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Ethnic Differences in Decisional Balance and Stages of Mammography Adoption

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Abstract

Behavioral theories developed through research with mainstream, English-speaking populations have been applied to ethnically diverse and underserved communities in the effort to eliminate disparities in early breast cancer detection. This study tests the validity of the transtheoretical model (TTM) decisional balance measure and the application of the TTM stages of change in a multiethnic, multilingual sample. A random sample of 1,463 Filipino, Latino, African American, Chinese, and White women aged 40 to 74 completed a phone survey of mammography beliefs and practices. Consistent with the TTM and independent of ethnicity, decisional balance was associated with mammography stage in all five ethnic groups when controlling for socioeconomic and other factors. In addition, having private insurance and a regular physician and being a long-time resident in the United States were positively associated with mammography maintenance. The application of the TTM for mammography is supported in a multiethnic and multilingual sample.

Keywords

attitudes; ethnicity; stages of mammography adoption; access; decisional balance

There are significant disparities in breast cancer detection, diagnosis, and mortality between White women and those in other ethnic/racial groups (Baquet & Commiskey, 2000). Despite impressive gains in the use of breast cancer screening overall, recent immigrants, non-English speakers, and women from ethnic minority communities often do not receive regular breast cancer screening (Hiatt, 1997; Hiatt & Pasick, 1996; Sabogal, Merrill, & Packel, 2001). The overwhelming influence of access to care on use of cancer screening (Breen, Wagener, Brown, Davis, & Ballard-Barbash, 2001) is now widely recognized. Yet, enhancing access alone is not sufficient in increasing utilization of breast screening among culturally diverse women (Kelaher & Stellman, 2000; Otero-Sabogal, Arnsberger, Nussey, Brown,&Fox, 1999; Sabogal et al., 2001). Understanding attitudes toward screening and the relationship of attitudes and

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behavior is key to the development of effective interventions. In particular, it is essential to assess the role of attitudes in relation to key factors such as health insurance and having a regular source of medical care (Garbers, Jessop, Foti, Uribelarrea, & Chiasson, 2003; Otero-Sabogal, Stewart, Sabogal, Brown,&Perez-Stable, 2003). Amajor problem in understanding attitudes and behaviors in culturally and linguistically diverse populations is valid conceptualization and measurement (Pasick, Stewart, Bird, & D'Onofrio, 2001). First, attitudes, which may differ across cultures, must be identified, and second, valid measures for attitudes must be developed and tested. An additional complication is that theories underlying the measurement of mammography-related attitudes were developed mainly among middle-class White women and have not been adequately tested for multicultural validity and comparability.

The Transtheoretical Model and Mammography: Delineating Stages of Adoption and Associated Positive and Negative Attitudes

The transtheoretical model (TTM) for behavior change has been adapted and applied in research on a variety of health behaviors including smoking, alcohol use, diet, exercise, breast-feeding, safe sex, and weight loss. In 1992, Rakowski and colleagues (1992) adapted the model to successfully predict mammography utilization. Rakowski et al. defined five stages associated with adoption of mammography ranging from precontemplation (women who have never had a mammogram and are not considering having a mammogram), contemplation (women planning to have a mammogram but who have not yet done so), action (women who have had a mammogram and intend to have another one), maintenance (women who have mammograms on a regular basis and plan to continue doing so), and relapse (women who have had a mammogram but do not intend to have another one in the near future).

A central tenet of the TTM is that in earlier adoption stages, negative attitudes toward behavior change (cons) outnumber positive attitudes (pros). Individuals advance in stage of readiness as attitudes shift from more negative to more positive. The excess of pros over cons is termed *decisional balance*. Several studies have confirmed the positive relationship between decisional balance and stage of change (Chamot, Charvet, & Perneger, 2001; Clark et al., 1998; Ma et al., 2002; Rakowski, Andersen, et al., 1997; Rakowski, Clark, et al. 1997; Rakowski, Fulton,&Feldman, 1993; Skinner, Arfken,&Sykes, 1998). Although the TTM has been widely applied to inform interventions in studies of ethnic populations (Champion & Scott, 1997; Kelaher et al., 1999; Otero-Sabogal et al., 2003), the validity of the decisional balance construct in diverse cultures has not been tested. Thus, it is not known whether measures of positive and negative attitudes toward mammography can be adapted and translated for other cultures and languages and if the resulting decisional balance measure is positively associated with the stage of change in diverse subgroups of women. The purpose of this study is to test the validity of the TTM decisional balance measure in women from five ethnic groups who speak four languages. We are particularly interested in mammography maintenance, because little is known about sustained, periodic mammography screening in accordance with guidelines among ethnic-women (Rakowski, Ehrich, Dube,&Pearlman, 1996) and because regular mammography is a national priority in cancer detection and control programs (U.S. Department of Health & Human Services, 2000).

In addition, this study seeks to answer two questions: (a) Are there ethnic differences in decisional balance associated with the stages of mammography adoption? and (b) What is the relative contribution of socioeconomic status, access to care, and decisional balance to mammography maintenance for Latino, African American, Chinese, Filipino, and White women?

METHOD

This research is part of a larger program project grant funded by the National Cancer Institute referred to as Pathfinders (1997–2003). One Pathfinders component study was a randomized, controlled, longitudinal-cohort, intervention trial designed to improve initial breast and cervical cancer screening and maintenance of interval screening under conditions of shifting access to medical care in a sample of African American, Chinese, Filipino, Latino, and White women in low-income areas of Alameda County, California.

Sample

Alameda County is an urban, industrialized region on the east side of San Francisco Bay. The 2000 census shows that the county has an ethnically diverse population of approximately 1.45 million residents of which 14.9% are African American, 20.4% are Asian or Pacific Islander, and 19% are Latino. The largest Asian populations are Chinese (7.5%) and Filipino (4.8%; California Department of Finance, 2001).

Study participants were recruited by telephone to obtain a random sample of women aged 40 to 74 stratified by race/ethnicity: 500 African American, 300 non-Hispanic White, 300 Latino, 200 Chinese, and 200 Filipino women. To identify potential participants, we selected telephone prefixes associated with zip codes corresponding to low-income multiethnic areas of Oakland and Berkeley (the main study prefixes) and used the Mitofsky-Waksberg random-digit-dialing (RDD) technique (Marin, Vanoss Marin, Perez-Stable,& Vanoss, 1990; Potthoff, 1994). We eliminated telephone prefixes associated with predominantly high-income areas and oversampled prefixes associated with large proportions of Chinese and Latino respondents. An RDD sample for Filipino recruitment was generated using telephone prefixes in Union City, an area in which approximately 20% of the residents are Filipino (California Department of Finance, 2001). To complete the desired sample of Chinese women, we purchased two Chinese-listed surname samples, one for the main study prefixes and another for all of Alameda County. A Spanish-listed and a Filipino-listed surname sample for Union City and a Filipino-listed surname sample for all of Alameda County were used to improve recruitment of Filipino women. Use of listed samples has proven to be productive in reaching less numerous subpopulations (Catania et al., 1992). The impact of the use of cell phones in our RDD sample was minimal in spite of using a sample frame of residential households with landline telephones. Results from the National Health Interview Survey in 2003 indicate that only 3.6% of U.S. households did not have a landline telephone but had a wireless telephone (National Center for Health Statistics, 2003). In addition, 4.8% of adults had only a working cellular phone or had no telephone. Thus, very few adults had given up their home phone in 2003. These results indicate that the population without a landline was small (National Center for Health Statistics, 2003). Thus, it was likely smaller still at the time of recruitment for this study (1999–2000), and the potential for bias in our RDD survey due to lack of a landline telephone is negligible. However, as wireless substitution continues to grow over time, RDD telephone surveys will soon find it necessary to include wireless telephones in their sampling frames (Blumberg, Luke, & Cynamon, 2004).

On contacting a household, we verified that it was in one of the targeted areas and confirmed race/ethnic eligibility. We then asked for the number of women aged 50 to 74 years and aged 40 to 49 years living in the home. If more than one woman in the household qualified, we asked to speak to the woman aged 50 to 74 with the most recent birthday. If there were no women aged 50 to 74, we asked to speak to the woman aged 40 to 49 with the most recent birthday. Only one woman per household was asked to participate.

During the initial telephone contact, the interviewer explained the study design and the monetary incentives for participation. A $25 money order was sent by mail to each respondent

after completion of the survey. In addition to age, race/ethnicity, and area of residence, eligibility criteria included (a) being an English, Cantonese, Tagalog, or Spanish speaker; (b) having no history of cancer; and (c) intending to reside in the study area for the next 3 years. Each woman consented to be randomly assigned to the intervention or control group, provided her contact information and that of one or two relatives or friends, and agreed to be contacted every 6 months during the study period.

Verbal consent was obtained for eligible women who agreed to participate, and an interview was scheduled for approximately 2 weeks later. Before the interview, each woman received a letter describing the study, the incentives, and her rights as a study participant. Also enclosed was a note informing her that she could call us or send us a refusal letter in an enclosed envelope if she did not wish to participate. The committees on human research of the collaborating institutions (the Northern California Cancer Center and the University of California–San Francisco) approved the research protocol.

The baseline survey was conducted by phone in English, Cantonese, Tagalog, or Spanish by professional bilingual, bicultural female interviewers using a computer-assisted telephone interview system.

Measures

A 40-minute, structured questionnaire was developed. Many of the measures were obtained from surveys used in our prior cancer screening studies with comparable populations (Hiatt et al., 2001; McBride et al., 1998; Perez-Stable, Otero-Sabogal, Sabogal,& Napoles-Springer, 1996; Perez-Stable, Sabogal, & Otero-Sabogal, 1995). Additional items were newly developed based on extensive formative research using focus groups and in-depth interviews, which were adapted from other studies and refined by our multiethnic team of researchers for comprehensibility and for linguistic, cultural, and content validity (Chaturvedi & McKeigue, 1994; Pasick, D'Onofrio, & Otero-Sabogal, 1996). Items were initially developed in English terms known by the multilingual research team to be readily translated into Spanish, Cantonese, and Tagalog. Questions were back-translated, decentered, and pretested in English and the other three languages (Pasick, Sabogal, et al., 1996).

Decisional Balance

Our decisional balance measure was originally adapted from Rakowski (Rakowski et al., 1992; Rakowski et al., 1993) and expanded with new items derived from two focus groups in each of the targeted race/ethnic groups. These were extensively pretested with all five ethnic groups for cultural and linguistic appropriateness (Pasick et al., 2001; Sabogal, Otero-Sabogal, Pasick, Jenkins,&Perez-Stable, 1996). Con items were designed to reflect women's concerns about or barriers to mammography including the cost of mammography, their fears of the test, results and risk of radiation, feelings of embarrassment, anticipation of having a negative mammography experience, being too busy, and dislike of the procedure. Our list of pros or facilitators was designed to measure factors that motivate women to get screened and includes, for example, the idea that a mother having a mammogram is good for the entire family, with family being a strong value in the cultures we are studying (Sabogal, Marin, Otero-Sabogal, Marin,&Perez-Stable, 1987). (New pro and con items and items adapted from Rakowski's measure are shown in Table 2). Items also addressed misconceptions and knowledge about cancer screening because our previous studies (Perez-Stable, Sabogal, Otero-Sabogal, Hiatt, & McPhee, 1992; Zambrana, Breen, Fox, & Gutierrez-Mohamed, 1999) and focus group findings indicate these are important barriers to mammography screening among our target population. We used the same pro and con measures with all ethnic groups.

We simplified the pro and con response scales, because pretesting shows some subsets of our target population had difficulty with the original scaled responses (a 4-point, Likert-type scale of 1 = *strongly disagree* to 4 = *strongly agree*), particularly over the phone. The result was a two-step response. First, women were asked if they agree or disagree with an item (e.g., "You are too busy to have a mammogram"). Next, using their response, they were asked if they "(dis) agree strongly" or "(dis)agree somewhat." "Strongly agree" was coded as 4, "somewhat agree" as 3, "somewhat disagree" as 2, and "strongly disagree" as 1. "Don't know" and "refused" responses were coded as 2.5. Pretesting indicated that these response categories offered better construct validity and reduced the number of "do not know" responses in the test sample.

To build the Decisional Balance Scale, items measuring cons were summed into one scale and pros were summed into another scale. The scales were standardized to a mean of 50 and a standard deviation of 10. Decisional balance was computed by subtracting the Cons Scale from the Pros Scale (Rakowski et al., 1997). We did not compute the Cronbach's alpha reliability coefficients for the Pros and Cons Scales because the items in the Cons (or Pros) Scale refer to different aspects of mammography that need not be related to one another. Alpha should be computed when the items in a scale are supposed to measure the same construct. However, one may have negative (or positive) attitudes about conceptually unrelated aspects of mammography (e.g., radiation and cost), and it could be argued that a cons (or pros) scale consisting of entirely unrelated items would be appropriate.

Sociodemographic Variables

Sociodemographic variables included self-reported race/ethnicity (non-Hispanic White, African American, Latino, Chinese, or Filipino), the preferred language of the interview (coded as English vs. non-English), and years of residence in the United States (coded as ≤ 10 or > 10). Other demographic characteristics included age at time of interview, years of education, marital status (married; living with a partner; or single, divorced, widowed), and insurance status (private, public only, or none). To measure respondents' income, we asked women to select among one of seven annual household income categories (less than $5,000, $5,000–$9,999, $10,000–$19,999, $20,000–$29,999, $30,000–$39,999, $40,000–$49,999, and $50,000 or more), which we collapsed into three categories: less than $20,000, $20,000 to $49,999, and $50,000 or more.

Access to Medical Care

Based on prior literature, we measured access to medical care as follows: (a) having health insurance (private, public, none; Berk & Schur, 1998; Potosky, Breen, Graubard, & Parsons, 1998) and (b) having a regular doctor indicating continuity of care (Bindman et al., 1995; Osmond, Vranizan, Schillinger, Stewart, & Bindman, 1996). We have reported elsewhere in the Pathfinders study the relationship between race/ethnicity, access, satisfaction, and regular mammography and Pap testing in five racial/ethnic groups (Somkin et al., 2003).

Outcome Variable: Stages of Adoption for Mammography

The stage of adoption for mammography was our primary dependent variable. To measure the stage of adoption, women were asked if they have ever had a mammogram. Those who indicated they have had a mammogram were asked for the month and year of their most recent mammogram and the year of the mammogram before their most recent one. In this study, we used a 15-month window after the last mammogram as a cutoff point to define recent screening (Legler et al., 2002). Women are often required to wait 12 months after a mammogram to make their next appointment, and a wait of several weeks for an available appointment is not unusual. Thus, we allowed 3 extra months to compensate for a delay. In addition, women were asked if they planned to have a mammogram in the next 12 months. Accordingly, our mammography adoption stage definitions were as follows:

- precontemplation: never had a mammogram; did not plan to have one in the next 12 months
- relapse: had one or more mammograms in the past; did not plan to have one in the next 12 months
- contemplation: had no mammogram in the 15 months prior to the interview; planned to have one in the next 12 months
- action: had a mammogram within the past 15 months but not during the 2 years before that; planned to have one in the next 12 months
- maintenance: had a mammogram within the past 15 months and a mammogram within the 2 years before that; planned to have one in the next 12 months

Statistical Methods

Our selection of the independent variables was guided by prior research about the factors influencing ethnic women's decision to undergo mammography (Otero-Sabogal et al., 1999; Otero-Sabogal et al., 2003; Suarez, Roche, Nichols, & Simpson, 1997). Differences in sociodemographic characteristics and screening rates among race/ethnic groups were assessed using the chi-square test for categorical variables (marital status, income, years in the United States, language of interview, insurance status, regular doctor, and mammography stage) and an ANOVA for continuous variables (age, years of education, and decisional balance; see Table 1).

We compared the proportion of respondents who agreed with each decisional balance item by race/ethnicity using chi-square tests (see Table 2). The relationship between the decisional balance and mammography stage was assessed by using polytomous logistic regression with generalized logits (Stokes & Davis, 1995) to obtain adjusted odds ratios (ORs) and 95% confidence intervals (CIs). In addition to the main effect of decisional balance, an interaction between race/ethnicity and decisional balance was included to model the specific race/ethnic effects of decisional balance on the stage of adoption (precontemplation, relapse, contemplation, and action vs. maintenance) controlling for the other covariates listed above (see Table 3). ORs were computed per 15 units (1 *SD*) of decisional balance; a chi-square test was used to test the interaction between race/ethnicity and the decisional balance. Observations with missing data for a particular variable were excluded from the relevant analyses, because the proportion missing was sufficiently low and did not threaten to bias our survey results. As described in the Method section, "don't know" and "refused" responses to the pro and con items were coded to the midpoint (2.5) for decisional balance calculations. In the analysis of agreement with pro and con items, "don't know" and "refused" responses were grouped with "disagree" responses so that there are no missing values for Table 2.

RESULTS

Response Rate

At the end of recruitment, an ethnically diverse sample of 1,463 women (497 African American, 199 Chinese, 167 Filipina, 300 Latina, and 300 White) 40 to 74 years of age was enrolled and interviewed. A total of 46,206 telephone numbers were called, of which 32,521 (70%) were household numbers. Among households, 15,264 (47%) were screened for eligibility, of which 2,963 (19%) contained an eligible participant. Among eligible participants, 1,840 (62%) consented to participate in the study. Of those who agreed to participate, 1,463 (80%) were recontacted and interviewed. Reasons for ineligibility included not being a member of a study ethnic/racial group (20%), not speaking any of the study languages (10%), no woman aged 40

to 74 in the household (66%), having a history of cancer (2%), and residing or planning to move out of the area (1%).

Sample Characteristics

Among the 1,463 women enrolled in the survey, a total of 1,016 women were interviewed in English, 220 in Spanish, 171 in Chinese, and 56 in Tagalog. As shown in Table 1, a substantial proportion of women had no health insurance (17%), no regular doctor (21%), a household income below $20,000 (36%), or 10 or fewer years of residence in the United States (12%). There were significant race/ethnic differences in the distribution of sociodemographic characteristics: Latinas were least likely to have health insurance or a regular doctor and had the lowest mean years of education; Chinese women were least likely to have lived in the United States more than 10 years or to be interviewed in English; and Filipinas and White women had higher income levels and were more likely to have private insurance than African Americans, Chinese, and Latinas.

Decisional Balance and Stages of Mammography Screening

Although most women (87%) reported having had at least one mammogram, fewer than half (42%) were in the maintenance stage. There were significant race/ethnic differences in the stage of adoption. White and African American women were most likely to be in maintenance, and Chinese women were most likely to be in precontemplation or relapse. There were also substantial race/ethnic differences in the decisional balance. Latinas had the lowest mean scores, and Filipinas had the highest mean scores.

Race/ethnic differences were found in agreement with con items (Table 2). In general, Latinas showed relatively high levels of agreement with most cons (e.g., “being to busy,” “concerned about x-rays,” “never thought about it,” “someone you know had a bad experience,” “you worry that you will not be able to pay for treatment”) compared with African Americans and Filipinas. White women reported a higher level of agreement only for one con item: “do not like to have mammograms.” In addition, White and African American women reported the lowest level of agreement with “being too busy to get a mammogram.” Chinese women tended to show higher levels of agreement with all pros than women in other racial/ethnic groups (Table 2). White women agreed less often than the other groups with the attitudinal pros but agreed more often than African Americans, Filipinas, and Latinas with the pros that were knowledge-oriented (“having a mammogram every 1 to 2 years decreases a woman’s chance of dying from breast cancer”). African Americans reported the lowest level of agreement with that knowledge statement. Agreement with “you would have a mammogram if your doctor told you that it is important” and “a woman should get a mammogram even if no one in her family has had breast cancer” was high in all ethnic groups.

A multivariate model (Table 3) showed that younger women were more likely than older women to be in precontemplation (OR = 0.90 per year of age), relapse (OR = 0.96), contemplation (OR = 0.94), or action (OR = 0.93) rather than maintenance. Compared to White women, Filipinas were more likely to be in relapse (OR = 2.51) or contemplation (OR = 2.35), and Chinese women were much more likely to be in precontemplation (OR = 6.88) or relapse (OR = 5.93). Women who had lived 10 or fewer years in the United States were more likely than longer term residents to be in precontemplation (OR = 4.15) or action (OR = 2.66). Participants without a regular doctor were more likely to be in precontemplation (OR = 3.93), relapse (OR = 1.89), or contemplation (OR = 1.72); those with private insurance were less likely than the uninsured to be in precontemplation (OR = 0.35) or contemplation (OR = 0.43). There was a significant association between the decisional balance and mammography stage in all race/ethnic groups, and a higher decisional balance was associated with a higher mammography stage. On average, for each additional standard deviation of decisional balance,

women were less likely to be in precontemplation (OR = 0.21, 95% CI = 0.15, 0.30), relapse (OR = 0.36, 95% CI = 0.28, 0.45), contemplation (OR = 0.54, 95% CI = 0.44, 0.67), or (marginally) action (OR = 0.71, 95% CI = 0.49, 1.02) rather than maintenance. Overall, there was no significant racial/ethnic difference in the effect of a decisional balance on screening, $\chi^2(df = 16) = 18.75$, $p = .28$.

DISCUSSION

The main contribution of our study is the demonstration that the decisional balance was associated with mammography screening behavior among women of different cultures and languages in accordance with the TTM. Among Latino, Chinese, Filipino, African American, and White women, the odds of mammography maintenance increased with higher levels of decisional balance. This result provides support for the cross-cultural application of the decisional balance measure to mammography screening—an important finding because the development of the TTM mammography measures occurred predominately among White women (Chamot et al., 2001; Lauver, Henriques, Settersten, & Bumann, 2003; Rakowski et al., 1992).

This study also examined stages of mammography adoption, positive and negative attitudes toward screening (pros, cons, and decisional balance), and key sociodemographic characteristics. We found that when controlling for sociodemographic characteristics and access to medical care, women from all ethnic groups who were in maintenance viewed mammography more favorably than women who were in precontemplation. Access to medical care and socioeconomic factors were also correlated with women's stage of readiness for mammography adoption as reported by other studies (Levy-Storms, Bastani, & Reuben, 2004; Otero-Sabogal et al., 2003). Women who were younger, did not have insurance or a regular doctor, had lived in the United States for less than 10 years, and perceived more barriers relative to benefits of mammography were more likely to be in precontemplation. As expected, recent immigrants were more likely to be new to mammography (action) or unfamiliar with mammography (precontemplation). Those women with private insurance were less likely to be in contemplation or precontemplation but were as likely to be in relapse as women with no insurance. Our logistic regression results indicate that the association between insurance status and relapse can be explained largely by other factors. In particular, compared to women with a regular doctor, those without one were more likely to be in relapse and less likely to have private insurance. This suggests that the intention to maintain screening is fostered not by having insurance per se but by having an ongoing relationship with a health care provider.

Other important variables, such as knowledge, attitudinal, behavioral, and contextual factors, may influence a woman's decision to get annual mammograms. As reported by our Pathfinders colleagues (Somkin et al., 2003), women who reported that there were too many forms to fill out and those who felt embarrassed at the last mammogram were less likely (ORs = 0.51 and 0.59, respectively) to receive mammograms regularly. Thus, although cost and lack of insurance are repeatedly cited as primary deterrents to regular use of breast cancer screening, simply having insurance is not enough to eliminate barriers to the regular use of mammography screening. In addition to cost and lack of insurance, individual, attitudinal, clinician, and health care system factors may further explain regular participation in mammography screening among low-income women (Otero-Sabogal et al., 2004). Continuity of medical care was strongly associated with stages of mammography.

Chinese women were least likely to have lived in the United States 10 years or more, but even so, they were disproportionately likely to be in precontemplation and relapse. Latinas were least likely to have a regular doctor, and they also reported agreement with more barriers to mammography than women from the other ethnic groups. This finding indicates that the factors

included in our model did not explain the overrepresentation of Chinese women in the precontemplation and relapse stages. In our sample, Chinese women were much less likely than women in other ethnic groups to report an intention to get a mammogram in the next year regardless of their screening history. Perhaps this is due in part to differences in the degree of commitment implied by a "yes" answer to, "Do you plan to have a mammogram in the next 12 months?" Low perceived need, lack of physician recommendation, and attitudes related to modesty and sexuality may also account for Chinese women's reluctance to be screened (Tang, Solomon, & McCracken, 2000). We also found ethnic differences in women's agreement with the decisional balance statements assessing pros and cons. White and African American women who participated in regular mammography screening were significantly more likely to perceive greater benefits and fewer barriers to screening than women who did not get screened regularly (Champion & Menon, 1997; Holm, Frank, & Curtin, 1999).

Overall, Latinas agreed with a greater number of cons and had a lower decisional balance in maintenance than women in other ethnic groups when controlling for insurance and other demographic factors. This result is consistent with previous findings indicating that Latino ethnicity was a strong predictor of mammography underuse (Calle, Flanders, Thun, & Martin, 1993). It is important to further explore whether Latinas' lower decisional balance compared with the other ethnic groups can be explained by a tendency to agree with statements measuring perceived cons rather than truly negative attitudes toward mammography. As reported in other studies, a high proportion of African American women reported a dislike of mammography (Andrews, 2001; Champion & Menon, 1997;Keemers-Gels et al., 2000). Fear of radiation, limited knowledge, (Miller&Champion, 1997), and past experiences (Champion & Menon, 1997) may explain this result. Chinese women reported a high number of pros as well as cons. Low education, low perceived need, lack of physician recommendation, and attitudes related to modesty and sexuality may account for Chinese women's reluctance to be screened (Tang et al., 2000). Filipino women agreed with a high number of pros and a low number of cons. Given that they also reported having insurance, being bilingual, and having a regular physician, the proportion of Filipino women in mammography maintenance was lower than expected. Modesty, traditional health beliefs, and gender roles may explain these results (McBride et al., 1998).

Members of the Pathfinders research team have investigated this issue (McPhee et al., 2002). Following our baseline telephone survey regarding receipt of mammogram, computerized and written medical records were examined in a subsample of 846 women to validate dates and locations of tests. Overall, the validation rate for mammogram self-report was 75.4%. Validation rates differed significantly by ethnicity for mammograms with African American, Chinese, and Filipino ethnicity associated with lower odds of validation compared to White ethnicity. These findings suggest that studies such as ours and other estimates of mammography screening may need to be adjusted downward. Additional validations should be conducted to confirm this result and ascertain the degree of correction needed.

There is still potential to improve our Decisional Balance Scale by identifying additional pros and cons to cover the full range of attitudes toward mammography across ethnically diverse groups. Understanding sociodemographic, cultural, attitudinal, behavioral, and contextual factors associated with breast cancer screening among women of different ethnic/racial backgrounds and developing adequate measures for those factors requires group-specific ethnographic studies using qualitative methods (focus groups, observations, and unstructured interviews).

This study had limitations. First, our results are based on a cross-sectional baseline survey of a longitudinal study and thus do not allow causal attributions to be made. Subsequent analyses from this study may illuminate the causal relationship between the decisional balance and

screening stage. Also, although self-report is the usual method for eliciting screening behavior among women, because the cost of obtaining medical record data is substantial, self-reported rates for mammography among racial and ethnic groups may overestimate its use, and this issue has been investigated by members of the Pathfinders research team (McPhee et al., 2002). Finally, our sample was selected from one urban county with a large multiethnic population, and we only selected women who could be contacted a second time. Thus, results may not be applicable to women who live in communities with different access to mammography screening services or even the broader population of women in Alameda County.

IMPLICATIONS FOR PRACTICE

Our findings have significant implications for the promotion of cancer detection efforts among multiethnic populations. They suggest that, in addition to access to health care, attitudes toward screening matter. Efforts to improve mammography screening among ethnically diverse communities can and should address perceived barriers and facilitators that are associated with the stage of mammography adoption (Legler et al., 2002).

Future studies need to explore additional pros and cons toward mammography across ethnic groups as well as the validity of additional constructs of the TTM and other behavioral theories in explaining screening behaviors among ethnic/racial groups. Furthermore, a better understanding of the cultural context for positive and negative perceptions in relation to stages of adoption will be needed to develop the most effective screening promotion strategies and messages. Even as we continue to explore and gain understanding of the role and meaning of culture in cancer screening behavior and communication, the TTM offers a sound framework for tailoring intervention messages across very diverse cultural and socioeconomic groups. Our results suggest that individual tailoring to a woman's stage of adoption must be performed in the appropriate cultural context. Pros and cons to screening not only differ by individual but may have different meanings and values across cultures. In addition, attitudes to health and health care providers may vary across ethnic and socioeconomic groups. These cultural variations need to be taken into account when providers attempt to move a woman from one screening stage to another.

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Table 1

Distribution of Demographic Covariates and Screening by Ethnicity

Variable	African American (*n* = 497) %	Chinese (*n* = 199) %	Filipina (*n* = 167) %	Latina (*n* = 300) %	White (*n* = 300) %	Total (*N* = 1,463) *n*	Total (*N* = 1,463) %
Age in years, *M* (*SD*)	52.1 (9.0)	52.3 (9.2)	54.8 (9.4)	50.7 (8.5)	52.6 (8.4)	1,462	52.3 (8.9)
Education in years, *M* (*SD*)	13.6 (2.4)	10.6 (4.4)	14.2 (3.1)	8.7 (4.5)	16.5 (2.9)	1,449	12.9 (4.3)
Marital status							
Married	32.2	85.4	73.1	65.7	54.3	812	55.5
Not married	67.8	14.6	26.9	34.3	45.7	651	44.5
Income							
< $20,000	43.6	46.0	16.0	48.6	17.4	496	36.0
$20,000–$50,000	35.6	38.1	28.8	40.5	31.2	483	35.1
> $50,000	20.9	15.9	55.1	10.9	51.3	397	28.9
Years in United States							
≤ 10 years	0.2	32.2	20.4	23.3	0.7	171	11.7
> 10 years	99.8	67.8	79.6	76.7	99.3	1,292	88.3
Language of interview							
Not English	0.0	85.9	33.5	73.3	0.0	447	30.6
English	100.0	14.1	66.5	26.7	100.0	1,016	69.5
Insurance							
Private	61.4	52.3	83.2	48.3	87.3	955	65.3
Public	24.9	23.6	10.8	16.0	5.7	254	17.4
None	13.7	24.1	6.0	35.7	7.0	254	17.4
Regular doctor							
Do not have one	19.1	17.1	15.0	35.3	14.3	303	20.7
Have one	80.9	82.9	85.0	64.7	85.7	1,160	79.3
Decisional balance, *M* (*SD*)	1.4 (15.0)	0.1 (13.1)	4.3 (14.2)	−5.3 (14.5)	0.5 (15.3)	1,463	0.0 (14.9)
Mammography stage[a]							
Precontemplation	3.2	16.6	2.4	3.7	5.7	81	5.5
Relapse	10.1	31.2	16.8	9.3	14.0	210	14.4

Variable	African American (*n* = 497) %	Chinese (*n* = 199) %	Filipina (*n* = 167) %	Latina (*n* = 300) %	White (*n* = 300) %	Total (*N* = 1,463) *n*	Total (*N* = 1,463) %
Contemplation	34.0	22.6	31.7	34.0	24.7	443	30.3
Action	5.8	4.0	10.2	15.3	5.3	116	7.9
Maintenance	46.9	25.6	38.9	37.7	50.3	613	41.9

NOTE: Age: 1 missing; income: 87 missing; education: 14 missing. All variables differ across race/ethnicity at $p < .001$ except years in the United States ($p = .021$). Language of interview and years in the United States tested among Chinese, Filipina, and Latina women only.

[a]Precontemplation: never had a mammogram, does not plan to get one in next 12 months; relapse: had one or more mammograms in past, does not plan to get one in next 12 months; contemplation: no mammogram within 15 months, plans to get one in next 12 months; action: most recent mammogram within 15 months, none within 2 years of most recent, plans to get one in next 12 months; maintenance: most recent mammogram within 15 months, another within 2 years of most recent, plans to get one in next 12 months.

Table 2

Percentage Agreeing With Decisional Balance Scale Items (Somewhat or Strongly Agree) by Ethnicity

Variable	African American (*n* = 497) %	Chinese (*n* = 199) %	Filipina (*n* = 167) %	Latina (*n* = 300) %	White (*n* = 300) %	Total (*N* = 1,463) *n*	Total (*N* = 1,463) %
Mammography Cons Scale							
You are too busy to have a mammogram	9.1	28.1	24.0	30.7	9.7	262	17.9
You will only get a mammogram if you have a breast problem[a]	10.3	28.1	9.0	25.0	7.0	218	14.9
You are concerned that mammogram x-rays may be risky or dangerous	27.0	30.2	22.2	46.7	33.0	470	32.1
Mammograms cost too much for you	16.5	22.6	15.0	36.7	8.0	286	19.5
You do not like to have mammograms	42.3	27.6	15.6	44.7	56.7	595	40.7
You just never thought of getting a mammogram	18.7	24.6	18.0	35.7	5.0	294	20.1
Someone you know had a bad experience getting a mammogram	28.6	22.1	27.5	40.7	29.0	441	30.1
You do not want a mammogram because you are afraid to find out if you have cancer	12.9	17.1	8.4	26.0	7.7	213	14.6
You worry that you would not be able to pay for treatment if you got breast cancer	42.3	58.3	33.5	73.0	25.7	678	46.3
Mammography Pros Scale							
You would have a mammogram if your doctor told you that it is important	97.8	98.0	96.4	98.0	96.0	1,424	97.3
Having a mammogram every year will give you a feeling of control over your health[a]	87.9	95.0	89.8	91.7	78.3	1,286	87.9
It will be good for your family if you have a mammogram	89.7	97.5	95.2	93.0	86.0	1,336	91.3
Yearly mammograms give you peace of mind[a]	91.3	98.5	93.4	95.0	83.7	1,342	91.7
A woman should get a mammogram even if no one in her family has had breast cancer[a]	97.0	96.5	97.0	94.0	95.0	1,403	95.9
Having a mammogram every 1 to 2 years decreases a woman's chance of dying from breast cancer	75.7	92.0	83.2	83.7	91.3	1,223	83.6

NOTE: All variables differ across race/ethnicity at $p < .001$ except "you would have a mammogram if your doctor told you that it is important" ($p = .43$) and "a woman should get a mammogram even if no one in her family has had breast cancer" ($p = .24$).

[a] Statements similar to Rakowski's (1992) Pros and Cons Scale. Statement wording was written in simpler language.

Table 3

Logistic Regression Models of Mammography Stage Versus Maintenance (n = 1,368)

	Precontemplation OR (95% CI)	Relapse OR (95% CI)	Contemplation OR (95% CI)	Action OR (95% CI)
Race/ethnicity				
African American	0.53 (0.17, 1.66)	0.58 (0.32, 1.04)	1.02 (0.68, 1.55)	0.90 (0.42, 1.94)
Chinese	6.88 (1.61, 29.4)	5.93 (2.63, 13.4)	1.78 (0.86, 3.68)	0.62 (0.17, 2.30)
Filipina	1.17 (0.22, 6.17)	2.51 (1.19, 5.27)	2.35 (1.27, 4.36)	2.41 (0.92, 6.34)
Latina	0.32 (0.07, 1.55)	0.61 (0.28, 1.33)	0.86 (0.48, 1.53)	1.13 (0.43, 2.96)
White	1.00	1.00	1.00	1.00
Age[a]	0.90 (0.86, 0.94)	0.96 (0.94, 0.98)	0.94 (0.93, 0.96)	0.93 (0.90, 0.96)
Education[a]	0.97 (0.88, 1.07)	0.94 (0.88, 1.00)	0.97 (0.93, 1.02)	0.96 (0.89, 1.04)
Marital status				
Married	0.69 (0.34, 1.39)	0.93 (0.60, 1.43)	0.98 (0.71, 1.36)	0.93 (0.55, 1.57)
Unmarried	1.00	1.00	1.00	1.00
Income				
< $20,000	1.08 (0.37, 3.10)	1.17 (0.63, 2.19)	1.03 (0.64, 1.66)	0.73 (0.34, 1.57)
$20,000–$50,000	1.35 (0.54, 3.34)	1.29 (0.78, 2.14)	1.30 (0.89, 1.89)	0.59 (0.31, 1.12)
> $50,000	1.00	1.00	1.00	1.00
Years in the United States				
≤ 10	4.15 (1.65, 10.4)	1.51 (0.73, 3.12)	1.82 (1.00, 3.33)	2.66 (1.23, 5.75)
> 10	1.00	1.00	1.00	1.00
Language of interview				
Non-English	0.69 (0.19, 2.59)	0.53 (0.25, 1.09)	0.70 (0.40, 1.22)	1.51 (0.66, 3.48)
English	1.00	1.00	1.00	1.00
Insurance				
Private	0.35 (0.15, 0.80)	0.86 (0.46, 1.60)	0.43 (0.27, 0.69)	0.64 (0.31, 1.36)
Public	0.79 (0.32, 1.93)	0.93 (0.46, 1.87)	0.78 (0.47, 1.30)	1.37 (0.64, 2.96)
None	1.00	1.00	1.00	1.00
Regular doctor				
No	3.93 (2.05, 7.54)	1.89 (1.16, 3.10)	1.72 (1.18, 2.51)	1.56 (0.89, 2.74)
Yes	1.00	1.00	1.00	1.00
Decisional balance[b]				
African American	0.27 (0.18, 0.42)	0.39 (0.28, 0.54)	0.64 (0.49, 0.83)	0.91 (0.55, 1.52)
Chinese	0.14 (0.06, 0.32)	0.36 (0.19, 0.69)	0.44 (0.23, 0.85)	0.68 (0.20, 2.35)
Filipina	0.18 (0.06, 0.59)	0.21 (0.10, 0.41)	0.38 (0.21, 0.71)	0.46 (0.20, 1.07)
Latina	0.34 (0.18, 0.66)	0.72 (0.45, 1.14)	0.76 (0.55, 1.06)	0.74 (0.48, 1.14)
White	0.18 (0.10, 0.32)	0.28 (0.18, 0.42)	0.57 (0.39, 0.83)	0.85 (0.42, 1.72)

NOTE: OR = odds ratio, adjusted for all variables tabulated; CI = confidence interval.

[a] Per year.

[b] Per 15 units (1 *SD*).