation. Results of these adjusted analyses revealed that present orientation was negatively associated with family related pros (β = −.223, S.E. = .11, p = .05) and personal control (β = −.318, S.E. = .16, p = .05). Future orientation was found to be positively associated with family related pros (β = .263, S.E. = .10, p = .01), family related cons (β = .240, S.E. = .12, p = .05), and personal control (β = .329, S.E. = .14, p = .02).

4. Discussion and conclusion

4.1. Discussion

In the current study, findings support an association between temporal orientation and attitudes about *BRCA* testing in a sample of women of African descent with family histories of breast cancer. As expected, future orientation was associated with greater endorsement of overall testing advantages. This result extends the work of others in the area [3,12], who have found future orientation to be higher in genetic counseling and testing acceptors, but have not explored potential mediators of this association.

Additional analyses revealed that present and future orientation were related to both pro and con item subsets. The positive relationship found between future orientation and family related pros of testing suggests that for women who tend to think and act according to more future consequences, the extent to which *BRCA* testing results provide useful information related to family members' future cancer risk was viewed as beneficial. The vast majority of women (95%) agreed that testing could help family members make better decisions about health care and an even greater number (97%) agreed that test results could provide family members with useful information about their own risk. This finding is consistent with previous studies, which found that 89–91% ([17,4]; respectively) of participants indicated that genetic testing would help family members make more informed testing-related decisions. Previous research has indicated that future oriented individuals are more inclined to participate in genetic counseling and testing, and being that the nature of testing is to provide both personal and familial risk information, it is not surprising that family benefits is a potential mediator between time orientation and genetic testing.

Contrary to expectations, future orientation was found to be positively associated with family related cons of testing, including feelings of guilt and worry about family members' carrier status and concern about the effect of testing on family. It could be speculated that the family members these women are most concerned about are children for whom these consequences may not be relevant or apparent for a number of years. For a woman who is future-oriented, the potentially negative future impact of BRCA test results on the children in her family may be viewed as a considerable disadvantage of testing. These attitudes may be further compounded within this population by a strong sense of collectivism and familial interdependence that has been noted as salient in African American culture and has been cited by several researchers as a factor influencing BRCA testing decisions [3,17].

Future orientation was found to be positively associated with perceived personal control, suggesting that for women who tend to think and act according to more future consequences, the extent to which *BRCA* testing would increase their sense of personal control and ability to make appropriate decisions concerning the management of cancer risk was viewed as an incentive to participate in genetic testing. A fair percentage of the women (76%) reported that testing would help to increase their sense of personal control and a similar number (70%) believed that testing would aid in making important life decisions. These findings are not surprising and reflect similar results found in other studies, where 67–74% believed that testing would increase their sense of personal control and 70–74% believed testing would help in making important life decisions [17,4]. Although this is the first study to show a relationship between temporal orientation and perceived personal control in relation to cancer prevention and management, other researchers have found that among women of African descent at increased risk, 'the need to plan for the future' [20] and 'taking certain steps to prevent cancer' [6,21] are rated as important factors affecting decisions to participate in genetic counseling and testing. In addition, one can speculate that for future oriented women, the belief that the information received from genetic testing can help in making major future life decisions and increase one's sense of personal control, would be perceived as beneficial.

In contrast, present orientation was negatively associated with personal control, suggesting that for women who tend to think and act according to more immediate consequences, the perceived benefits that testing could provide in terms of strengthening one's sense of personal control were not viewed as advantageous. It is plausible to assume that women who are more present oriented focus on more immediate concerns that may effect their ongoing personal and social experiences. Therefore, the immediate consequences of genetic testing participation and receipt of results, may not be viewed as aiding in reducing concerns regarding breast cancer, but may be viewed instead as one more thing to be concerned about and needing to be dealt with in the here and now. This assumption may also explain the expected relationship found between present orientation and family related pros of testing.

Interestingly, the present study found no significant differences between African American and Caribbean women regarding genetic testing attitudes or temporal orientation. To date, no studies have described within group differences among women of African descent with regard to the relationship between temporal orientation and genetic testing attitudes. The lack of significant temporal orientation differences may be attributed to the aforementioned model described by Graham [9] as the 'circular-traditional' perception of time, which has been observed in non-Western cultures. As African Americans and African Caribbeans share common African ancestry, the absence of differences between these groups regarding this culturally relevant construct may reflect retention of this shared ancestry. The absence of differences may also be attributed to beliefs about perceived low control over future outcomes due to comparable histories of oppression: racism in the United States and foreign colonialism in Caribbean nations. Future work should examine the extent to which differences exist or are absent between the two groups among other culturally relevant constructs.

4.2. Conclusion

These findings support an association between present and future orientation and attitudes about *BRCA* testing in a sample of women of African descent with family histories of breast cancer.

4.3. Practice implications

The present findings, demonstrating a relationship between temporal orientation and attitudes about genetic testing have a number of practice implications and should be of particular interest to health care providers and researchers interested in issues relevant to *BRCA* testing. First, these results add to the current body of literature on potential culturally relevant factors that may serve to influence *BRCA* testing attitudes and, ultimately, *BRCA* testing participation decisions among women of African descent. Given the growing focus on culturally competent health care, including the provision of genetic risk assessment services, awareness of temporal orientation as a factor in women's testing decisions may help to increase genetic counselors' sensitivity to the sociocultural context within which women make such decisions. Similarly, structured decision aids designed to facilitate genetic testing decisions could also be potentially strengthened by taking into account the sociocultural context within which women may make testing-related decisions.

Similar to health care professionals' efforts to educate diverse populations about cancer prevention related behaviors, such as mammography or colonoscopy, genetic counselors' efforts to impart information related to *BRCA* testing may integrate temporal orientation into their approaches for women of African descent. This may include the development and presentation of messages and materials that acknowledge variability in present and future orientation across women and the impact it has on health-related behaviors and decisions. Given the considerable resources allocated to increasing screening participation among African Americans, who have the highest cancer mortality rates across a number of cancer types, as

well as the growing focus on culturally targeted and tailored interventions (see [22,23]; for review on tailoring), continued exploration of the influence of temporal orientation is warranted in both research and intervention design.

4.4. Limitations

Several limitations of the present study must be acknowledged. First, the generalizability of the results may be somewhat limited, as our sample was fairly homogenous, consisting of middle-class educated women of African descent. According to the U.S Census Bureau, based on data from the 2004 American Community Survey [24], about 26% of African Americans live below the poverty line and roughly 17% of Black women have a bachelor's degree or more education, compared to the current sample in which 51% of the participants reported equal to or greater than $35,000 in annual income and 32% reported receipt of bachelor's degree or more education. Thus, the present sample of women may not be representative of the larger population of women of African descent, particularly in terms of income and education. Second, an additional limitation of the present study is the modest internal consistencies of the present and future orientation subscales, which is likely due to the low number of items within each subscale. Internal consistencies for the original study [16] also revealed moderate alphas (.73 and .72 for present and future, respectively). However, the expected relationships found between temporal orientation and other study variables provide some evidence of the stability of the measure. A similar explanation is warranted for the low internal consistency coefficients found for several of the genetic testing pro and con subscales. Future development of additional items for these subscales and evaluation within a larger sample may aid in strengthening the reliability of these subscales and the larger scale overall. Third, as aforementioned, the participants in this sample were recruited following women's initiation of contact with the study team based on physician referral or community outreach. Some of these women may have contacted the study team because they had an existing interest in obtaining *BRCA* counseling and testing. Furthermore, the counseling and testing offered free of charge, to all women, through study participation may have provided an additional incentive. It is plausible that these women may have entered the study with relatively positive attitudes toward *BRCA* testing, thus biasing the responses of the sample overall. However, 5 of the 14 con items were endorsed by one-third or more of the entire sample suggesting that attitudes were not uniformly positive. Still, this remains an important methodological issue that has been discussed in similar studies [25,18] and warrants future research to develop strategies to address these issues. Lastly, although the present study addresses an important theoretical issue, future work can extend these findings by exploring the uptake of genetic counseling and testing as behavioral outcomes.

References

1. National Cancer Institute. Genetic Testing for BRCA1 and BRCA2: it's your choice. 2002 [Retrieved January 28, 2008]. from http://www.cancer.-gov/cancertopics/factsheet/Risk/BRCA
2. Armstrong K, Micco E, Carney A, Stopfer J, Putt M. Racial differences in the use of *BRCA*1/2 testing among women with a family history of breast or ovarian cancer. J Am Med Assoc 2005;293:1729–36.
3. Hughes C, Fasaye G, LaSalle VH, Finch C. Sociocultural influences on participation in genetic risk assessment and testing among African American women. Patient Educ Couns 2003;51:107–14. [PubMed: 14572939]
4. Kinney AY, Croyle RT, Dudley WN, Bailey CA, Pelias MK, Neuhausen SL. Knowledge, attitudes, and interest in breast–ovarian cancer gene testing: a survey of a large African American kindred with a *BRCA*1 mutation. Prev Med 2001;33:543–51. [PubMed: 11716649]
5. Donovan KA, Tucker DC. Knowledge about genetic risk for breast cancer and perceptions of genetic testing in a sociodemographically diverse sample. J Behav Med 2000;23:15–36. [PubMed: 10749009]

6. Hughes C, Gomez-Caminero A, Benkendorf J, Kerner J, Isaacs C, Barter J, Lerman C. Ethnic differences in knowledge and attitudes about *BRCA*1 testing in women at increased risk. Patient Educ Couns 1997;32:51–62. [PubMed: 9355572]
7. Thompson HS, Valdimarsdottir HB, Jandorf L, Redd W. Perceived disadvantages and concerns about abuses of genetic testing for cancer risk: differences across African American, Latina, and Caucasian women. Patient Educ Couns 2003;51:217–27. [PubMed: 14630378]
8. Brown CM, Segal R. Ethnic differences in temporal orientation and its implications for hypertension management. J Health Soc Behav 1996;37:350–61. [PubMed: 8997890]
9. Graham RJ. The role of perception of time in consumer research. J Consum Res 1981;7:335–42.
10. Jones, JM. Cultural differences in temporal orientation: instrumental and expressive behaviors in time. In: McGrath, JE., editor. The social psychology of time: new perspectives. Newbury Park, CA: Sage; 1988. p. 21-37.
11. Chapman GB. Short-term cost for long-term benefit: time preference and cancer control. Health Psychol 2005;24:S41–8. [PubMed: 16045418]
12. Levy AG, Micco E, Putt M, Armstrong K. Value for the future and breast cancer-preventive health behavior. Cancer Epidemiol Biomarkers Prev 2006;15:955–60. [PubMed: 16702376]
13. Parmigiani G, Berry DA, Aquilar O. Determining carrier probabilities for breast cancer susceptibility genes BRCA1 and BRCA2. Am J Hum Genet 1998;62:145–58. [PubMed: 9443863]
14. Couch FJ, DeShano ML, Blackwood MA, Calzone K, Stopfer J, Campeau L, Ganguly A, Rebbeck T, Weber BL, Jablon L, Cobleigh MA, Hoskins K, Garber JE. BRCA1 mutations in women attending clinics that evaluate the risk of breast cancer. N Eng J Med 1997;336:1409–15.
15. Frank TS, Manley SA, Olopade OI, Cummings S, Garber JE, Bernhardt B, Antman K, Russo D, Wood ME, Mullineau L, Isaacs C, Peshkin B, Buys S, Venne V, Rowley PT, Loader S, Offit K, Robson M, Hampel H, Brener D, Winer EP, Clark S, Weber B, Strong LC, Rieger P, McClure M, Ward BE, Shattuck-Eidens D, Oliphant A, Skolnick MH, Thomas A. Sequence analysis of BRCA1 and BRCA2: correlation of mutations with family history and ovarian cancer risk. J Clin Oncol 1998;16:2417–25. [PubMed: 9667259]
16. Lukwago SN, Kreuter MW, Bucholtz DC, Holt CL, Clark EM. Development and validation of brief scales to measure collectivism, religiosity, racial pride, and time orientation in urban African American women. Fam Community Health 2001;24:63–71. [PubMed: 11563945]
17. Thompson HS, Valdimarsdottir HB, Duteau-Buck C, Guevarra J, Bovbjerg DH, Richmond-Avellaneda C, Amarel D, Godfrey D, Brown K, Offit K. Psychosocial predictors of *BRCA* counseling and testing decisions among urban African-American women. Cancer Epidemiol Biomarkers Prev 2002;11:1579–85. [PubMed: 12496047]
18. Jacobsen PB, Valdimarsdottir HB, Brown KL, Offit K. Decision-making about genetic testing among women at familial risk for breast cancer. Psychosom Med 1997;59:459–66. [PubMed: 9316177]
19. Lerman C, Narod S, Schulman K, Hughes C, Gomez-Caminero A, Bonney G, Gold K, Trock B, Main D, Lynch J, Fulmore C, Snyder C, Lemon SJ, Conway T, Tonin P, Lenoir G, Lynch H. *BRCA*1 testing in families with hereditary breast-ovarian cancer: a prospective study of patient decision making and outcomes. J Am Med Assoc 1996;275:1885–929.
20. Matthews AK, Cummings S, Thompson S, Wohl V, List M, Olopade OI. Genetic testing of African Americans for susceptibility to inherited cancers: use of focus groups to determine factors contributing to participation. Psycho-oncology 2000;18:1–19.
21. Kessler L, Collier A, Brewster K, Smith C, Weathers B, Wileyto EP, Halbert CH. Attitudes about genetic testing and genetic testing intentions in African American women at increased risk for hereditary breast cancer. Genet Med 2005;7:230–8. [PubMed: 15834240]
22. Kreuter M, Strecher V, Glassman B. One size does not fit all: the case for tailoring print materials. Ann Behav Med 1999;21:1–9. [PubMed: 18425647]
23. Kreuter MW, Lukwago SN, Bucholtz DC, Clark EM, Sanders-Thompson V. Achieving cultural appropriateness in health promotion programs: targeted and tailored approaches. Health Educ Behav 2002;30:133–46. [PubMed: 12693519]
24. U.S. Census Bureau Website. [Accessed August 15, 2007]. available at http://www.census.gov/prod/2007pubs/acs-04.pdf

25. Durfy SJ, Bowen DJ, McTiernan A, Sporleder J, Burke W. Attitudes and interest in genetic testing for breast and ovarian cancer susceptibility in diverse groups of women in western Washington. Cancer Epidemiol Biomarkers Prev 1999;8:369–75. [PubMed: 10207642]

Table 1

Participant characteristics (N = 140)

Variable	*n* (%)
Age, mean (range) (year)	45.6 (22–79)
Race/ethnicity	
Black-African American	74 (56%)
Black-West Indian/Caribbean	58 (44%)
Marital status	
Single	49 (35%)
Married	44 (31%)
Divorced/separated	41 (30%)
Widowed	6 (4%)
Education	
Less than 8th grade	2 (1%)
8th to 11th grade	8 (6%)
High school graduate or equivalent	35 (25%)
Technical or vocational school	7 (5%)
Some college	44 (31%)
College graduate	29 (21%)
Post-graduate degree	15 (11%)
Annual household income	
<$15,000	25 (19%)
$15,000–24,999	18 (13%)
$25,000–34,999	14 (10%)
$35,000–49,999	22 (16%)
$50,000–69,999	22 (16%)
$70,000–89,999	12 (9%)
>$90,000	13 (10%)
Health insurance	
Insured	120 (86%)
Uninsured	20 (14%)
Personal breast cancer history	
Affected	94 (69%)
Unaffected	42 (31%)

Table 2

Perceived pros of genetic testing

Perceived pro items	Agree or strongly agree (%)
Family related pros	
If I were found to carry the gene mutation, it would help my daughter(s) or sister(s) decide whether to undergo genetic testing	92
My genetic test results could give my family members useful information about their risk of getting cancer	97
My genetic test results could help my family members make better decisions about how to take care of their health	95
Genetic testing would help me learn if my children were at risk for getting breast cancer.	91
Surveillance behaviors	
Knowing that I carry the gene mutation would motivate me to perform breast self-examination more frequently	91
Knowing that I carry the gene mutation would help me decide whether to go for more frequent mammograms	83
Personal control	
My concerns about getting breast cancer again would be reduced if I knew I did not carry the gene mutation	74
Knowing whether I had the gene mutation would increase my sense of personal control	76
Knowing whether I have the gene mutation or not would help me make important life decisions (e.g., getting married, having children)	70

Table 3

Perceived cons of genetic testing

Perceived con items	Agree or strongly agree (%)
Family related cons	
If I underwent genetic testing for cancer, I would be concerned about the effect it would have on my family	52
If I were found to carry the gene mutation for breast cancer, I would worry about passing the gene to my children	75
Knowing that I carry the gene mutation would cause me to worry more about other family members who could be carriers (e.g., mother, sisters, daughters)	72
If I were found to carry the gene for breast cancer, I would feel guilty if my daughter(s) developed breast cancer	29
I would feel guilty if one of my relatives had the gene mutation and I did not	11
Stigma related to testing	
If I were found to carry a gene mutation for cancer, I would feel singled out	8
If I were found to carry a gene mutation for cancer, it would cause others to view me negatively	3
I would be ashamed if I were found to carry the gene mutation	2
Anticipation of negative emotional reaction	
I would be frightened if I were found to carry the gene mutation	37
Knowing that I carry the gene mutation would leave me in a state of hopelessness and despair	2
I would consider suicide if I were found to carry the gene mutation for breast cancer	0
If I underwent genetic testing for cancer, I would not be able to handle it emotionally	3
Confidentiality concerns	
If I were found to carry the gene mutation, I would worry that the results would not stay confidential	12
Being tested for the gene mutation could jeopardize my insurance coverage	11

Table 4
Summary of regression analyses

Variable	S.E. *B*	β	Significance
Present orientation			
Family related pros	.11	−.223	.05
Personal control	.16	−.318	.05
Future orientation			
Pro total score	.09	.271	.002
Family related pros	.10	.263	.01
Personal control	.14	.329	.02
Family related cons	.12	.240	.05