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Study objectives were to describe the barriers to primary and secondary prevention of breast cancer in African American women, to develop tools to measure these barriers, and to describe prevalence in a community sample. This final report describes all four phases of our research.

After a comprehensive review of the literature, we developed a structured interview, interviewed 155 African American women, and developed a systematic and detailed coding system to successfully describe the barriers to reducing fat intake, increasing consumption of fruits and vegetables, doing breast self-examination, and getting a mammogram. These results were used to develop 4 questionnaires that were demonstrated to be reliable and valid in a sample of 117 African American women. The questionnaires were then used to survey the occurrence of the barriers to behavior change in a community sample of older white and black women in Nashville, TN. While many women in the community described themselves as already compliant with cancer prevention guidelines, a substantial subgroup reported varying degrees of difficulty with both psychological and environmental barriers to behavior changes. Few differences were found between African American and Caucasian women with members of each ethnic group falling into the five stages of change.

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Margaret K Hargreaves 10/26/99

PI – Signature Date

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INTRODUCTION

PRIMARY AND SECONDARY PREVENTION OF BREAST CANCER

Breast cancer is a major source of morbidity and mortality in women. Black women, impoverished women, and older women are at higher risk of dying from breast cancer than white, upper income, younger women.[1-7] Elderly and disadvantaged women have been hard to reach [8], and the decrease in their survival is considered due mainly to late stage diagnosis [9-11].

Morbidity and mortality in poor and minority women may be reduced by lowering primary risk factors for breast cancer, as well as by encouraging early detection, diagnosis, and treatment. Specifically, reducing fat intake and increasing fruits and vegetables have been advocated as promising approaches to the primary prevention of breast cancer. Breast self-examination and mammography are well-accepted methods for the secondary prevention of breast cancer. It is apparent that lifestyle changes are required for breast cancer prevention.

But lack of adherence to clinical and preventive regimes has been a continuing problem in medicine and public health [12-13]. Adherence, defined as the extent to which an individual's behavior meets the goals of a treatment or prevention plan, has been the subject of extensive behavioral science research [14--15]. As a result, a number of theoretical models have been developed and evaluated in an effort to understand and encourage adherence to health regimes [12-24]. The Transtheoretical or stage-of-change model is a promising approach to understanding health behavior change, and has been used in some experiments described in this report.

The concept of barriers or obstacles to adherence, conditions that impede or block an individual's efforts to follow a treatment plan, is included in most theoretical models [15, 22]. Empirical studies have investigated barriers to adherence using a variety of methods [25-31]. However, there has been little systematic effort to develop and validate a general methodology for identifying, describing, assessing, and overcoming barriers to adherence.

PURPOSE

We will systematically identify, describe, and classify obstacles that prevent African American women from making lifestyle changes that could result in breast cancer prevention.

PROJECT DESIGN

This project was guided by a systematic methodology for overcoming adherence obstacles proposed by Schlundt and colleagues [32-40]. The work was conducted in four phases. Phase I used semi-structured interviews with 155 African American women to identify and systematically describe barriers to breast cancer prevention. Phase II involved the development of a measurement tool - the Obstacles to Breast Cancer Prevention Questionnaire - and an evaluation of its psychometric properties using African American women. Phase III used telephone interviews with randomly selected women from the Nashville community to describe the prevalence of barriers to breast cancer prevention by race, SES, and stage of health behavior change. In Phase IV, cluster analysis was used to identify patterns of individual differences in obstacles to cancer prevention. These Phases are described in the report that follows.

BODY OF THE REPORT

TECHNICAL OBJECTIVES

Technical objectives were:

1. To identify and describe the barriers to changing the following behaviors for African American women (Phase I):
    1. Reducing dietary fat intake;
    2. Increasing consumption of fruits and vegetables;
    3. Doing breast-self-examinations; and
    4. Getting screened for breast cancer by mammogram.
2. To develop a quantitative assessment tool to measure the presence of barriers to making primary and secondary prevention behavior changes in a particular individual (Phase II);
3. To use this tool to establish preliminary norms in an urban, southern, African American community (Phase III); and
4. To investigate individual differences in obstacles to behavior change, and differences between low and middle income black and white women (Phase IV).

These four phases formed the basis of our Statement of Work, and are they described in detail below.

PHASE 1: IDENTIFICATION OF BARRIERS TO CANCER PREVENTION

Methods

Subjects . Participants were adult African American women recruited from the employee population of Meharry Medical College, Fisk University, Tennessee State University, and through contacts with churches and community organizations. A total of 155 women participated in the study, and each was given $5.00 for her participation. The mean age was 42.3 ± 11.9 years; average body mass index was 30.8 ± 7.7. The sample was fairly well educated with 5% not finishing high school, 21% high school graduates, 41% having taken some college, 28% college graduates, and 5% having attended graduate or professional school. Incomes were modest, with 39.9% making $10,000-$19,999 per year, 37.3% making $20,000-$29,999 per year, 15.7% making $30,000-$39,999 per year, and only 7.2% reporting incomes greater than $40,000 per year.

Barriers Instrument. The literature on obstacles to primary prevention (dietary adherence) and secondary prevention (screening) of breast cancer was reviewed in order to generate interview questions. A semi-structured interview was developed to gather information on: 1) obstacles to reducing dietary fat intake, 2) obstacles to increasing intake of fruits and vegetables, 3) obstacles to doing monthly breast self-examination, and 4) obstacles to getting mammograms. Participants were asked to describe the barriers that made it difficult to make and/or maintain these behaviors.

Following the open ended questions about barriers, specific questions prompted the participants to consider problem areas that were derived from the literature review for each prevention behavior. Problem areas included : lack of family support, difficulty changing, financial concerns/costs, habits and family traditions, taste and preference for specific foods, distrust of medical information, time and effort involved, not liking to make changes, being

under too much stress, job or place of work, being too busy, health concerns, the way foods make one feel, uncertainty about doing the behavior, eating away from home or at restaurants, lack of knowledge, or attitude towards specific foods. At the end of the section, the participant was asked if she could think of any other things that might make changing more difficult. The specific prompts were slightly different depending upon the behavior. A copy of each questionnaire was appended to the first Progress Report (1997 [41])

Coding System . A coding system was developed in order to describe the reasons the participants gave for not wanting to change, or for finding it difficult to make changes. The unit of analysis was the explanation. A response to any particular interview question was first partitioned into explanations. The coding system was developed to allow each explanation to be placed into a single category.

The coding system first divided explanations into two categories: psychological and environmental. Each category was then divided into subcategories that were further divided until the final set of hierarchical codes was derived. The codes were first gleaned from the literature reviews. The initial coding system was then used to code 5 sample interviews. This led to the development of several additional categories and a refinement of the coding system. A manual was written describing the coding process and defining each coding category. The complete coding manual is in Appendix A.

Training of Coders . Three coders were trained for this study. They first read the manual and then their questions were discussed. A sample of five interviews for each behavior was used for training and practice purposes. The coders rated each interview independently and then results were compared. This process was used to establish a common understanding and agreement on the meaning of the different coding categories.

Coding strategy . Each coder was assigned randomly to be the primary coder of 1/3 of the interviews. An additional sample of 1/2 of the interviews was selected to be coded twice for a reliability assessment. The coders were not aware of which interviews were primary or which were reliability checks.

Results

Type and Number of Barriers . A total of 1,386 descriptions of obstacles to reducing fat intake was obtained from the interviews with the 155 women (546 psychological, and 825 environmental). From the fruits and vegetables interviews were obtained 759 descriptions of obstacles (323 psychological, and 426 environmental). The breast self-examination interviews resulted in 386 descriptions of obstacles (307 psychological, and 79 environmental) and the mammography interview resulted in 265 descriptions (154 psychological, 111 environmental). Because women under 40 did not always answer the mammography questions, the number of subjects completing that interview was 104.

Table 1 presents the obstacles mentioned more than 10 times sorted from most frequently mentioned to least frequently mentioned for the primary prevention behaviors. Table 2 presents the obstacles mentioned more than 5 times sorted from most frequently mentioned to least frequently mention for the secondary prevention behaviors.

Coding Reliability . The reliability of coding was excellent with correlations between the primary and secondary coders mostly in the 0.80-1.0 range with only one correlation in the .40's and one in the .60's. Table 3 presents the mean number of times each explanation was given along with the coding reliability coefficients for dietary fat and fruits and vegetables. Table 4 presents the mean number of times each explanation was given along with the coding reliability coefficients for breast self-examination and mammography.

Barriers by Demographic Characteristics . Table 5 presents the correlations between demographic variables (age, education, income, and body mass index (BMI)) and the total number of obstacles, the number of psychological obstacles, and the number of environmental obstacles. For reducing dietary fat, the total number of obstacles and the number of psychological obstacles mentioned were negatively correlated with age - younger women tended to describe more psychological obstacles to reducing fat intake. For this behavior as well, education was positively associated with the total number of obstacles and with the number of psychological obstacles - better educated women mentioned more of these obstacles. For fruits and vegetables, the only significant correlation was between environmental obstacles and body mass index (wt/ht^2); women who were more overweight reported a greater number of environmental barriers. For breast self-examination, there were negative correlations between income and the total number of obstacles and the number of psychological obstacles - women with higher incomes reported fewer barriers to breast self-examination. Finally, there were no significant correlations between the number of barriers to mammography and the demographic variables.

PHASE II: DEVELOPMENT OF MEASUREMENT SCALES

Methods

Item Pool Development . As indicated above, the coded interviews were used to create a list of obstacles to low-fat eating and increased consumption of fruits and vegetables. The obstacles were sorted from most frequently mentioned to least frequently mentioned (see Tables 1 and 2). The most frequently mentioned obstacles were used to write questionnaire items. For example, the most frequently mentioned obstacle to reducing fat intake was not having enough time leading to the item, "Eating a low fat diet takes too much time". A five point rating scale (1 = strongly agree, 2=agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree) was used to obtain responses. Initially, there were 20 items written for the low-fat questionnaire, 14 items written for the fruits and vegetables questionnaire, 10 items written for breast self-examination, and 11 items written for mammography. Table 6 presents the categorical definition from the coding manual of the most frequent barriers to reducing dietary fat intake, the mean number of times each was mentioned by the subjects in phase I, and the percent of women who mentioned the obstacle. Table 6 also presents the questionnaire item that was written to correspond to each barrier. Tables 7, 8, and 9 present the same data for fruits and vegetables, breast self-examination, and mammography respectively.

Pilot Testing and Revision . The preliminary versions of all four questionnaires were administered to 40 African American women recruited from a variety of sources, including

faculty and staff of Meharry Medical College and residents of a local public housing project. Participants were given $5.00 for completing the questionnaires.

Psychometric Evaluation .

Subjects . Participants were 117 low income, African American women from a Nashville housing project who were participating in another research program. The mean age was 36.2 ± 12.0 years; the mean body mass index (BMI) was 31.4 ± 8.3. Four percent has less than an 8th grade education, 51% completed 9th-11th grades, 36% were high school graduates, 7% had some college, and 2% had graduated from college. The women were offered $10.00 for completing a packet of questionnaires.

Reliability . Reliability was assessed using the standard measure, coefficient alpha, which measures internal consistency of the scale, and by examining the corrected item-total correlation coefficients.

Validity .

Primary Prevention Barriers Validated against Dietary Intakes

A battery of dietary intake questionnaires was used for this validation exercise. This conforms to current dietary assessment theory, advocating comparability of at least two measures for evaluation purposes. The questionnaire battery included three measures, - the Meharry Food Frequency Questionnaire (MFFQ), Eating Behavior Patterns Questionnaire (EBPQ), and the Eating Styles Questionnaire (ESQ) - evaluated against the newly developed Obstacles to Low-Fat Eating Questionnaire (OLFEQ) and the Obstacles to Eating Fruits and Vegetables Questionnaire (OEFVQ). All three measures, EBPQ, ESQ, and MFFQ, were designed by our team for use with African Americans. The Meharry Food Frequency Questionnaire (MFFQ) consists of 131 food items divided into nine food groups (Meat, Milk, Vegetables, Fruits, Breads, Snacks and desserts, Condiments, Beverages, and Fast foods. The subject rates how often (from never to 3 or more times a day) she eats each of the foods. The questionnaire is computer scored to derive an estimate of usual daily intake of macronutrients, selected micronutrients, and fiber. The Eating Behavior Patterns Questionnaire (EBPQ) has seven reliable and valid subscales [42] that measure different style of patterns of food intake: 1) low-fat healthy eating (Low-fat), 2) frequent snacking and use of convenience foods (Snack), 3) eating in response to emotions (Emotion), 4) planning one's meals and food intake ahead of time (Planning), 5) skipping meals (Skip), and 6) African American cultural and lifestyle behaviors (Lifestyle/Ethnic). The Eating Styles Questionnaire (ESQ) is a 16-item questionnaire that assesses a person's commitment to eating a low-fat diet. It is reliable and can distinguish between women at different stages of behavior change.[43].

Secondary Prevention Barriers Validated Against Screening Practices

A health practices interview was independently administered to these women and a question on this interview about health screening and prevention practices was used to evaluate the validity of the obstacles to secondary prevention (breast self-examination, and mammography). The variables obtained from the health practices interview included blood pressure screening, cholesterol checks, yearly mammograms, monthly breast self-examination, skin cancer screening, and pap smears.

Results

Questionnaire Revision . Frequency distributions, means, standard deviations, and skewness of the items were used to reduce the number of items and to revise the rating scales. The items were reworded so that participants could make a difficulty rating. For example, "The time it takes to prepare low fat foods makes it... (extremely difficult, difficult, a little difficult, not a problem)". The revised low-fat questionnaire had 19 items, the revised fruits and vegetables questionnaire had 14 items, the revised breast self-examination had 9 items, and the revised obstacles to mammography questionnaire had 9 items. The questionnaires were appended to the Second Progress Report (1999 [44]).

Psychometric Evaluation .

DifficultyRatings for Prevention Behaviors . Table 10 presents the item means and standard deviations of the difficulty ratings, and the percent of subjects choosing each alternative for the obstacles to reducing dietary fat questionnaire. Tables 11, 12, and 13 present the same data for fruits and vegetables, breast self-examination, and mammography respectively. These data show that the women reported many more obstacles to changing dietary over screening behaviors. Across the set of obstacles for the low fat behavior, each one of them tended to be endorsed as at least a little difficult by 50%-80% of the women. On the other hand, the comparable figure for many of the obstacles to breast self-examination and mammography was 20-30%. The major exception to this was the item of "fear of finding cancer" as an obstacle to mammography where 68% reported at least some difficulty with this barrier.

Scale Reliability . The reliability of the scales was evaluated by looking at coefficient alpha, a measure of internal consistency, and by examining the corrected item-total correlation coefficients (Table 10). For reducing dietary fat, coefficient alpha was 0.91. All items tended to have moderate to large correlations with the total score suggesting that this questionnaire can be considered a good measure of a single construct – obstacles to reducing dietary fat intake. However, the level of item-total correlations (0.37 - 0.69) suggests that each item taps a slightly different aspect of barriers to dietary behavior change. Coefficient alpha for increasing fruits and vegetables was 0.90 with a similar pattern of item-total correlations (0.51 - 0.69) (Table 11). The coefficient alpha for breast self-examination was 0.92. The item-total correlations were higher for breast-self examination than for the other three behaviors (0.64 - 0.80) suggesting that women who faced one obstacle tended to report facing many other obstacles as well (Table 12). The coefficient alpha for obstacles to mammography was slightly lower at 0.83. Again most of the items were moderately correlated with the total score (0.47 - 0.64) with the exception of the cost of a mammogram (0.26)(Table 13). In general, these scales have good internal consistency and as such can be considered reliable measures of the obstacles to primary and secondary cancer prevention behaviors.

Validity of the Obstacles to Reducing Dietary Fat Questionnaire . Table 14 presents correlations between the Obstacles to Low-Fat Eating Questionnaire and macronutrient intake values estimated by the Meharry Food Frequency Questionnaire (MFFQ). Correlations are presented for the individual items and the total score with total kcal, grams of fat, grams of

protein, and grams of carbohydrate. In addition, a step-wise regression using the best combination of individual items to predict macronutrient values was conducted and the multiple correlation coefficient (R) is also presented in Table 14. For total kilocalories, five of the 19 items were significantly correlated (0.21-0.32). Eight of the 19 items had significant ($p < 0.05$) correlations with total fat intake, although the correlations tended to be very modest (0.21-0.32). Similarly, there were five items significantly correlated with protein (0.21-0.33) intake and three items significantly correlated with carbohydrate intake (0.21-0.26). The best set of items for predicting fat intake using step-wise regression had a multiple correlation of 0.38 which was statistically significant ($p < 0.001$). These data suggest that reporting more obstacles to reducing dietary fat is associated with greater levels of fat, protein, and calorie intake. It would not be reasonable to expect extremely high correlations since a number of factors influence fat and calorie intake besides perceived barriers to changing.

Table 15 presents correlations between the Obstacles to Low-Fat Eating Questionnaire items and micronutrient intake as measured by the Meharry Food Frequency Questionnaire. Correlations are presented for the individual items and the total score with vitamin A (IU), vitamin C (mg), vitamin E (mg), and fiber (grams). There were no significant correlations between the items and vitamins A and E. Fiber was negatively correlated with one item, "feeling deprived" (-0.20) as was vitamin C (-0.18). The best items for predicting fiber by step wise multiple regression were "feeling deprived" and "the high cost of low fat foods", with a multiple correlation coefficient of 0.32 which was statistically significant ($p<0.01$). The best item for predicting vitamin C was "feeling deprived" with a multiple correlation of 0.21 ($p<0.05$).

Table 16 presents correlations between the Obstacles to Low-Fat Eating Questionnaire and food group frequencies as measured by the Meharry Food Frequency Questionnaire. Correlations are presented for the individual items and the total score with grains, fast foods, dairy, fruit, vegetables, meat, and snacks/desserts. Grains were significantly negatively correlated with 1 item, "the time it takes to prepare" (-0.22); snacks were significantly positively correlated with "the high cost of low fat foods" (-.0.17); dairy was significantly negatively correlated with "cravings for high fat foods" (-0.18); and fruit was significantly negatively correlated with "not being able to purchase low fat foods at work" (-0.26). All food groupings had significant predictors among the obstacle items. For grains, significant predictors were preparation time and emotional eating with a multiple correlation coefficient of 0.32 ($p<0.01$). For fast food, the only significant predictor ($p<0.05$) was "the high cost of low fat foods" with a multiple correlation of 0.19. For dairy foods, significant predictors were cravings and eating a lot of fast foods with a multiple correlation of 0.36 ($p<0.01$). For fruit, the only significant predictor was the unavailability of low fat foods at work having a multiple correlation of 0.24 ($p<0.05$). For vegetables, significant predictors were buying many special foods and taste of high fat food with a multiple correlation of 0.35 ($p<0.01$). For meat, significant predictors were busy work schedule, changing the way one eats, and cravings for high fat foods yielding a multiple correlation of 0.48 ($p<0.001$). For snacks/desserts, significant predictors were the high cost of low fat foods, and keeping the family happy with food with a multiple correlation of 0.31 ($p<0.01$).

Table 17 shows the correlations between the Obstacles to Low-Fat Eating Questionnaire and the six subscales of the Eating Behavior Patterns Questionnaire (EBPQ) as well as the total score on the Eating Styles Questionnaire (ESQ). The low fat subscale of the

EBPQ measures the degree of behavioral commitment to following a low-fat diet. Five of the individual items (not liking to change, family influence, will power, busy work schedule, and keeping the family happy) and the total score were significantly negatively correlated (-0.20 - -0.35) with the low-fat subscale. In the step-wise multiple regression, six items (willpower, family habit, emotional eating, changing, busy work schedule, and no foods at work) had a multiple correlation of 0.51 with the low-fat subscale. A variety of obstacles made an independent contribution to predicting the degree to which these women reported a behavioral commitment to low-fat eating. The snacking and convenience food subscale of the EBPQ measures a variety of snacking behaviors and the use of convenience foods that would be expected to increase fat intake. Twelve of the barriers were significantly and positively correlated with the snacking and convenience food subscale (0.21-0.40) showing that having more obstacles to low fat-eating was associated with a greater intake of snack and convenience foods. In the stepwise multiple regression, five items (emotional eating, willpower, time to prepare, cravings, and busy work schedule) had a multiple correlation of 0.54.

The emotional eating subscale of the EBPQ measures the extent to which a person uses food as a way to cope with stress and other emotional difficulties. Five of the items and the total score were significantly positively correlated (0.19-0.46) with emotional eating. Having more barriers to low-fat eating was associated with a greater tendency to engage in emotional eating. Using step-wise multiple regression, three items (emotional eating, restaurants and fast food places, and fast foods) had a multiple correlation of 0.53 with the emotional eating scale.

The impulsive/planning scale of the EBPQ is a continuum in which low-scores represent people who carefully plan their food intake and high scores represent people who are haphazard and impulsive in their food choices. Four of the obstacles were significantly and positively correlated (0.19-0.23) with the impulsive/planning scale. In the step-wise multiple regression, only one item was included in the model (not knowing what to avoid) which has a multiple correlation of 0.22.

The meal skipping scale measures a tendency to skip meals or to substitute snacks for meals. None of the items were significantly correlated with this scale and the step-wise regression did not result in a statistically significant model.

The ethnic/lifestyle subscale includes behaviors that reflect African American cultural practices. There were 7 items that were significantly correlated (0.19-0.37) with the ethnic/lifestyle subscale. In the step-wise multiple regression, six items (willpower, restaurants and fast food places, social functions, changing, taste, and family) had a multiple correlation of 0.55 with the ethnic/lifestyle subscale. The more problems a person experienced with some of the obstacles, the more their dietary behaviors conformed to African American cultural practices.

The Eating Style Questionnaire (ESQ) is a 16-item scale that samples dietary fat reducing behaviors. There were significant negative correlations between the ESQ and 6 of the barriers (0.21-31). A multiple correlation of 0.48 resulted from 4 items (willpower, changing, social functions, and family pressure). More barriers were associated with less fat reducing behaviors.

Table 18 presents the correlations between the obstacles to reducing dietary fat and the demographic variables age, education, activity level, and body mass index (BMI). Seven of the items were negatively correlated with age (-0.32 to -0.27) along with the total score. This

suggests that older women reported less difficulty with obstacles to reducing fat intake than younger women. A step wise multiple regression was conducted and the multiple correlation between age and two items (busy work schedule and willpower) was 0.33.

For education, none of the individual items or the total score was significantly correlated. The step wise multiple regression included two items (taste and feeling deprived) and had a multiple correlation of 0.30. For activity, one item (busy work schedule) was positively correlated with physical activity - women who thought their busy work schedule was an obstacle tended to get more physical activity. The step wise multiple regression included three items (taste, work schedule, and feeling deprived) with a multiple correlation of 0.36. Two items were also significantly correlated with BMI while the total score was not. The step wise multiple regressionconsisted of three items (taste, family, and fast foods) with a multiple correlation of 0.38 with BMI.

Taken together, these data suggest a pattern of validity for the Obstacles to Low-Fat Eating Questionnaire. Barriers were associated with higher intakes of calories and fat, with specific behavioral problems such as impulsive eating and emotional eating, with African American cultural patterns, and with fewer fat reducing behaviors.

Validity of the Obstacles to Eating Fruits and Vegetables Questionnaire . Table 19 presents the correlations between the items on the Obstacles to Eating Fruits And Vegetables Questionnaire and macronutrient intake. None of the items nor the total score was significantly correlated with macronutrient intake. Likewise, the stepwise multiple regression analyses were not significantly able to predict macronutrient intake from any combination of items.

Table 20 presents correlations between the Obstacles to Eating Fruits and Vegetables Questionnaire and micronutrient intake as measured by the Meharry Food Frequency Questionnaire. Correlations are presented for the individual items and the total score with vitamin A (IU), vitamin C (mg), vitamin E (mg), and fiber (grams). There were no significant correlations of items with Vitamin A. Vitamin C was significantly negatively correlated (-0.20 to –0.26) with liking other foods more, changing the way one eats, and with the time it takes to buy and prepare fruits and vegetables. Vitamin E was significantly negatively correlated (-0.18) with time; and fiber was significantly negatively correlated (-0.18 to –0.20) with three items (cost, eating in restaurants and fast food places, and time). The best predictor of vitamin C by step wise multiple regression was the time it takes to buy and prepare fruits and vegetables (0.25, $p < 0.01$). For vitamin E, the best predictor was also the time it takes (0.18, $p < 0.05$), and for fiber the best predictors were cost and transportation (0.28, $p < 0.01$).

Table 21 presents correlations between the Obstacles to Eating Fruits and Vegetables Questionnaire and food group frequencies as measured by the Meharry Food Frequency Questionnaire. Correlations are presented for the individual items and the total score with grains, fast food, dairy, fruits, vegetables, meats, and snacks/desserts. Grains were significantly correlated with two items (year round unavailability (0.20) and liking fast food (0.20)) and significantly negatively correlated with one item (family not liking fruits and vegetables, -0.19). Fast foods were significantly negatively correlated with two items (liking fast foods (-0,19) and family not liking fruits and vegetables (-0.17)). Dairy was significantly negatively correlated with two items, cost of fruits and vegetables (-0.25) and eating in restaurants and fast food places (-0.18). Fruits were significantly negatively correlated with four

items (cost of fruits and vegetables (-0.27), time to buy and prepare (-0.33), unavailability at work (-0.24), and effort to prepare(-0,26)). Vegetables were significantly negatively correlated with one item, liking to eat fast foods (-0.19). Meats and snacks/desserts were not correlated with any items. Significant item predictors using multiple linear regression were found among 5 of the 7 food groupings. For grains, significant predictors ($R= 0.32$, $p <0.01$) were year round unavailability and family not liking fruits and vegetables. For fast food, the only significant predictor was liking to eat fast food (0.18, $p < 0.05$). For dairy, three items were significant predictors ($R=0.38$, $p < 0.01$) (cost, year round unavailability, and changing the way one eats). For fruits, there were three significant predictors ($R=0.43$, $p < 0.01$) (time to buy and prepare, liking other foods more, and unavailability at work). For vegetables, there were also three significant predictors ($R=0.33$, $p<0.01$) (liking fast foods, transportation, and cost). There were no significant predictors for meats or snacks/desserts.

Table 22 contains the correlations between the obstacles to eating fruits and vegetables items and the Eating Behavior Pattern Questionnaire (EBPQ) subscale scores as well as the total score on the Eating Styles Questionnaire (ESQ). Four of the items were significantly negatively correlated (-0.19 to -0.25) with the low-fat eating subscale of the EBPQ (time to buy and prepare, liking other foods more, not liking to change, and effort to prepare). The total score was also negatively correlated. This means that women who had more difficulty with eating fruits and vegetables engaged in more behaviors that would tend to raise fat intake. In the step-wise regression, three items (time to prepare, changing, and transportation) made a significant contribution to the multiple correlation of 0.36 ($p<0.01$).

Three of the obstacles to eating fruits and vegetables were significantly correlated (0.20 - 0.25) with the snacking and convenience food subscale of the EBPQ. The total score was not significantly correlated with snacking and convenience foods. The stepwise regression consisted of only 1 item (family not liking) which had a multiple correlation of 0.25 with snacking and convenience foods ($p<0.05$).

For the emotional eating subscale of the EBPQ, there were two items that were significantly correlated (0.19, 0.21). The total score, however, was not significantly correlated with emotional eating. The step wise multiple regression consisted of a single item "liking other foods more than fruits and vegetables" with a multiple correlation of 0.21 ($p<0.05$).

There was one item, "my family not liking to eat fruits and vegetables", which was significantly correlated with the impulsive/planning subscale of the EBPQ. Women whose families did not like fruits and vegetables were less likely to plan their meals and more likely to make food choices impulsively. The stepwise multiple regression had a multiple correlation of 0.36 and included three items (effort to prepare, family not liking, and transportation).

None of the items were significantly correlated with the meal skipping subscale of the EBPQ. There were two items significantly correlated with the ethnic/cultural subscale (0.23, 0.27). The more women endorsed these two items, the more likely they were to engage in behaviors typical of African American culture. The total score was correlated 0.18 with the ethnic/cultural subcale, although this was not statistically significant. Only one item, "changing the way I eat" made a significant contribution to the prediction of the lifestyle/cultural subscale with a multiple correlation of 0.27 ($p<0.05$). Only one item, "liking other foods more than fruits and vegetables" was significantly negatively correlated (-0.21) with the total score of the ESQ. This means that women who liked other foods more than fruits and vegetables tended to engage

in fewer behaviors designed to reduce dietary fat intake. This item was the only item contributing to the stepwise regression.

Table 23 has the correlations between demographic variables age, education, activity, and BMI with the obstacles to eating fruits and vegetables items. There was 1 item significantly negatively correlated with age, "the time it takes" - older women reported less difficulty finding time to prepare fruits and vegetables. This item was also the only item included in the stepwise regression.

There were no significant correlations between obstacles to eating fruits and vegetables and education. There were 4 items significantly negatively correlated (0.23 - 0.29) with physical activity. Women who are more physically active reported fewer obstacles to eating fruits and vegetables. The step wise multiple regression included only one item, "changing the way I eat", which had a multiple correlation of 0.29 with physical activity.

There were three items significantly correlated with BMI (0.25 - 0.29) while the total score was not significant - women who experienced more difficulty with these obstacles tended to be more overweight as measured by body mass index. The step wise multiple regression coefficient was 0.48 with four items contributing (cost, liking other foods more, changing, and unavailable at work).

In general, these data support modest validity of the obstacles to eating fruits and vegetables questionnaire. The lack of any relationship between obstacles to fruits and vegetable intake and calorie and macronutrient intake suggests that there are other aspects of dietary behavior that more strongly determine calorie and macronutrient intake than fruits and vegetables. The best predictors of caloric intake are meats (r=0.56), snacks (r=0.39), and dairy (r=0.33) foods. There were interesting significant correlations between the EBPQ subscales and some of the obstacles to eating fruits and vegetables that generally suggest a pattern in which more obstacles to fruits and vegetables are associated with a greater number of eating problems.

Validity of the Obstacles to Breast Self-Examination Questionnaire . Table 24 has the correlations between the obstacles to breast self-examination items and the presence or absence of different health screening behaviors (blood pressure, cholesterol, mammogram, breast self-examination, skin cancer, and pap smear). None of the items were significantly correlated with blood pressure, cholesterol, or mammography. Six of the nine obstacles were significantly negatively correlated with the presence or absence of breast self-examination (-0.22 to -0.44). The total score was also negatively correlated (-0.29) with adherence to breast self-examination. The more obstacles a woman reported to breast self-examination, the lower her probability of actually engaging in breast self-examination. The stepwise regression included only one item, "remembering to do a breast self-examination" with a multiple correlation coefficient of 0.43. For skin cancer, only one obstacle, "my busy schedule" was significantly correlated (0.20). This item also entered into the stepwise regression model. There were 5 items that were negatively correlated with getting a pap smear (-0.21 to -0.26) and the total score was also significant. The stepwise regression coefficient was 0.27 and included a single item, "remembering to do a breast self-exam".

Table 25 shows the correlations between the demographic variables - age, education, activity level, and BMI - and the obstacles to breast self-examination. For age, only "remembering to do a breast self-exam" was significantly negatively correlated. This item also entered into the stepwise regression. None of the obstacles were significantly correlated with

education. Activity was associated with 1 item, "my stressful life" (r=-0.26). Women whose lives were more stressful tended to get less physical activity. The multiple regression included "my stressful life" and "my busy schedule" with a multiple correlation coefficient of 0.34. BMI was significantly correlated with eight of nine of the barriers to breast self-examination. Women who are more overweight reported more barriers to breast self-examination. The step wise multiple regression included a single item, "not being good at doing BSE" with a multiple correlation coefficient of 0.29.

The validity data suggests that the obstacles to breast self-examination questionnaire is modestly associated with the presence or absence of breast self-examination assessed in a separate interview. While the obstacles to BSE are not strongly associated with most other screening behaviors, there was a similar pattern of associations with the presence or absence of getting a pap smear. The demographic variables showed an interesting association between barriers to breast self-examination and BMI. Rather than viewing this as a confounding variable, it makes sense to see BMI as an additional barrier to breast self-examination. Women who are considerably obese would have a more difficult or frustrating time doing breast self-examination because of the large mass of tissue that has to be explored.

Validity of the Obstacles to Mammography Questionnaire . Table 26 presents the correlations between the obstacles to mammography and the presence or absence of a variety of health screening behaviors: blood pressure, cholesterol, mammography, breast self-examination, skin cancer screening, and pap smear. Because women under 40 did not answer this part of the questionnaire battery, the sample size for these analyses was 42. There were no significant correlations between mammography obstacles and blood pressure, breast self-examination, and skin cancer. There was one item, "the scary stressful process of having a mammogram", that was significantly negatively correlated with cholesterol screening - women who found mammography scary and stressful were less likely to report having cholesterol screens. This item was also the only item included in the step wise multiple regression. There were two items, "busy at work" and "the cost" that were significantly negatively correlated (-0.32 to -0.32) with the presence or absence of getting a mammogram. Only one of these items, "the cost", entered into the step-wise regression model. There were three obstacles to mammography that were significantly negatively correlated (-0.33 to -0.38) with the presence or absence of a pap smear. The step wise multiple regression included two items (remembering to schedule and scary stressful process) with a multiple correlation coefficient of 0.45.

Table 27 presents the correlations between the demographic variables age, education, activity, and BMI and the obstacles to mammography questionnaire items. As women get older they report fewer obstacles to mammography. One item and the total score were significantly negatively correlated with age. One item, "the pain and discomfort", entered into the stepwise regression with a multiple correlation of 0.32. Education was significantly negatively correlated with one item, "the cost" (r=-0.40). Women with less education tended to see cost as more of a barrier. The stepwise regression included "the cost" and "remembering to schedule a mammogram" with a multiple correlation of 0.54. There were no significant correlations between activity level and adherence to mammography. There were three items positively correlated with BMI (0.35 - 0.39). The total score was correlated 0.51 with BMI, suggesting that women who are more overweight report more barriers to obtaining a mammogram. The step wise multiple regression included "the time and effort it takes to take

care of my family" and "not knowing where to get a mammogram" with a multiple correlation of 0.51.

The obstacles to mammography questionnaire is predictive of health screening behavior, although it has a stronger relationship to obtaining a pap smear than it does to getting a mammogram. Of all the questionnaires, this one was most affected by education. Similar to BSE, women who were more overweight tended to report more barriers to mammography suggesting that obesity may actually be an additional barrier to getting a mammogram.

Stage of Change and Obstacles to Primary and Secondary Prevention of Breast Cancer . Each questionnaire include an item to assess the individual's stage of change coded as 1=precontemplation, 2=contemplation, 3=preparation, 4=action, and 5=maintenance. Table 28 presents the obstacles to low fat eating as a function of stage of change. Thirty percent of the women were in precontemplation, 35% were in contemplation, 20% were in preparation, 8% were in action, and 7% were in maintenance. The majority of these women (85%) were not currently trying to reduce their fat intake. Using one-way analysis of variance, nine of the nineteen items differed significantly as a function of stage of change. For five of the items, women in the maintenance stage reported fewer obstacles than did women in the other stages. For four of the items, women in the action and maintenance stages reported fewer obstacles than did women in precontemplation, contemplation, and preparation. For the psychological obstacles, women in the maintenance stage reported fewer barriers than did women at the other stages. However, women in the maintenance stage reported more difficulty with environmental barriers than women in the action and preparation stages. These data suggest that women get over the psychological barriers to changing by the time they reach the maintenance stage but that even during maintenance, environmental obstacles are difficult to deal with. Women in preparation and action may be underestimating the difficulty of environmental obstacles. One-way analysis of variance was used to compare the stages of change on the percent of calories from fat. There was a significant effect of reduced fat with stage of change ($p < 0.02$, with precontemplation (44%), contemplation (44%), preparation (44%), differing from action (38%) and maintenance (37%).

The validity of self-assignment to stages of change was evaluated in two ways. First, a one-way analysis of variance was conducted examining the percent of energy from protein, carbohydrates, and fats as a function of stage of change. There was no significant difference in the percent of energy from protein as a function of stage of change ($p < 0.79$). There was a significant difference in percent of energy from carbohydrate ($p<0.04$) and percent of energy from fats ($p < 0.002$). Women in precontemplation, contemplation, and preparation consumed a greater percentage of their energy from fat (44%) than women in the action (38%) and maintenance (37%) groups and a lower percentage of energy from carbohydrate (42%) than women in action (48%) and maintenance (49%). It is noteworthy, however, that women in the maintenance stage could not be described as compliant with a low fat diet. In fact, the highest percent of energy from fat in the data set (50%) came from a woman who placed herself in the action stage of change. In addition, an analysis of variance was run on the following food groups: meat, dairy, fruits, vegetables, snacks and desserts, and fast foods. The only group that differed as a function of stage of change was meats ($p<0.006$). Women in the precontemplation, contemplation, and preparation stages reported eating 4-5 servings of meat per day as compared to 3 servings for women in the action and maintenance stage. These data suggest that the major

changes made by women in action and maintenance were to cut down on meat consumption. Other sources of fat, such snacks and desserts or fast foods, did not show evidence of having been changed.

The fruits and vegetables obstacles by stage of change are presented in Table 29. Ten percent of the women were in precontemplation, 48% of the women were in contemplation, 14% in preparation, 8% in action, and 20% in maintenance. Five of the fourteen items differed significantly as a function of stage of change. Women in maintenance tended to report fewer obstacles to eating fruits and vegetables. In some cases, women in precontemplation see fewer obstacles than women in contemplation. There were no differences in psychological and environmental obstacles as a function of stage of change. There were no significant differences in percent of calories from fat as a function of stage of change for fruits and vegetables. Stages of change for fruit and vegetable intake was validated by examining the intake of vitamin A, vitamin C,. vitamin E, and fiber along with the food groups. The only significant difference ($p<0.04$) between stages was for fiber, with women in action and maintenance reporting about 10 grams more fiber each day than women in the precontemplation, contemplation, and preparation stages. There were no significant differences in the reported consumption of fruits ($p < 0.18$) or vegetables ($p < 0.42$). There was a significant difference in the consumption of dairy products ($p < 0.04$) with women in action and maintenance reporting about 2 additional servings of dairy each day than women in precontemplation, contemplation, and preparation.

The data on breast self-examination and stage of change are presented in Table 30. Eight percent of the women were in precontemplation, 26% were in contemplation, 25% in preparation, 14% in action, and 38% in maintenance. About half of the women reported performing a monthly breast self-examination. There were significant differences as a function of stage of change on 4 of the 9 items. Women in the action and maintenance stages tended to see fewer barriers to breast self-examination than women in the precontemplation, contemplation, and preparation stages. The women in the action stages, however, sometimes did not differ from precontemplation, contemplation, and preparation when the women in maintenance did. In one case, "doing the breast self-examination correctly", the difference was between women in preparation, action, and maintenance seeing fewer barriers than women in precontemplation and contemplation. These patterns held mainly for the psychological barriers. There were no significant differences between stages for the environmental barriers.

Table 31 gives the mean item scores for the obstacles to mammography questionnaire by stage of change. There were 15% in precontemplation, 13% in contemplation, 4% in preparation, 35% in action, and 33% in maintenance. Therefore almost 70% of these 42 women claimed to have followed the age-specific guidelines for mammography. Note that the wording of the item for the action stage was "yes I have, but am currently past due". There were differences as a function of stage of change for three of the items – "my busy schedule", "remembering to schedule a mammogram", and "being very busy at work". Women in the contemplation stage consistently saw more barriers than women in the precontemplation stage. Women in the contemplation stage also saw more barriers than women in preparation, action, and maintenance. The same pattern existed for environmental barriers.

PHASE III: POPULATION BASED SURVEY OF BARRIERS TO CANCER PREVENTION

Methods

Questionnaire Refinement and Administration . Based on items characteristics and similarity of items, several items were dropped from the questionnaires. A 17-item version of the OLFEQ, an 8-item version of the OBSEQ, an 11-item version of the OEFVQ, and an 9-item version of the OMQ were administered to 200 African American and 200 Caucasian women in Nashville, Tennessee. Commercial lists of telephone numbers having demographic information were obtained, and a professional survey research company (Perdue research, Nashville, Tennessee) was hired to conduct the surveys. Women were contacted by telephone and asked to participate in a survey on women's health issues. The OLFEQ was administered first followed by the OBSEQ then the OEFVQ. Age was then determined, and women over 40 were administered the OMQ. Phone calls continued until 200 women of each race were contacted and interviewed using phone numbers randomly selected from the telephone directory listings.

Determination of SES Index . Socioeconomic status (SES) was scored using the Hollingshead 2-factor model. A numeric code was assigned according to years of education and a separate numeric code was assigned based on occupation. When either occupation or education was missing, the same SES level was used for both. The two factors were weighted according to Hollingshead and added together to obtain an SES index.

Results

Obstacles as a Function of Ethnicity and SES

Fat . Responses to the individual items on the OLFEQ, the total score, psychological obstacles, and environmental obstacles by race and SES are presented in Table 32. A two-way Analysis of Variance (Ethnicity by SES) was used to compare African American women to Caucasian women. For dietary fat, only 3 items differed between the African American and Caucasian women: eating fast foods, church and social events, and emotional eating. In all three cases, whites reported having more difficulty with these obstacles than blacks. Two items had SES differences, eating fast foods, and busy work schedule. For both items, women with higher SES reported more difficulty with these obstacles. There were no Ethnicity by SES interaction effects.

Fruits and Vegetables . Responses to the individual items on the OEFVQ, psychological obstacles, and environmental obstacles by race and SES are presented in Table 33. A two-way Analysis of Variance (Ethnicity by SES) was used to compare African American women to Caucasian women. African American women reported less difficulty on all the items except one, not having transportation. There was no difference between the two ethnic groups on the transportation item. The three items with SES main effects were liking other foods more, eating in restaurants and fast food places, and not being able to get fruits and vegetables at work. In each instance, women with higher SES reported greater difficulty with these obstacles. There were no ethnicity by SES interaction effects.

Breast Self-Examination . Responses to the individual items on the OBSEQ,

psychological obstacles, and environmental obstacles by race and SES are presented in Table 34. A two-way Analysis of Variance (Ethnicity by SES) was used to compare African American women to Caucasian women. There were no main effects for ethnicity and one SES effect for "nobody ever showed me how". Women with low SES reported more difficulty with this obstacle than women with higher SES. There were no ethnicity by SES interaction effects.

Mammography . Responses to the individual items on the OMQ, psychological obstacles, and environmental obstacles by race and SES are presented in Table 35. A two-way Analysis of Variance (Ethnicity by SES) was used to compare African American women to Caucasian women. There were no main effects for ethnicity and two main effects for SES. For items, my busy schedule and busy at work, women with higher SES levels reported more difficulty with these obstacles. There were no ethnicity by SES interaction effects.

Obstacles as a Function of Stage of Change

Fat . A two by five analysis of variance was used to look at Ethnicity and Stage of change in obstacles to decreasing dietary fat. Figure 1 presents the difficulty ratings for the psychological obstacles score for black and white women. There was a main effect for stage ($p < 0.0001$) but no significant main effect for ethnicity ($p < 0.06$). There was also not a significant interaction of ethnicity and stage of change ($p < 0.55$). Those in precontemplation (n=81) tended to report fewer obstacles that those in contemplation (n=53). Subjects in the contemplation stage perceived the greatest number of obstacles followed by the preparation stage (n=29). Action (n=50) and maintenance (n=186) reported the least difficulty with obstacles. Figure 2 presents the environmental barriers to reducing fat intake by ethnicity and stage of change. There was a main effect for ethnicity ($p<0.02$) with African American women reporting fewer obstacles than Caucasian women. There was a significant stage of change effect ($p<0.0001$) with women in contemplation reporting the most obstacles and women in maintenance reporting the fewest obstacles.

Fruits and Vegetables . Similar two-way analyses of variance were conducted on the obstacles to increasing fruit and vegetable intake. Figure 3 presents the mean difficulty ratings for the psychological barriers to increasing fruit and vegetable intake for black and white women. There was a significant main effect for ethnicity ($p<0.0001$) and for stage of change ($p<0.0001$). There was also a ethnicity by stage interaction effect ($p<0.001$). Black women reported fewer obstacles than white women, especially at precontemplation and preparation stages while they were similar at contemplation and maintenance. Figure 4 presents the mean difficulty ratings for environmental obstacles by stage and ethnicity. The pattern was similar with main effects for ethnicity ($p<0.0001$), stage ($p< 0.0001$), and stagy by ethnicity ($p<0.002$).

Breast Self-Examination . Figure 5 presents the mean difficulty ratings for psychological barriers to breast self-examination by ethnicity and stage of change. The main effect for ethnicity was not significant ($p < 0.58$) but the main effect for stage was ($p < 0.0001$). The ethnicity by stage of change interaction effect was also not statistically significant ($p < 0.14$). In general, women in action and maintenance reported the fewest psychological obstacles to breast self-examination while women in contemplation and preparation reported the most. Figure 6 presents the mean difficulty ratings for environmental barriers. There was no

significant main effect for ethnicity ($p<0.57$) while there was a significant stage main effect ($p<0.0001$) and a significant stage by ethnicity interaction effect ($p<0.002$). Black women reported more obstacles at the contemplation stage while white women reported more obstacles at the precontemplation and preparation stages. The two ethnic groups were very similar in action and maintenance.

Mammography . Figure 7 presents the results for psychological barriers to mammography. For mammography, the staging question had four instead of five options: 1) Precontemplation; no, not in the near future, 2) Contemplation; no, in the next year, 3) Action; yes, in the past but not recently, and 4) Maintenance; yes, as appropriate for my age. There was no ethnicity main effect ($p<0.95$) but there was a main effect for stage ($p < 0.0001$) and a significant stage by ethnicity interaction effect ($p<0.001$). Black women reported more barriers at the contemplation stage while white women reported more barriers at the precontemplation stage. There were no differences at the action or maintenance stages. Figure 8 presents the results for environmental barriers to mammography. The ethnicity main effect was significant ($p < 0.0001$) with blacks reporting fewer environmental obstacles than whites. The stage effect was significant ($p < 0.0001$) and the interaction effect was also significant ($p < 0.03$). The interaction is due to white women in the action stage reporting more environmental barriers than black women.

Stage of Change as a Function of Ethnicity and SES . Table 36 presents the number and percentage of women at each stage of change by race and SES for the primary and secondary prevention behaviors. Chi-square tests were used to compare the number of women at each stage by race and SES. There was a significant difference by race in the percent of women at each stage for reducing dietary fat intake ($p < 0.01$). The percentages are displayed in Figure 9. African American women were more likely to be in the contemplation stage while there were more white women in the precontemplation stages with no differences at preparation, action, and maintenance. For fruits and vegetables, there were significant differences by ethnicity in the number of women at each stage of change ($p<0.02$). There were fewer black women at precontemplation and preparation and more black women at maintenance than whites. The percentages are presented in Figure 10. For breast self-examination, the chi-square for ethnicity by stage was not significant ($p < 0.56$). The percentages are presented in Figure 11 showing that the majority of women were in the maintenance stage and that 20% or less were in each of the other stages. There was a significant association between stage and ethnicity ($p<0.04$) for mammography. There were more white women at precontemplation and more black women at contemplation and action. However, the vast majority of women described themselves as being in the maintenance phase. The percentages are presented in Figure 12.

PHASE IV: STUDY OF INDIVIDUAL DIFFERENCES IN BARRIERS TO CANCER PREVENTION.

Methods

Subjects . The data from the 400 women included in the community survey were used to study individual differences in barriers to cancer prevention. Each of the four behaviors – dietary fat intake, consumption of fruits and vegetables, breast self-examination, and mammography – was analyzed separately.

Cluster Analyses of Obstacles and Subjects . In the first step, a cluster analysis was conducted of the questionnaire items to group them into subscales in order to improve our ability to interpret individual differences. The cluster analysis was done on squared Euclidian distances using Ward's methods. The dendrogram was examined and items in the same cluster were listed in order to develop an interpretation or name for each group of items. A score was computed for each cluster of items by calculating the mean rating of the items within the cluster. Next, the 400 subjects were clustered on their responses to the questionnaire items using Ward's method on squared Euclidian distances. The dendrogram was examined and used to form clusters of people. A one-way analysis of variance was used to compare the subjects clusters on the different groups of barriers and on age, ethnicity, and SES. Differences between the groups were used to develop an interpretation of each subject cluster. Using this methodology, we were able to identify meaningful patterns of individual differences in barriers to cancer prevention.

Results

Dietary Fat . The cluster analysis of items resulted in six clusters named family, emotional pressure, buying foods, too busy, resisting temptation, and taste for high fat foods (Table 37). The cluster analysis of people resulted in five subject groups named no obstacles, psychological obstacles, temptation and taste obstacles, intermediate obstacles, and severe obstacles (Table 38). The differences between the subject clusters on the barriers to reducing fat intake are presented in Figure 13 while the differences in demographics are in Figure 14. For barriers to reducing fat intake, there were significant differences between the subject groups on all six of the item clusters ($p<0.0001$) while for demographics, there were significant differences in age ($p < 0.001$) and SES ($p<0.05$). The no obstacles group and the temptation and taste group tended to be older while the intermediate obstacles group tended to have a higher SES.

Fruits and Vegetables . The cluster analysis of items resulted in five clusters of barriers to eating fruits and vegetables: home environment problems, taste, availability away from home, overcoming difficulties, and high cost (Table 39). The cluster analysis of people resulted in three subject groups: no difficulty, some difficulty, and greatest difficulty (Table 40). The profile of obstacles for each subject cluster is presented in Figure 15. The analysis of variance results showed that the three groups of subjects differed significantly on all five sets of barriers ($p< 0.0001$). The demographic variables are presented in Figure 16. There were significant differences in age ($p<0.001$), ethnicity ($p<0.001$), and SES ($p<0.01$). The no problems group had more blacks than whites, and were older. The some difficulty group tended to be the youngest and to have the highest SES.

Breast Self-Examination . The cluster analysis of items resulted in four clusters of barriers to breast self-examination: stress, technical knowledge, emotional, and memory (Table 41). The cluster analysis of people resulted in three subject groups: no problems, intermediate problems, and major problems (Table 42). The profile of obstacles for each subject cluster is presented in Figure 17. The analysis of variance results showed that the three groups of subjects differed significantly on all four sets of barriers ($p < 0.0001$). The demographic variables are presented in Figure 18. There were no significant differences in age, ethnicity, and SES.

Mammography . The cluster analysis of items resulted in three clusters of barriers to mammography: busy, emotional, and perceived difficulty (Table 43). The cluster analysis of people resulted in four subject groups: no problems, fearful, intermediate problems, and high problems (Table 44). The profile of obstacles for each subject cluster is presented in Figure 19. The analysis of variance results showed that the four groups of subjects differed significantly on all four sets of barriers ($p < 0.0001$). The demographic variables are presented in Figure 20. There were no significant differences in age, ethnicity, and SES.

DISCUSSION

This is an exploratory and theory-building project. This was necessary because there has not been a systematic approach to the definition of barriers or obstacles to health behavior change in the literature that would result in the development of effective health interventions. This is especially true for African Americans. This study represents the descriptive phase of such scientific work. Our goal was to describe and measure the barriers to breast cancer prevention, both primary and secondary, in African American women in the community. Systematic description, observation, and measurement of the barriers to breast cancer prevention would allow us to develop better theoretical models and to build and test preventive interventions.

The methodology for the project was guided by a systematic methodology for overcoming adherence obstacles proposed by Schlundt and colleagues [32-40]. This systematic approach included the following steps:

1. Selection of the population, the health problem, and the behavioral risks;
2. A literature review of current knowledge, both general and population specific;
3. Use of qualitative research methods to identify and describe
    a) specific behavior changes required,
    b) barriers to making changes, and
    c) critical situations in which decision-making concerning risky behaviors occurs;
4. Systematic analysis and summary of qualitative data: identification and classification of change targets and the obstacles to making these changes;
4. Development and validation of assessment tools to measure the behaviors and the barriers to behavior change in individuals and populations; and
5. Use of the tools to survey obstacles to change in target populations.

The discussion will center around the elements of this approach as listed above.

Breast cancer in African American women is a serious health problem. Although the incidence of breast cancer is lower in black women, their mortality rate is higher.. The disparity in mortality may be due to a lack of knowledge about risk factors, or failure to detect cancer early and to seek appropriate treatment immediately. Primary prevention, taking steps to prevent cancer from developing in the first place, and secondary prevention, insuring that cancers are detected early when they are more treatable, are necessary components of eliminating breast cancer disparities in African American women. However, the key to effective cancer prevention is to identify risk factors and then modify them.

For primary prevention, we selected two behaviors based on a systematic review of the literature: intake of dietary fat and consumption of fruits and vegetables. While the data on fat is somewhat equivocal, there are a number of studies supporting the idea that lowering fat intakes may help prevent breast cancer. Increasing fruits, vegetables, and fiber intakes likewise is a promising approach to reducing cancer risk. The secondary prevention of cancer has two well-established behaviors: breast self-examination and regular mammography.

We reviewed the literature on barriers to dietary behavior change and on the obstacles to breast self-examination and mammography. We found many studies that point to a large number of potential variables that prevent or impede women's efforts to make and maintain these healthy changes in behavior. In addition, we found that the transtheoretical or stages of change model was a promising way to understand the process of making and maintaining behavior changes.

Based on the literature review, we developed structured interviews for each of the four behaviors. These interviews included open ended questions asking women to describe any problems they encountered in the process of behavior change, with specific prompts related to the results of our literature review of known obstacles. The interview was structured around the stages of change model: women in precontemplation, contemplation, and preparation were asked to describe the barriers that keep them from initiating these behavior changes, and women in the action and maintenance stages were asked to describe the barriers that make it difficult to make and maintain behavior changes.

We employed a top-down theoretical approach driven by our literature reviews and developed a coding system for systematically describing the barriers to behavior change. The barriers were divided into psychological and environmental barriers and each of these was then broken down into very specific categories. We developed definitions, trained coders, and achieved a good level of reliability in the use of this coding system. One benefit of this research is the development of this coding system that is general enough to be applied to the study of other health enhancing and disease prevention behaviors. The system is logical, complete, and theoretically based, and should prove to be a useful tool in future qualitative research on barriers to behavior change.

From the descriptive studies, we learned that African American women face many barriers to making and maintaining these behavior changes. The top barriers to reducing fat intake were: not having enough time, liking the taste of high fat foods, not liking to make changes in diet, eating in restaurants and fast foods places, the higher cost of low-fat foods, the demands of one's job, and not being sure of the benefits of reducing fat intake. These represent a mixture of both psychological and environmental barriers. The results for fruits and vegetables were fairly similar. The number of barriers mentioned for fat was greater than the number generated for fruits and vegetables. The number of barriers reported for the secondary prevention behaviors were even fewer. For breast-self examination, the most important barrier

was forgetting, followed by lack of knowledge, lack of time, and the fear of finding breast cancer. Similarly, the top barrier to mammography was the fear of finding breast cancer, followed by forgetting to schedule an appointment, not having enough time, and interference from one's work schedule. Again, the mixture of barriers for the secondary preveention behaviors was a combination of psychological and environmental barriers.

It is important to keep in mind that from the perspective of the individual, the frequency with which a particular barrier was mentioned may not be related to its importance. For example, a small number of women described their attitudes towards medicine and their distrust of medical information as a barrier to making changes. While not commonly mentioned, this may still be a critical variable for those women who hold these beliefs. Personality traits such as lack of willpower and laziness, were also mentioned by a number of women. While social scientists do not often utilize these categories as scientific explanations, it is important to understand that the women perceive themselves and their behavior in this way. Interventions to overcome barriers to cancer prevention will have to address beliefs such as I am too lazy, it is too hard for me to do, and I don't have the willpower.

Not only did the descriptive interview study provide specific information about barriers to behavior change in African American women, it allowed us to develop questionnaires to measure individual perceptions of the importance and difficulty of each of these barriers for each of the four behaviors. The questionnaires were developed in parallel with the findings of the descriptive study, with each frequently mentioned barrier being translated into a questionnaire item.

The questionnaires were first refined with a small sample of respondents. This was a very important step, since we discovered that our first response scale gave less than optimal response distributions. We changed the scale from an agree-disagree to a difficulty rating and this allowed women to describe themselves as having varying degrees of difficulty with the barriers.

Once the scales were established, we conducted a study to determine the psychometric characteristics of each of the four questionnaires. We used an internal consistency approach to evaluating the reliability of the scales. Coefficient alpha's were high for dietary fat, fruits and vegetables, and breast-self examination. The internal consistency for mammography was in the acceptable range. Further research should establish the test-retest reliability of these scales.

Our approach to validation was to relate the dietary scales to other measures of eating behavior and to validate the secondary prevention scales against an independent assessment of screening health prevention behaviors. We looked at validity using three approaches: the correlation of individual items with validation measures, the correlation of the total scale score with validation measures, and the best multiple regression model using a combination of individual items to predict each validation measure. The validation data for the barriers to dietary fat intake were encouraging. There were modest correlations with macronutrient intakes and some significant correlations with vitamin C and fiber. One would not expect perceived barriers to dietary fat intake to be strongly related to micronutrients. In addition, there was an interesting pattern of correlations between obstacles to reducing fat intake and the consumption of our food groups. In general, barriers to reducing dietary fat intake were related to eating less fruit, less vegetables, less dairy, and more meat. There was a smaller tendency for barriers to reducing fat intake to be associated with eating more snack and dessert foods. Barriers to fat intake were related to patterns of eating behavior, with more barriers being associated with fewer

behaviors designed to reduce fat intake. These associations were fairly robust with barriers accounting for 25% of the variance in low-fat diet behaviors. The barriers were associated with more snacking, more frequent and severe emotional eating, more frequent impulsive eating, and the occurrence of ethnic preferences associated with higher fat intakes. The largest effect size was for the ethnic lifestyle subscale of the Eating Behavior Patterns Questionnaire in which a linear combination of barriers was able to account for 30% of the variance. Responses to the questionnaire items were associated with demographic variables although the magnitude of the correlations was fairly modest. Of most interest is the relationship of barriers for low-fat eating to body mass index. Two of the barriers, liking the taste of low fat food and keeping my family happy, were positively associated with degree of overweight. Together, the barriers accounted for about 16% of the variance in body mass index. These data provide a strong basis for concluding that our Obstacles to Low Fat Eating Questionnaire is a valid measurement tool to identify the kind and severity of barriers to low-fat eating.

The Obstacles to Eating Fruits and Vegetables Questionnaire was not related to macronutrient intake but was associated with intake of vitamin C, vitamin E, and fiber. The more obstacles, the less the intake of these antioxidants and fiber. The strength of these relationships is relatively weak accounting for about 3-8% of the variance in the intake of these dietary constituents. There may be several reasons that these correlations are not higher. First, estimation of these using a food frequency questionnaire is not ideal. In addition, a number of factors besides perceived barriers to eating fruits and vegetables may influence consumption of micronutrients and fiber. For example, vitamin E and fiber are also contained in grains. The items of the Obstacles to Eating Fruits and Vegetables Questionnaire were modestly correlated with food group consumption. More barriers were associated with consuming less fruit, less vegetables, and less dairy, accounting for 10-18% of the variance. The relationship with grains was somewhat more complex, with two barriers associated with higher grain intake and one barrier associated with lower grain intake. There were several significant correlations with behavior patterns. More obstacles to eating fruits and vegetables was associated with fewer behaviors that reduce fat intake. In addition, more barriers to eating fruits and vegetables were associated with higher consumption of snack and convenience foods, more emotional eating, more impulsive eating, and more ethnic behaviors that increase fat intake. The effect sizes ranged from 3-13% of the variance. The barriers to eating fruits and vegetables were also associated with body mass index, with more barriers being related to a higher BMI. Obstacles to fruits and vegetable intake accounted for 23% of the variance in BMI. These data suggest that the Obstacles to Eating Fruits and Vegetables Questionnaire is a valid measurement tool.

Barriers to breast self-examination was validated against an independent interview in which women were asked about different health screening behaviors, including blood pressure checks, cholesterol measurements, mammograms, breast self-examination, skin cancer screening, and pap smears. Barriers to breast self-examination were negatively correlated with breast self-examination and accounted for 18% of the variance. This is remarkable considering that the dependent variable was a simple yes or no answer, rather than a continuous measure of BSE compliance. Interestingly, there was a negative correlation between barriers to BSE and the likelihood of getting a pap smear. Eight of the nine barriers to BSE were positively associated with body mass index, although the best linear model accountedfor only about 10% of the variance. It appears that heavier women perceive more barriers to breast self-examination than women who are not as heavy. This is understandable since women who are very overweight

tend to have large breasts which may be more difficult to examine for potentially cancerous lumps. These data suggest that the Obstacles to Breast Self-Examination Scale is a valid measurement tool.

The results for mammography were similar to those for BSE. Since mammograms are appropriate only for women over 40 years of age, the sample size for the validation study was smaller, and therefore larger correlation coefficients were required to achieve statistical significance. Despite this, barriers to mammography accounted for about 10% of the variance in women's independent reports of having obtained a mammogram. The correlation between the Obstacles to Mammography questionnaire and pap smear was actually higher than the correlation with mammography, with the best linear combination of items accounting for 20% of the variance in women's reports of a pap smear. There was a fairly strong correlation between barriers to mammography and education, with women having less education perceiving more barriers, particularly with respect to cost as a barrier. Also, there was a strong relationship between barriers to mammography and body mass index, with women who were more obese perceiving a greater number of barriers with an effect size of 25% of the variance. These results provide some evidence for the validity of the Obstacles to Mammography Questionnaire, but the strength of the evidence is not as good as it was for the other three prevention behaviors.

For all four measures, the relationship to stage of change was fairly consistent. Women in the contemplation stage generally perceived the highest level of barriers, both psychological and environmental. Interestingly, women in precontemplation perceived fewer barriers to change. This is probably because these women are not thinking about changing and therefore had not thought much about what makes it hard to change. For psychological barriers, the degree of difficulty decreased as women moved from preparation to action to maintenance. For environmental barriers, women in maintenance tended to have more difficulty than women in preparation and action. The psychological barriers tended to block women from getting started on these behaviors while the environmental barriers came more into play once the behavior change was initiated.

After having validated the questionnaires on African Americans, several items were eliminated to make them shorter, and we surveyed by telephone 200 Caucasian and 200 African American women in Nashville, Tennessee. The names and telephone numbers were selected at random from commercially available lists that could be sorted by demographic variables. The data were examined as a function of ethnicity (Caucasian vs African American) and SES.

For dietary fat, three of the barriers differed as a function of ethnicity: eating in restaurants and fast food places, enjoying high fat foods at church meals and social functions, and emotional eating. In each case, white women perceived these barriers as significantly more difficult than black women. Only two barriers differed as a function of SES: eating in restaurants and fast food places and busy work schedule. In both cases, women with higher SES perceived more difficulty with these two barriers. The pattern of results showed that each of the barriers was endorsed as difficult by some women, with none of the barriers standing out as clearly more important. This suggests that there are many different barriers in the community that contribute to making it difficult for women to reduce dietary fat intakes. For the stages of change data, , the only difference between blacks and whites was a larger percent of black women in contemplation and a larger percent of white women in precontemplation. However, over 40% of both black and white women claimed to be in the maintenance stage.

For fruits and vegetables, there were more ethnic differences. African American women

consistently reported less difficulty with these obstacles than Caucasian women. Black women were significantly lower than white women on all but one of the individual items and on both psychological and environmental barriers. Three of the items differed as a function of SES: liking other foods more than fruits and vegetables, eating in restaurants and fast food places, and unavailability of fruits and vegetable at work. In each instance, women with higher SES perceived these barriers as more difficult than women with lower SES. These ethnic differences may be understandable in terms of the history of food intake in African Americans. [45] Traditionally poor, rural people had to rely upon gardens and home grown foods in order to survive and could not afford luxuries like meats and prepared foods. The traditional consumption of fruits and vegetables has apparently carried over into current times as evidenced by the greater apparent willingness of blacks to eat fruits and vegetables. Vegetables have always been a traditional part of the African American cuisine. For the stages of change data, fewer black women were in precontemplation and more were in maintenance than white women. For African American women, nearly 70% described themselves as in maintenance, meaning they claimed to be eating five or more servings of fruits and vegetables each day.

There were no ethnic differences in barriers to breast self-examination and only one difference as a function of SES. Women with lower SES were more likely to report that never having been shown how to do a breast self-examination was a difficulty barrier. The absolute level of the ratings was low with the means falling between no difficulty and a little difficulty. There were also no significant differences in stage of change by ethnicity for BSE. Over 50% of all women, both black and white, claimed to be in the maintenance stage.

For mammography, there were no significant ethnic differences in the perception of the difficulty of any of the barriers. There were SES differences in two barriers: busy schedule, and busy at work. Women with higher SES reported more difficulty with these two barriers. There was a significant association between stage of change and ethnicity with more white women at precontemplation and more black women at contemplation and action. Over 75% of both ethnic groups reported themselves to be in the maintenance stage of change for mammography.

There are several limitations to the community telephone survey that are important to discuss. First, the group we surveyed was older, having an average age of 55 years. The validation data showed that barriers to cancer prevention behaviors decrease with age. A community sample with younger women may have found more difficulty with the barriers. It is also possible that ethnic differences are different or more pronounced in younger women. A second limitation is the absence of any measures to verify compliance with the primary and secondary prevention behaviors. We have shown previously that many women who claim to be in the action and maintenance stage for dietary fat intake are continuing to consume relatively high fat diets. [43] There is no way in the community survey to disentangle this discrepancy between self-perception and behavior. That is, that many women perceive themselves as being on a low fat diet or eating adequate amounts of fruits and vegetables when in fact their behavior may not be consistent with this belief. Similarly, we don't have any way to validate that the 50-75% of women in the community who place themselves in the maintenance stage are actually compliant with BSE and mammography. Future surveys need to include a more detailed assessment of the behaviors.

In the final phase of our research, we examined individual differences in barriers to the primary and secondary prevention of breast cancer. First we did an hierarchical cluster analysis of the obstacles questionnaires to place the items into homogeneous groups. These groups

represent items that people tended to answer in a similar way. These item groupings allowed us to more easily interpret the results of the next step, clustering individuals. Hierarchical cluster analysis was used to place people into homogeneous groups based on their similarity in answering the obstacles questionnaires. We then examined each of these groups by looking at the mean values of the item clusters. Finally, an interpretation of each subject group was develop to allowed us to understand individual differences.

For reducing dietary fat, there were five distinctly different clusters of people. The first cluster consisted of people who reported no obstacles to lowering fat intake. This group tended to a little bit older and had a slightly lower SES. The second group reported mainly psychological obstacles to lowering fat intake such as dealing with temptation, emotional eating, family pressures, and liking the taste of high fat foods. The third group reported few barriers to eating a low-fat diet with the exception being liking the taste of high-fat foods and dealing with temptations. The fourth group had an intermediate level of difficulty with all of the obstacles to reducing dietary fat intake while the fifth group reported a severe level of difficulty with all of the barriers.

This analysis tells us that different people may require very different interventions. People in cluster 1, for example, may have to be made aware that their diets are not actually as low in fat as they think they are, and in fact may have to be sensitized to the fact that there actually are psychological and environmental barriers that keep them from successfully adhering to a low-fat diet. Clusters 2 and 3 had very specific barriers to deal with and people in these groups would benefit from a very focused intervention. The subjects in groups 4 and 5, however, report barriers in all areas, differing only in their perception of the degree of difficulty, and would probably benefit from a comprehensive program that involved a step-by-step approach to changing fat intake and dealing with both psychological and environmental barriers.

The cluster analysis of increasing fruits and vegetables, on the other hand, showed three groups that differ only in their perception of the severity of the obstacles. The first group, which tended to be older and more likely to be African American and of lower SES, saw no barriers to eating fruits and vegetables. Within this group, there are probably people who do eat five or more servings of fruits and vegetables per day, and people who do not. The intervention task with this group of people will be to separate those who need to make further changes from those who are already meeting fruit and vegetable consumption goals. The other two groups recognize that there are barriers to reaching these goals, and would benefit from programs that address overcoming all of the potential barriers to increasing fruit and vegetable intake.

The results for breast self-examination are very similar to the results for fruit and vegetable intake with three groups differing in their perception of the degree of difficulty of the barriers to BSE. The first group saw basically no barriers except a small degree of difficulty associated with remembering to do a BSE each month. The second group had some difficulty in most areas, but especially with remembering to do a monthly BSE. The third group had a high level of difficulty, especially with their stressful lives getting in the way and with remembering to do a BSE. Given these results, there is little justification for developing separate intervention programs for different groups of women. Interventions should stress developing strategies for remembering to give oneself a BSE in the context of having a busy and potentially stressful life.

The clusters of subjects for mammography were more interesting in that one group having a very specific barrier was identified. Cluster 2 had no real difficulties with mammography except for the emotional aspects having to do with the fear of finding breast

cancer, the stress associated with mammography, and the pain and discomfort associated with the procedure. The other groups fell into the familiar low, medium, and high level of barriers based on their perception of the difficulty. These results suggest that some women need a specific intervention focused on overcoming the emotional barriers to getting a yearly mammogram. Others need help with remembering to get a mammogram in the context of their busy family and work lives. In addition, when people claim to be too busy to do something like getting a mammogram, this indirectly shows that health and health screening tests are relatively low in their list of priorities.

Overall, the cluster analyses show that except for a few groups of people for dietary fat and mammography, these women did not discriminate greatly between the various barriers. The fact that the clusters typically came out with no problems, some problems, and difficult problems shows that these women tended to see all their obstacles as essentially equivalent. This conclusion is supported by some of the data from the psychometric analysis in which we found that the item-total correlations tended to be high and that the coefficient alpha's were in the 0.90 range. This means that women who had a lot of difficulty with one barrier tended to have a lot of difficulty with others. The few exceptions to this pattern have mainly to do with emotional factors related to eating and to mammography. In addition, with eating taste and temptation appear to function as specific barriers for some of the women.

These results have implications for the next steps in our research, the development of community based intervention programs to improve population levels of compliance with primary and secondary cancer prevention behaviors. First, the results of the community survey showed that there are few specific differences in barriers between African American and Caucasian women. When differences existed, the African American women usually reported less difficulty with barriers than the white women. While intervention programs need to have messages that are tailored to the culture of the recipient, these results suggest that interventions for black and white women do not need to have radically different content as the obstacles both groups face are similar both in kind and in magnitude. This conclusion needs to be considered somewhat tentative given the older age of our sample. It might be that we would have found more ethnic differences in a younger group of women. The validation sample from the housing project was younger and poorerand in general reported more difficulty with the barriers than the community sample. Further research using different age groups and conducted in different parts of the country is necessary before firm conclusions can be drawn about ethnic differences in the barriers to cancer prevention in women.

Despite these limitations, intervention programs to promote improved diet and cancer screening in African American women need to be developed and tested. The finding of our studies can be readily applied to this task. For example, we have learned that most women face a variety of barriers to making health behavior changes. These tend to be both psychological, such as overcoming fears and dealing with stress, and environmental like learning to eat differently in restaurants or dealing with family members who are reluctant to support making changes. In addition, some women will need help in even seeing that there are barriers that keep them from successfully making and maintaining health behavior changes. There appears to be a substantial number of women who report no barriers to change yet they are not compliant with cancer prevention guidelines. While it is possible that our methodology missed the barriers that are important for these women, it is also possible that they are simply not aware of the obstacles that stand in their way.

Our methodology was a good way to identify, measure, and evaluate the significance of barriers of which women are aware. That is, in order to make it into our study, a barrier had to mentioned by 5 or more women during the interviews. It is quite possible that there are both psychological factors and environmental systems that prevent women from making changes yet are outside of their conscious awareness. Identification of this sort of barrier will require a different methodological approach.

These results have sharpened our theoretical thinking about barriers to behavior change. In the literature, there has been no real discussion of how people become aware that some situation is creating an obstacle to changing a behavior. Most past research has assumed that people know what the barriers are and can describe these to others. This is the assumption we began with, and we have come to see that understanding a woman's perceptions of the barriers to behavior change is only a partial understanding of why she is able or unable to change. Intervention programs need to be developed using fully functional psychological theories that help us understand knowledge, motivation, intention, action, and barriers to those actions. An individual may fail to comply with preventive recommendations for a variety of reasons, not just because they face personal barriers to making changes.

KEY RESEARCH ACCOMPLISHMENTS

KEY RESEARCH ACCOMPLISHMENTS

- Structured interviews to elicit perceptions of barriers to behavior change
- A comprehensive coding system with manual for describing psychological and environmental barriers to health behavior change
- A specific taxonomy of the barriers for the behaviors associated with primary and secondary prevention of breast cancer
- The Obstacles to Low Fat Eating Questionnaire
- The Obstacles to Eating Fruits and Vegetables Questionnaire
- The Obstacles to Breast Self-Examination Questionnaire
- The Obstacles to Mammography Questionnaire
- A description of the obstacles in two groups of African Americans: one in a housing project and one in the community at large
- A description of the obstacles to primary and secondary prevention of breast cancer in white women
- An analysis of how these barriers differ as a function of stage of change, ethnicity, and SES.

REPORTABLE OUTCOMES

Abstracts – presented

1. Schlundt, D.G., Brownlee, A, Hargreaves, M.K., Buchowski, M, & Bigelow, J. (1999). Obstacles to dietary behavior changes in African American women. Annals of Behavioral Medicine, 21, S181.

2. Hargreaves, M.K., Buchowski, J., Bigelow, J, & Schlundt, D.G. (1999). Contextual factors contributing to eating behaviors of African American women.Annals of Behavioral Medicine, 21, S142.

Abstracts – submitted

1. Hargreaves, M.K., Buchowski, M., Schlundt, D.G. A Community Survey of Barriers to Dietary Change, Submitted to the Society for Behavioral Medicine, September, 1999..

2. Schlundt, D.G., Hargreaves, M.K., Buchowski, M. Questionnaires to Measure Barriers to Dietary Change in African American Women, Submitted to the Society for Behavioral Medicine, September, 1999.

Manuscripts in preparation

1. Descriptive study of barriers to dietary behavior change in African American Women
2. Descriptive study of barriers to breast cancer screening behaviors in African American Women
3. Development and validation of questionnaires to measure obstacles to dietary behavior change
4. Development and validation of questionnaires to measure obstacles to breast cancer screening
5. Stages of change and barriers to reducing dietary fat and increasing consumption of fruits and vegetables
6. Stages of change and barriers to breast self-examination and mammography
7. A community survey of barriers to dietary behavior change
8. A community survey of barriers to breast cancer screening
9. Individual differences in barriers to cancer prevention
10. Review of the literature on barriers to dietary behavior change
11. Review of the literature on the barriers to breast cancer screening
12. Development and validation of an Eating Behavior Patterns Questionnaire for African American Women

All manuscripts have a first draft consisting of purpose, methods and results. We will develop the specific discussion sections based on our findings as presented in this report.

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CONCLUSIONS

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We followed a systematic methodology for identifying, measuring, and describing individual's perceptions of barriers to primary and secondary prevention of breast cancer. As a result, we now have a taxonomy of barriers to changing four behaviors: reducing fat intake, increasing consumption of fruits and vegetables, doing breast self-examinations, and getting mammography. Further, we developed measurement tools to assess the importance of these barriers and validated these tools in a psychometric study. We then described the relative importance of these barriers in a community sample and examined how these barriers differ as a function of ethnicity, SES, and stage of change.

Future work on the barriers to behavior change in the community needs to include more specific and objective measures of the target behaviors in addition to measuring the barriers to behavior change. It is not sufficient to have people simply report on their stage of change, it is important to have an independent verification of whether or not the individual is compliant with cancer prevention recommendations. Future surveys should also focus on the full age range, even though mammography is only applicable to women over forty.

A greater understanding of barriers to behavior change is an important scientific product in that it will inform public health efforts to influence these behaviors in order to reduce the incidence of breast cancer and also to lower breast cancer mortality rates. This process will be made easier now because there are carefully developed and validated measurement tools. These tools can be used to describe the barriers to behavior change in other populations, and to monitor the effectiveness of clinical and public health interventions. The results of this study also provide a rational and empirical basis for developing clinical and community intervention programs. These programs need to be developed and tested in future research.

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TABLES AND FIGURES

Tables

Table 1: Frequency of Obstacles to Reducing Dietary Fat and Increasing Fruit and Vegetable Intake from Interviews with 155 African American Women.

Low-Fat Obstacles	Frequency	Fruits and Vegetables	Frequency
Time	183	Time	94
Taste	171	Specific Costs	91
Not Liking to Change	87	Taste	77
Restaurants	79	Health	49
Specific Costs	78	Restaurants	45
Work Demands	73	Not Liking to Change	45
Unsure of Benefits	68	Poverty	28
Family Demands	65	Work Demands	28
Family Tradition	64	Lack of Knowledge	26
Lack of Knowledge	51	Pain Consequence	25
Fast Food	50	Seasonal, Regional, or Weather	23
Lack of Willpower	40	Fast Food	22
Social Events	39	Resources of Workplace	20
Sabotage	36	Family Demands	18
Difficulty	33	Difficulty	15
Cravings	29	Lack of Willpower	15
Poverty	26	Sabotage	11
Negative Emotional triggers	23		
Attitudes Towards Medicine	20		
Resources of Workplace	19		
Vending Machines	14		
Other traits	12		
Family Conflict	11		
Health	11		
Other Aspects of Work	11		

Table 2: Frequency of Obstacles to Breast Self-Examination (n=155) and Mammography (n=104) from Interviews with African American Women.

Breast Self-Exam	Frequency	Mammography	Frequency
I forgot	113	Fear Trigger	68
Lack of Knowledge	74	Time	34
Time	48	I forgot	24
Fear Trigger	48	Work Demands	20
Attitudes Towards Medicine	13	Poverty	19
I Never Thought of It	11	Pain Consequence	18
Negative Emotional Triggers	10	Negative Emotional Consequences	15
Work Demands	9	Attitudes Towards Medicine	10
Difficulty	9	Specific Costs	10
Unsure of Benefits	8	Health Recommendations	10
Laziness	7	Unsure of Benefits	9
Lack of Willpower	5	Negative Emotional Triggers	5
Health	5	Laziness	5

Table 3: Obstacles to Behavior Change Coding System with Reliabilities and Means and Standard Deviations for Dietary Fat and Fruits and Vegetables

Hierarchical Classification of Explanations	r-Fat[a]	Mean Fat[b]	SD Fat	r_Frveg	Mean Frveg	SD Frveg
1.0 Psychological Explanations						
1.1 Emotional Explanations						
1.1.1 Feeling Triggers						
1.1.1.1 Negative Emotional Triggers	0.95	0.15	0.46	1	0.05	0.25
1.1.1.2 Fear Trigger		0	0	0	0	0
1.1.1.3 Positive Emotional Trigger		0	0	1	0.01	0.11
1.1.1.4 Boredom Trigger		0	0	0	0	0
1.1.1.5 Deprivation Trigger		0.025	0.25	0	0.006	0.002
1.1.2 Feeling Consequences						0
1.1.2.1 Negative Emotional Consequences	0.92	0.051	0.22	0	0.05	0.25
1.1.2.2 Positive Emotional Consequence	1	0.013	0.11	0	0	0
1.1.2.3 Embarrassment		0	0	0	0	0
1.1.2.4 Guilt or Shame		0	0	0	0	0
1.2 Personality Explanations						
1.2.1 Laziness	1	0.03	0.16	1	0.05	0.24
1.2.2 Other trait		0.08	0.08	0	0	0
1.3 Physiological Explanations						
1.3.1 Cravings	0.97	0.19	0.41	1	0.03	0.18
1.3.2 Hunger	0.96	0.05	0.29	0.93	0.05	0.24
1.3.3 Pain trigger		0	0	0	0.006	0.08
1.3.4 Pain Consequence	1	0.04	0.26	0.94	0.16	0.73
1.3.5 Health	1	0.07	0.33	0.99	0.32	1.04
1.3.6 Taste	0.99	1.1	1.19	1	0.5	1.01
1.4 Cognitive Explanations						
1.4.1.1 Thoughts as Triggers						
1.4.1.1 I Failed		0	0	0	0.006	0.08
1.4.1.2 Lack of Confidence	1	0.012	0.11	1	0.03	0.2
1.4.1.3 Difficulty	0.85	0.21	0.56	0.74	0.1	0.32
1.4.1.4 Lack of Knowledge	1	0.33	0.65	1	0.17	0.48
1.4.1.5 Lack of Willpower	0.95	0.26	0.52	1	0.1	0.32
1.4.1.6 I forgot		0	0	0.44	0.04	0.22
1.4.1.7 I Never Thought of It	1	0.01	0.11	1	0.06	0.23
1.4.1.8 Other thoughts		0	0	0	0	0
1.4.1.2 Thoughts as Consequences						
1.4.2.1 Negative Self-Evaluation		0	0	0	0	0

1.4.2.2 Loss of Pride or Self-Esteem		0	0	0	0	0
1.4.2.3 Not Liking to Change	0.94	0.56	0.87	0.95	0.29	0.74
1.4.2.4 Unsure of Benefits	0.97	0.44	0.87	0.83	0.06	0.25
1.4.2.5 Failure Experience	1	0.02	0.11	0	0	0
2.0 Environmental Explanations						
2.1 Time	0.99	1.18	1.48	0.99	0.61	1.01
2.2 Financial						
2.2.1 Poverty	0.89	0.17	0.48	0.79	0.18	0.54
2.2.2 Specific Costs	0.99	0.5	0.69	0.96	0.59	0.99
2.2.3 Competing Costs	1	0.003	0.26	0	0	0
2.3 Family						
2.3.1 Emotional Support	1	0.02	0.14	1	0.02	0.18
2.3.2 Tangible Support	1	0.03	0.26	1	0.01	0.11
2.3.3 Family Conflict	1	0.07	0.26	1	0.03	0.16
2.3.4 Sabotage	0.82	0.23	0.59	1	0.07	0.3
2.3.5 Family Tradition	0.97	0.41	0.66	1	0.06	0.29
2.3.6 Family Demands	0.95	0.42	0.77	0.97	0.12	0.39
2.4 Work						
2.4.1 Work Demands	0.97	0.47	0.91	0.99	0.18	0.54
2.4.2 Work Environment						
2.4.2.1 Actions of Coworkers	1	0.05	0.25	0	0.01	0.11
2.4.2.2 Rules of Workplace		0	0	0	0	0
2.4.2.3 Resources of Workplace	0.92	0.12	0.35	0.97	0.13	0.37
2.4.2.4 Other Aspects of Work	1	0.07	0.26	1	0.01	0.14
2.5 Home Environment						
2.5.1 Resources at Home		0.03	0.26	1	0.01	0.18
2.5.2 Space		0	0	0	0	0
2.5.3 Other Aspects of Home	0.7	0.012	0.11	1	0.006	0.08
2.6 Community						
2.6.1 Travel and Transportation		0.006	0.08	1	0.03	0.18
2.6.2 Resources						
2.6.2.1 Restaurants	0.94	0.51	0.66	0.94	0.29	0.46
2.6.2.2 Fast Food	1	0.32	0.57	1	0.14	0.41
2.6.2.3 Groceries	1	0.019	0.14	1	0.01	0.14
2.6.2.4 Vending Machines	0.96	0.09	0.31	1	0.05	0.21
2.6.2.5 Medical Resources		0.006	0.08	0	0	0
2.6.2.6 Seasonal, Regional, or Weather		0.02	0.14	0.98	0.15	0.54
2.6.3 Health Beliefs and Traditions						

2.6.3.1 Religions Traditions		0	0	0	0	0
2.6.3.2 Social Events	0.96	0.25	0.49	1	0.03	0.19
2.6.3.3 Social Sanction	1	0.03	0.2	0	0	0
2.6.3.4 Folk Beliefs		0	0	0	0	0
2.6.3.5 Attitudes Towards Medicine	1	0.13	0.39	0.91	0.06	0.24
2.6.3.6 Health Recommendations		0	0	0	0	0
2.7 Interpersonal						
2.7.1 Social Facilitation	1	0.06	0.28	0	0	0
2.7.2 Interpersonal Conflict	1	0.01	0.11	0	0	0
2.7.3 Lack of Social Support	1	0.03	0.18	0	0	0

a The Pearson correlation between the frequency with which a category was mentioned in the primary and secondary coders. The sample size for computation of this coefficient was 54.

b The mean number of times a particular barrier was mentioned across 155 interviews.

Table 4: Obstacles to Behavior Change Coding System with Reliabilities and Means and Standard Deviations for Breast Self-Examination and Mammography

Hierarchical Classification of Explanations	r-bse[a]	Mean bse[b]	SD bse	r_mam	Mean mam	SD mam
1.0 Psychological Explanations						
1.1 Emotional Explanations						
1.1.1 Feeling Triggers						
1.1.1.1 Negative Emotional Triggers	0.96	0.08	0.39	1	0.05	0.26
1.1.1.2 Fear Trigger	0.98	0.38	0.84	0.98	0.65	1.18
1.1.1.3 Positive Emotional Trigger		0	0		0	0
1.1.1.4 Boredom Trigger		0	0	0	0	0
1.1.1.5 Deprivation Trigger		0	0		0	0
1.1.2 Feeling Consequences						0
1.1.2.1 Negative Emotional Consequences	1	0.03	0.18	0.92	0.14	0.45
1.1.2.2 Positive Emotional Consequence		0	0	0	0	0
1.1.2.3 Embarrassment	1	0.02	0.15	0.81	0.02	0.16
1.1.2.4 Guilt or Shame		0	0	0	0	0
1.2 Personality Explanations						
1.2.1 Laziness	1	0.06	0.29	0.95	0.04	0.29
1.2.2 Other trait		0.008	0.08	0	0	0
1.3 Physiological Explanations						
1.3.1 Cravings	0	0	0		0	0
1.3.2 Hunger	0	0	0		0	0
1.3.3 Pain trigger	1	0.008	0.08	0.7	0.02	0.14
1.3.4 Pain Consequence	1	0.02	0.15	0.94	0.17	0.49
1.3.5 Health	1	0.04	0.32		0	0
1.3.6 Taste	0	0	0		0	0
1.4 Cognitive Explanations						
1.4.1.1 Thoughts as Triggers						
1.4.1.1 I Failed		0	0		0	0
1.4.1.2 Lack of Confidence	0.61	0.03	0.17		0	0
1.4.1.3 Difficulty	1	0.07	0.32		0	0
1.4.1.4 Lack of Knowledge	0.99	0.59	1.28	1	0.03	0.17
1.4.1.5 Lack of Willpower	1	0.04	0.23	1	0.03	0.22
1.4.1.6 I forgot	0.95	0.9	1	0.98	0.23	0.53
1.4.1.7 I Never Thought of It	0.87	0.09	0.4	1	0.02	0.2
1.4.1.8 Other thoughts		0	0	0	0	0
1.4.1.2 Thoughts as Consequences						
1.4.2.1 Negative Self-Evaluation		0	0		0	0
1.4.2.2 Loss of Pride or Self-Esteem		0	0		0	0
1.4.2.3 Not Liking to Change	1	0.008	0.08	1	0.02	0.14
1.4.2.4 Unsure of Benefits	0.96	0.06	0.33	1	0.08	0.37
1.4.2.5 Failure Experience		0	0	0	0	0
2.0 Environmental Explanations						
2.1 Time	0.96	0.38	1.01	0.95	0.33	0.74
2.2 Financial						
2.2.1 Poverty	1	0.008	0.08	0.91	0.18	0.54

2.2.2 Specific Costs		0	0	0.86	0.09	0.37
2.2.3 Competing Costs		0.008	0.08	0	0	0
2.3 Family						
2.3.1 Emotional Support		0	0		0	0
2.3.2 Tangible Support		0.008	0.08		0	0
2.3.3 Family Conflict		0.008	0.08		0	0
2.3.4 Sabotage	1	0.008	0.08	1	0.02	0.14
2.3.5 Family Tradition		0	0		0	0
2.3.6 Family Demands		0.008	0.08	1	0.02	0.14
2.4 Work						
2.4.1 Work Demands	0.95	0.07	0.34	1	0.19	0.52
2.4.2 Work Environment						
2.4.2.1 Actions of Coworkers		0	0		0	0
2.4.2.2 Rules of Workplace		0	0		0	0
2.4.2.3 Resources of Workplace		0	0		0	0
2.4.2.4 Other Aspects of Work		0	0		0	0
2.5 Home Environment						
2.5.1 Resources at Home		0	0		0	0
2.5.2 Space		0	0		0	0
2.5.3 Other Aspects of Home		0	0		0	0
2.6 Community						
2.6.1 Travel and Transportation		0	0	1	0.03	0.22
2.6.2 Resources						
2.6.2.1 Restaurants		0	0		0	0
2.6.2.2 Fast Food		0	0		0	0
2.6.2.3 Groceries		0	0		0	0
2.6.2.4 Vending Machines		0	0		0	0
2.6.2.5 Medical Resources	1	0.02	0.2		0.009	0.09
2.6.2.6 Seasonal, Regional, or Weather			0		0	0
2.6.3 Health Beliefs and Traditions						
2.6.3.1 Religions Traditions		0	0		0	0
2.6.3.2 Social Events		0	0		0	0
2.6.3.3 Social Sanction		0	0		0	0
2.6.3.4 Folk Beliefs		0	0		0	0
2.6.3.5 Attitudes Towards Medicine	1	0.1	0.38	0.77	0.09	0.33
2.6.3.6 Health Recommendations		0	0	0.84	9	0.36
2.7 Interpersonal						
2.7.1 Social Facilitation		0	0		0	0
2.7.2 Interpersonal Conflict		0	0		0	0
2.7.3 Lack of Social Support		0	0		0	0

a The Pearson correlation between the frequency with which a category was mentioned in the primary and secondary coders. The sample size for computation of this coefficient was 54.

b The mean number of times a particular barrier was mentioned across 125 interviews for Breast Self Examination and 104 interviews for Mammography

Table 5: Correlation between number of Obstacles Mentioned and Demographic Variables

Variable	Age	Education	Income	BMI
Lowfat - Total	-.20*	.18*	.03	.04
Lowfat - Psychological	-.25**	.19*	.08	-.06
Lowfat - Environmental	-.11	.10	-.12	.09
Fruits & Vegetables - Total	-.09	.05	-.06	.13
Fruits & Vegetables- Psychological	-.08	.03	-.06	.05
Fruits & Vegetables - Environmental	-.07	.06	-.04	.16*
BSE - total	-.11	-.11	-.24**	-.03
BSE - Psychological	-.09	-.09	-.25**	-.07
BSE - Environmental	-.09	-.08	-.09	.06
Mammogram - Total	.11	-.08	-.10	-.11
Mammogram - Psychological	.12	-.13	-.12	-.11
Mammogram - Environmental	.06	.01	-.02	-.06

* $p < 0.05$
** $p < 0.01$

Table 6: Creation of Dietary Fat Intake Items from the Interview Data

Category	Questionnaire Item	Mean times per person	S.D.	% who mentioned item
2.1 Time – the inability to adhere is attributed to a lack of time or to competing demands or obligations that take away time from making healthy choices. Or complains that healthy choices take to much time to follow as opposed to unhealthy alternatives.	1. Eating a low-fat diet takes too much time.	1.2	1.5	53%
1.3.6 Taste – the taste, texture, or quality of food influences one's choices. Healthy foods, low-fat foods, or foods preferred for disease prevention lack taste compared to unhealthy alternatives or high fat foods, and unhealthy foods taste so much better that they are preferred. Taste may also refer to specifically liking the taste of certain foods such as butter, meat, or cheese.	2. I don't like the taste of low-fat foods. 3. High-fat foods taste so good that I can't give them up.	1.1	1.2	66%
1.4.2.3 Not liking to change – choosing to adhere would involve making a change in one's habits or routines. The individual expresses the idea that she does not like to make changes and this is the reason she cannot adhere. This may also be stated in terms of having habits that are difficult to change or that the individual does not want to change.	3. I don't like making changes in my eating habits.	.56	.87	38%
2.6.2.1 Restaurants – the foods one should eat are not available in restaurants	4. It is hard to get a low-fat meal at a restaurant.	.50	.66	43%
2.2.2 Specific costs - the inability to adhere is attributed to the high cost of an item, service, medication, food etc. This can include the direct cost of the item, or an indirect cost such as short shelf life which makes you have to throw food away.	5. Low-fat foods are too expensive.	.50	.69	40%

2.4.1 Work demands – the demands of work are too high in terms of time, energy, attention, or effort to allow the person to be adherent.	6. My work keeps me so busy that I can't find the time to follow a low-fat diet.	.47	.92	28%
2.3.6 Family demands – the action could not be done because the level of demands for time, energy, effort, or attention from family members was too high or got in the way. Use this category whenever a person describes having to make a choice between adherence and the needs or demands of family life.	7. Eating low fat is hard because I have to cook for my family.	.42	.77	28%
2.3.5 Family tradition – the behavior would violate a norm of family behavior or somehow go against family traditions. Family here can mean both immediate family and extended family.	8. The way my family has always eaten involves lots of high fat foods.	.41	.66	34%
1.4.2.4 Unsure of benefits. The individual does not choose the behavior because she is unsure of what benefits might occur from doing so. This category may also be used when the individual knows what the benefits are, but is unsure that the benefits are powerful or worthwhile. This can also refer to knowing what the benefits are and not valuing those benefits, for example not being interested in losing weight. This category can also be used when specific benefits are mentioned as not being relevant or desirable to the individual. For example, the individual may state that she is not overweight so therefore she would not benefit from cutting her fat intake.	9. I'm not sure how eating low fat foods would help me.	.32	.87	18%
1.4.1.4 Lack of knowledge or information – the behavior is not selected because the individual does not have sufficient knowledge or information necessary to perform the behavior.	10. I am very sure about what foods to eat and what foods not to eat on a low-fat diet.	.32	.65	25%

2.6.2.2 Fast food – fast food establishments do not sell healthy foods	11. Eating a lot of fast foods makes it hard for me to follow a low-fat diet.	.32	.57	28%
1.4.1.5 Lack of will power/motivation – the individual describes struggling with making choices of healthy behaviors over unhealthy alternatives and explains that she lacks will power to make the healthy choice. When someone describes lacking motivation, or not having enough motivation to do something (and is not more specific about motivational factors), then code using this category.	12. I just don't have the will power when it comes to passing up high fat foods that I enjoy.	.26	.52	22%
2.6.3.2 Social events – attending social events in one's community creates a problem for adherence. This might include ball games, parties, school events, church socials, or getting together with neighbors and friends.	13. I love to eat the high fat foods at Church meals and other social functions.	.25	.49	22%
2.3.4 Sabotage – the actions or lack of actions on the part of family members sabotages the individual's attempts to adhere to recommendations. The actions may vary from trying to talk the person out of it .	14. My family pressures me to eat high fat foods.	.23	.59	17%
1.4.1.3 Difficulty – the action is perceived as too difficult or beyond one's ability or skill.	15. Eating low fat is too difficult for me to do.	.21	.56	17%
1.3.1 Cravings – the person describe having a craving for a particular food or type of food. Cravings may also refer to a taste such as sweet or salty.	16. I get cravings for high-fat foods.	.19	.41	18%
2.2.1 Poverty – a general statement is made that one is too poor or lacks the financial resources to be able to adhere to recommendations	17. I am too poor to be able to afford eating a low-fat diet,	.17	.48	13%
1.1.1.1 Negative emotional trigger – The feeling is negative or an unhappy such as a feeling of anger, sadness, anxiety, or depression.	18. I eat high-fat foods when I get upset, angry, stressed out, or depressed.	.15	.47	13%

2.6.3.5 Attitudes towards medicine – the individual expresses a cultural belief or attitude towards medicine, doctors, or the medical establishment that prevents or impedes adherence. An example is the idea that doctors are only interested in making money, or drug companies cannot be trusted, or public health officials are all telling lies. Any expression of distrust of doctors or health professionals, even if you cannot tell specifically if it is a cultural attitude, should be coded using this category.	19. I don't trust doctors or dietitians who tell me I should lower my fat intake.	.13	.39	11%
2.4.2.3 Resources of workplace – the resources in the workplace are such that it makes it difficult or impossible to adhere.	20. I can't get low-fat foods to eat at the place I work.	.12	.35	11%

Table 7: Generation of Fruit and Vegetable Items from the Interview Results

Category	Questionnaire Item	Mean times per person	S.D.	% who mentioned item
2.1 Time – the inability to adhere is attributed to a lack of time or to competing demands or obligations that take away time from making healthy choices. Or complains that healthy choices take to much time to follow as opposed to unhealthy alternatives.	1. Eating more fruits and vegetables would take too much time.	.61	1.0	37%
2.2.2 Specific costs - the inability to adhere is attributed to the high cost of an item, service, medication, food etc. This can include the direct cost of the item, or an indirect cost such as short shelf life which makes you have to throw food away.	2. Eating more fruits and vegetables would cost too much money.	.59	.99	33%
1.3.6 Taste – the taste, texture, or quality of food influences one's choices. Healthy foods, low-fat foods, or foods preferred for disease prevention lack taste compared to unhealthy alternatives or high fat foods, and unhealthy foods taste so much better that they are preferred. Taste may also refer to specifically liking the taste of certain foods such as butter, meat, or cheese.	3. When choosing something to eat, I often pick something that tastes better than fruits or vegetables..	.50	1.0	28%
1.3.5 Health – the anticipated effect of adherence on one's health is negative or is insufficiently positive. The state of one's health might be such that it prevents the individual from adhering. Health conditions include things like physical handicaps, lack of teeth, chronic fatigue, incontinence, unable to get out of the house, and so forth.	4. I don't see how eating more fruits and vegetables would improve my health.	.32	1.0	23%

1.4.2.3 Not liking to change – choosing to adhere would involve making a change in one's habits or routines. The individual expresses the idea that she does not like to make changes and this is the reason she cannot adhere. This may also be stated in terms of having habits that are difficult to change or that the individual does not want to change.	5. I just don't like making changes in the way I eat.	.29	.74	18%
2.6.2.1 Restaurants – the foods one should eat are not available in restaurants	6. It's hard to order fresh fruits and vegetables when eating in restaurants.	.29	.45	29%
2.2.1 Poverty – a general statement is made that one is too poor or lacks the financial resources to be able to adhere to recommendations	7. I can't afford to buy many fresh fruits or vegetables.	.18	.54	13%
2.4.1 Work demands – the demands of work are too high in terms of time, energy, attention, or effort to allow the person to be adherent.	8. I am so busy with my work that I can never find the time to buy fruits and vegetables.	.18	.54	13%
1.4.1.4 Lack of knowledge or information – the behavior is not selected because the individual does not have sufficient knowledge or information necessary to perform the behavior.	9. I don't know much about the benefits of eating more fruits and vegetables.	.17	.48	13%
1.3.4 Pain consequence – the consequence of adhering is aches and pains. These can include headaches, stomach aches, muscle cramps, or feelings of tenderness or discomfort.	10. Eating too many fruits and vegetables gives me an upset stomach or gas.	.16	.73	6%
2.6.2.6 Seasonal, regional, or weather – variations in season, location, or weather limit the availability of healthy choices.	11. The fruits and vegetables I like are only available during certain seasons of the year.	.14	.55	8%

2.6.2.2 Fast food – fast food establishments do not sell healthy foods	12. I eat so much fast food that it is hard to get a lot of fruits and vegetables.	.14	.41	11%
2.4.2.3 Resources of workplace – the resources in the workplace are such that it makes it difficult or impossible to adhere.	13. Fruits and vegetables are not available where I work.	.13	.37	12%
2.3.6 Family demands – the action could not be done because the level of demands for time, energy, effort, or attention from family members was too high or got in the way. Use this category whenever a person describes having to make a choice between adherence and the needs or demands of family life.	14. Taking care of my family's needs does not leave enough time for serving fresh fruits and vegetables.	.12	.39	9%

Table 8: Generation Breast Self-Examination Items from Interview Data

Category	Questionnaire Item	Mean times per person	S.D.	% who mentioned item
1.4.1.6 I forgot – the individual explains that memory problems or forgetting is the reason for not engaging in a behavior. This may be expressed as a failure to think about something or a failure to recognize when it is an appropriate time to do something.	1. I just forget to do a breast self-examination each month.	.88	.97	55%
1.4.1.4 Lack of knowledge or information – the behavior is not selected because the individual does not have sufficient knowledge or information necessary to perform the behavior.	2. I am not sure about the correct way to do a breast self-examination.	.55	1.2	25%
1.1.1.2 Fear trigger - being afraid or what might happen or what consequence might occur leads to failure to adhere or selection of an incompatible behavior instead. If no specific source of the fear is described or can be reasonably inferred from the context, then code it as a negative emotional trigger. This category is to be used with a specific fear event or outcome is identified.	3. I don't like to do breast self-examinations because I am afraid of finding a lump.	.35	.78	24%
2.1 Time – the inability to adhere is attributed to a lack of time or to competing demands or obligations that take away time from making healthy choices. Or complains that healthy choices take to much time to follow as opposed to unhealthy alternatives.	4. I am too busy to do a breast self-examination each month.	.32	.92	18%

2.6.3.5 Attitudes towards medicine – the individual expresses a cultural belief or attitude towards medicine, doctors, or the medical establishment that prevents or impedes adherence. An example is the idea that doctors are only interested in making money, or drug companies cannot be trusted, or public health officials are all telling lies. Any expression of distrust of doctors or health professionals, even if you cannot tell specifically if it is a cultural attitude, should be coded using this category.	5. I don't trust doctors so I don't pay much attention when they tell me to check my breasts for cancer.	.10	.38	8%
1.4.1.7 I never thought of it – the individual explains that they have never engaged in the behavior because it never occurred to them to do so.	6. I has never occurred to me that I should check my breasts each month for lumps.	.08	.37	5%
2.4.1 Work demands – the demands of work are too high in terms of time, energy, attention, or effort to allow the person to be adherent.	7. I spend so much time and energy on my job that I never seem to get around to doing a breast self-exam.	.08	.35	5%
1.1.1.1 Negative emotional trigger – The feeling is negative or an unhappy such as a feeling of anger, sadness, anxiety, or depression.	8. I don't get around to examining my breasts because my life is so stressful all the time.	.07	.36	4%
1.4.1.3 Difficulty – the action is perceived as too difficult or beyond one's ability or skill.	9. I don't examine my breasts because I am not very good at it.	.06	.29	5%

1.4.2.4 Unsure of benefits. The individual does not choose the behavior because she is unsure of what benefits might occur from doing so. This category may also be used when the individual knows what the benefits are, but is unsure that the benefits are powerful or worthwhile. This can also refer to knowing what the benefits are and not valuing those benefits, for example not being interested in losing weight. This category can also be used when specific benefits are mentioned as not being relevant or desirable to the individual. For example, the individual may state that she is not overweight so therefore she would not benefit from cutting her fat intake.	10. I don't examine my breasts regularly because I am not sure how this really helps me.	.06	.30	4%

Table 9: Generation of Mammography Items From Interview Data

Category	Questionnaire Item	Mean times per person	S.D.	% who mentioned item
1.1.1.2 Fear trigger - being afraid or what might happen or what consequence might occur leads to failure to adhere or selection of an incompatible behavior instead. If no specific source of the fear is described or can be reasonably inferred from the context, then code it as a negative emotional trigger. This category is to be used with a specific fear event or outcome is identified.	1. The fear of finding cancer keeps me from having a mammogram done.	.62	1.3	30%
2.1 Time – the inability to adhere is attributed to a lack of time or to competing demands or obligations that take away time from making healthy choices. Or complains that healthy choices take to much time to follow as opposed to unhealthy alternatives.	2. I am so busy I never seem to find the time to schedule a mammogram.	.31	.70	22%
1.4.1.6 I forgot – the individual explains that memory problems or forgetting is the reason for not engaging in a behavior. This may be expressed as a failure to think about something or a failure to recognize when it is an appropriate time to do something.	3. I never seem to remember to schedule a mammogram.	.25	.56	20%
2.4.1 Work demands – the demands of work are too high in terms of time, energy, attention, or effort to allow the person to be adherent.	4. My work keeps me so busy that I don't have the time to go have a mammogram done.	.20	.51	18%
2.2.1 Poverty – a general statement is made that one is too poor or lacks the financial resources to be able to adhere to recommendations	5. I am poor and cannot afford to spend money on things like mammograms.	.18	.53	14%

1.3.4 Pain consequence – the consequence of adhering is aches and pains. These can include headaches, stomach aches, muscle cramps, or feelings of tenderness or discomfort.	6. Mammograms cause too much pain and discomfort.	.16	.46	13%
1.1.2.1 Negative emotional consequence – adhering provokes negative feelings like depression, anger, anxiety, or sadness. General statements about actions being stressful are coded with this category.	7. The whole process of having a mammogram is scarey and stressful.	.12	.41	10%
2.6.3.5 Attitudes towards medicine – the individual expresses a cultural belief or attitude towards medicine, doctors, or the medical establishment that prevents or impedes adherence. An example is the idea that doctors are only interested in making money, or drug companies cannot be trusted, or public health officials are all telling lies. Any expression of distrust of doctors or health professionals, even if you cannot tell specifically if it is a cultural attitude, should be coded using this category.	8. I don't trust doctors so I don't pay much attention when they tell me I need to have a mammogram.	.12	.39	10%
2.6.3.6 Family demands – the action could not be done because the level of demands for time, energy, effort, or attention from family members was too high or got in the way. Use this category whenever a person describes having to make a choice between adherence and the needs or demands of family life.	9. Taking care of my family leaves little time or energy for scheduling a mammorgram.	.09	.35	8%
2.2.2 Specific costs - the inability to adhere is attributed to the high cost of an item, service, medication, food etc. This can include the direct cost of the item, or an indirect cost such as short shelf life which makes you have to throw food away.	10. I don't know how I would pay for a mammogram.	.08	.36	6%

1.4.2.4 Unsure of benefits. The individual does not choose the behavior because she is unsure of what benefits might occur from doing so. This category may also be used when the individual knows what the benefits are, but is unsure that the benefits are powerful or worthwhile. This can also refer to knowing what the benefits are and not valuing those benefits, for example not being interested in losing weight. This category can also be used when specific benefits are mentioned as not being relevant or desirable to the individual. For example, the individual may state that she is not overweight so therefore she would not benefit from cutting her fat intake.	11. I don't think I would get much benefit from having a mammogram.	.08	.35	6%

Table 10: Responses of 117 African American women to the Obstacles to Low-Fat Eating Questionnaire

Item	Mean ± S.D.	Item total correlation	Not a Problem=1	A little Difficult = 2	Difficult = 3	Extremely Difficult = 4
1. The time it takes to prepare low-fat foods makes it	2.0 ± 1.0	0.50	45%	17%	30%	7%
2. The good taste of high fat foods makes it	2.8 ± 1.0	0.37	15%	19%	41%	25%
3. Changing the way I eat makes it	2.7 ± 0.8	0.43	8%	30%	45%	17%
4. Eating in restaurants and fast foods places makes it	2.6 ± 1.0	0.54	17%	24%	40%	18%
5. The high cost of low-fat foods makes it	2.3 ± 1.0	0.50	31%	22%	37%	10%
6. My busy work schedule makes it	1.8 ± 1.1	0.53	57%	11%	22%	10%
7. Keeping my family happy with the foods I cook makes it	2.3 ± 1.1	0.55	34%	19%	28%	18%
8. My family's habit of eating high fat foods makes it	2.6 ± 1.1	0.55	23%	17%	40%	20%
9. Not knowing what foods to eat on a low-fat diet makes it	2.6 ± 1.0	0.60	20%	19%	44%	17%
10. Not knowing what foods to avoid on a low-fat diet makes it	2.6 ± 1.0	0.60	18%	22%	43%	17%
11. Eating a lot of fast foods makes it	2.7 ± 1.0	0.55	17%	19%	46%	18%
12. Not having the will power to pass up high fat foods that I enjoy makes it	2.9 ± 1.1	0.54	13%	13%	40%	34%
13. Enjoying high fat foods at church meals and other social functions makes it	2.5 ± 1.1	0.53	27%	19%	34%	19%
14. Family pressure to eat high-fat foods makes it	2.3 ± 1.0	0.64	32%	21%	37%	11%
15. Cravings for high-fat foods makes it	2.7 ± 1.1	0.59	20%	14%	39%	27%
16. Eating when I feel angry, upset, stressed, or depressed makes it	2.4 ± 1.1	0.52	33%	16%	30%	21%
17. Not being able to buy low-fat foods at work makes it	1.8 ± 1.0	0.60	57%	12%	23%	8%
18. Having to buy many special foods makes it	2.3 ± 1.0	0.66	29%	22%	41%	8%
19. Feeling deprived of all the foods I like makes it	2.6 ± 1.1	0.66	24%	18%	34%	24%

Alpha = 0.91

Table 11: Responses of 117 African American women to the Obstacles to Fruits and Vegetables Questionnaire

Item	Mean ± S.D.	Item-Total Correlation	Not a Problem=1	A little Difficult = 2	Difficult = 3	Extremely Difficult = 4
1. The time it takes to prepare fruits and vegetables makes it	1.4 ± 0.7	0.52	71%	18%	9%	2%
2. The high cost of eating fruits and vegetables makes it	1.8 ± 1.0	0.53	53%	20%	21%	6%
3. Liking other foods more than fruits and vegetables makes it	2.2 ± 0.8	0.51	21%	41%	33%	5%
4. Changing the way I eat makes it makes it	2.2 ± 1.0	0.67	32%	22%	37%	9%
5. Eating in restaurants and fast food places makes it	2.1 ± 1.0	0.64	40%	22%	28%	10%
6. The time it takes to buy and prepare fruits and vegetables makes it	1.6 ± 0.9	0.65	63%	19%	15%	3%
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	1.9 ± 1.1	0.57	53%	10%	26%	10%
8. Not being able to get the fruits and vegetables I like all year round makes it	2.2 ± 1.1	0.56	38%	19%	32%	11%
9. My liking to eat fast food makes it	2.1 ± 1.1	0.60	43%	16%	31%	10%
10. Not being able to get fruits and vegetables at work makes it	1.7 ± 1.0	0.63	67%	8%	17%	9%
11. The effort it takes to prepare fruits and vegetables makes it	1.5 ± 0.8	0.69	68%	16%	13%	4%
12. My family not liking to eat fruits and vegetables makes it	1.6 ± 1.0	0.55	63%	15%	16%	6%
13. Not having transportation to get to a store makes it	2.2 ± 1.2	0.57	45%	11%	24%	19%
14. Forgetting to eat fruits and vegetables makes it	1.9 ± 1.0	0.65	49%	20%	21%	10%

Alpha = 0.90

Table 12: Responses of 117 African American women to the Obstacles to Breast Self-Examination Questionnaire

Item	Mean ± S.D.	Item-Total Correlation	Not a Problem=1	A little Difficult = 2	Difficult = 3	Extremely Difficult = 4
1. Remembering to do a breast self-examination each month	1.8 ± 1.0	0.64	52%	25%	16%	7%
2. Doing the breast exam correctly is	1.6 ± 0.9	0.74	62%	19%	15%	5%
3. My fear of doing breast self-examination makes it	1.7 ± 1.0	0.71	62%	14%	18%	6%
4. My busy schedule makes it	1.4 ± 0.8	0.70	78%	9%	10%	3%
5. Checking my breast **each month** for lumps is	1.5 ± 0.8	0.78	69%	17%	13%	1%
6. Spending so much time and energy on my job makes it	1.4 ± 0.8	0.75	81%	6%	10%	3%
7. My stressful life makes examining my breasts	1.5 ± 0.9	0.78	71%	10%	15%	4%
8. Not being good at doing breast self-examination makes it	1.4 ± 0.8	0.80	79%	9%	9%	3%
9. Since nobody has ever shown me how to do a breast self-examination, I find it	1.5 ± 0.9	0.71	74%	9%	12%	5%

Alpha = 0.92

Table 13: Responses of 53 African American women to the Obstacles to Mammography Questionnaire

Item	Mean ± S.D.	Item-Total Correlation	Not a Problem=1	A little Difficult = 2	Difficult = 3	Extremely Difficult = 4
1. The fear of finding cancer makes it	2.4 ± 1.1	0.52	32%	11%	40%	17%
2. My busy schedule makes it	1.4 ± 0.8	0.64	77%	11%	13%	2%
3. Remembering to schedule a mammogram is	1.6 ± 1.0	0.62	68%	11%	13%	8%
4. Being very busy at work makes it	1.3 ± 0.8	0.63	81%	8%	8%	4%
5. The cost makes it	1.5 ± 1.0	0.26	74%	9%	8%	9%
6. The pain and discomfort makes it	1.7 ± 1.0	0.57	58%	15%	21%	6%
7. The scary stressful process of having a mammogram makes it	2.0 ± 1.2	0.58	49%	13%	23%	15%
8. The time and effort to care for my family makes it	1.4 ± 0.9	0.47	77%	6%	13%	4%
9. Not knowing where to get a mammogram makes it	1.5 ± 1.0	0.59	75%	4%	17%	4%

coefficient alpha = 0.83

Table 14: Correlations of Obstacles to Reducing Fat Intake with Macronutrient Intake Measured by a Food Frequency Questionnaire

Item	Total Kcal	Total Fat	Protein	Carbohydrates
1. The time it takes to prepare low-fat foods makes it	.09	.15	.05	.04
2. The good taste of high fat foods makes it	.03	.05	.01	.00
3. Changing the way I eat makes it	..22*	.24*	.18	.18
4. Eating in restaurants and fast foods places makes it	.13	.13	.19	.09
5. The high cost of low-fat foods makes it	.20	.22*	.21*	.18
6. My busy work schedule makes it	.29**	.31**	.32**	.21*
7. Keeping my family happy with the foods I cook makes it	.01	.04	-.02	.00
8. My family's habit of eating high fat foods makes it	.13	.17	.14	.08
9. Not knowing what foods to eat on a low-fat diet makes it	.18	.22*	.17	.12
10. Not knowing what foods to avoid on a low-fat diet makes it	.13	.16	.13	.08
11. Eating a lot of fast foods makes it	.16	.15	.19	.13
12. Not having the will power to pass up high fat foods that I enjoy makes it	.26*	.27*	.24*	.22*
13. Enjoying high fat foods at church meals and other social functions makes it	.19	.21*	.23*	.14
14. Family pressure to eat high-fat foods makes it	.21*	.26*	.20	.13
15. Cravings for high-fat foods makes it	.09	.13	.13	.02
16. Eating when I feel angry, upset, stressed, or depressed makes it	.32**	.32**	.33**	.26*
17. Not being able to buy low-fat foods at work makes it	.13	.13	.18	.09
18. Having to buy many special foods makes it	.12	.14	.15	.08
19. Feeling deprived of all the foods I like makes it	.04	.08	.07	-.01
Total Score	.26*	.29**	.27**	.19
Stepwise Multiple Regression	.47***	.38***	.50***	.38**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: Correlations of the Obstacles to Low-Fat eating items with Selected Micronutrient Content as Measured by a Food Frequency Questionnaire

Item	Vitamin A (IU)	Vitamin C (mg)	Vitamin E (mg)	Fiber (grams)
1. The time it takes to prepare low-fat foods makes it	-.03	-.09	-.01	-.05
2. The good taste of high fat foods makes it	-.17	-.15	-.12	-.16
3. Changing the way I eat makes it	.02	.01	.15	.07
4. Eating in restaurants and fast foods places makes it	.02	-.01	-.05	-.06
5. The high cost of low-fat foods makes it	.09	.03	.12	.14
6. My busy work schedule makes it	-.03	.08	.09	.03
7. Keeping my family happy with the foods I cook makes it	-.01	-.06	.00	-.08
8. My family's habit of eating high fat foods makes it	-.14	-.10	-.06	-.15
9. Not knowing what foods to eat on a low-fat diet makes it	-.04	-.12	.08	-.05
10. Not knowing what foods to avoid on a low-fat diet makes it	.00	-.13	.05	-.07
11. Eating a lot of fast foods makes it	.06	.03	.02	.00
12. Not having the will power to pass up high fat foods that I enjoy makes it	.12	-.03	.14	.03
13. Enjoying high fat foods at church meals and other social functions makes it	.12	.07	.08	.01
14. Family pressure to eat high-fat foods makes it	,05	.10	.02	-.01
15. Cravings for high-fat foods makes it	-.07	-.04	-.06	-.13
16. Eating when I feel angry, upset, stressed, or depressed makes it	.07	.11	.11	.06
17. Not being able to buy low-fat foods at work makes it	-.04	-.06	-.02	-.05
18. Having to buy many special foods makes it	-.12	-.03	-.06	-.06
19. Feeling deprived of all the foods I like makes it	-.12	-.18*	-.14	-.20*
Total Score	-.03	-.09	.01	-.09
Stepwise Multiple Regression	N.S.	.21*	N.S.	.32**

* $p < 0.05$
** $p < 0.01$

Table 16: Correlations of Obstacles to Low Fat Eating With Food Group Frequencies from a Food Frequency Questionnaire

Item	Grains	Fast Food	Dairy	Fruit	Veggies	Meat	Snacks desserts
1. The time it takes to prepare low-fat foods makes it	-.22*	-.01	.03	-.06	-.23*	.24**	-.01
2. The good taste of high fat foods makes it	-.14	-.13	-.07	-.13	-.25**	.11	-.10
3. Changing the way I eat makes it	-.01	-.13	.13	-.06	-.13	.28**	-.02
4. Eating in restaurants and fast foods places makes it	.00	.02	.03	.00	-.16	.16	.00
5. The high cost of low-fat foods makes it	.02	-.17*	.03	-.14	-.10	.28*	.20*
6. My busy work schedule makes it	.11	-.10	-.09	-.16	-.14	.39**	.06
7. Keeping my family happy with the foods I cook makes it	-.06	.02	-.14	-.10	-.23*	.13	-.10
8. My family's habit of eating high fat foods makes it	.07	.06	-.15	-.11	-.21*	.21*	-.09
9. Not knowing what foods to eat on a low-fat diet makes it	-.05	-.09	.06	-.11	-.24*	.22*	-.05
10. Not knowing what foods to avoid on a low-fat diet makes it	.04	-.09	.03	-.15	-.24*	-.19*	-.10
11. Eating a lot of fast foods makes it	.03	-.08	.15	-.16	-.24**	.27*	.07
12. Not having the will power to pass up high fat foods that I enjoy makes it	-.10	-.11	-.10	-.03	-.09	.21*	.02
13. Enjoying high fat foods at church meals and other social functions makes it	-.10	-.12	-.12	-.10	-.19*	.17	-.09
14. Family pressure to eat high-fat foods makes it	-.07	-.16	-.17	-.08	-.16	.33**	-.02
15. Cravings for high-fat foods makes it	-.11	.05	-.18*	-.07	-.17	.33*	-.01
16. Eating when I feel angry, upset, stressed, or depressed makes it	.12	-.10	.08	-.10	-.05	.34*	.06
17. Not being able to buy low-fat foods at work makes it	-.06	-.13	.02	-.26**	-.11	.30**	-.09
18. Having to buy many special foods makes it	.04	-.10	-.09	-.17	-.27**	.31**	.06
19. Feeling deprived of all the foods I like makes it	.05	.07	-.06	-.15	-.25**	.18*	-.09
Total Score	-.05	-.08	-.06	-.18*	-.29**	.39**	-.06
Stepwise Multiple Regression	.32**	.19*	.36**	.24*	.35**	.48***	.31**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 17: Correlations of the Obstacles to Low-Fat eating items with the Eating Behavior Patterns Questionnaire and the Eating Styles Questionnaire

Item	EPPQ Lowfat	EBPQ Snacking	EBPQ emotional	EBPQ Impulsive	EBPQ Meal skip	EBPQ Ethnic	ESQ Total
1	-.11	.35**	.18	.04	.04	.18	-.18
2	-.14	.13	.07	.07	.12	.05	-.24*
3	-.27**	.22*	.20*	.12	-.03	.27*	-.30**
4	-.09	.32**	.18	.03	.15	.30*	-.04
5	-.09	.20*	.19*	-.04	-.03	.15	-.11
6	-.21*	.32**	.12	.08	-.13	.21*	-.20
7	-.20*	.12	.03	.21*	.06	.04	-.21*
8	-.29**	.24**.	.09	.15	.00	.24**	-.26**
9	-.10	.12	.08	.12	.08	.12	-.15
10	-.13	.11	.08	.19*	.07	.09	-.17
11	-.02	.15	.00	.02	-.07	.11	-.04
12	-.35**	.34**	.14	.19*	.05	.37**	-.31*
13	-.11	.12	.09	.00	.07	.02	.04
14	-.17	.23*	.17	.07	.08	.08	-.23*
15	-.15	.16	.16	.00	-.05	.10	-.10
16	0.04	.40**	.46**	-.06	-.12	.21*	-.10
17	-.05	.30**	.14	.00	-.06	.19*	-.12
18	-.12	.28**	.21*	.18	-.04	.14	-.17
19	-.11	.21*	..22*	.23*	-.06	.17	-.13
Total score	-.21*	.39**	.26**	.11	.03	.28**	-.23*
Stepwise Regression	.51***	.54***	.53***	.22*	N.S.	.55***	.48***

N.S. Regression model did not account for a significant amount of variance in the Dependent variable

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 18: Correlations of the Obstacles to Low-Fat eating items with Demographic Variables (n=93)

Item	Age	Education	Activity	BMI
1. The time it takes to prepare low-fat foods makes it	-.26*	-.16	.02	.16
2. The good taste of high fat foods makes it	-.18	-.17	-.16	.27**
3. Changing the way I eat makes it	-.08	.05	-.03	.05
4. Eating in restaurants and fast foods places makes it	-.20	.18	.05	-.04
5. The high cost of low-fat foods makes it	-.14	.14	.01	.11
6. My busy work schedule makes it	-.27**	-.01	.21*	.06
7. Keeping my family happy with the foods I cook makes it	-.15	.10	.02	.26**
8. My family's habit of eating high fat foods makes it	-.23*	.13	-.06	.14
9. Not knowing what foods to eat on a low-fat diet makes it	-.18	.03	.11	.19
10. Not knowing what foods to avoid on a low-fat diet makes it	-.10	.10	.06	.18
11. Eating a lot of fast foods makes it	-.18	.03	-.13	-.12
12. Not having the will power to pass up high fat foods that I enjoy makes it	-.26*	.11	-.13	.06
13. Enjoying high fat foods at church meals and other social functions makes it	-.10	.03	.05	.07
14. Family pressure to eat high-fat foods makes it	-.12	-.08	.12	.09
15. Cravings for high-fat foods makes it	-.22*	.03	-.05	.08
16. Eating when I feel angry, upset, stressed, or depressed makes it	-.24*	.04	-.01	.05
17. Not being able to buy low-fat foods at work makes it	-.05	.05	.02	-.02
18. Having to buy many special foods makes it	-.21*	.10	-.01	.10
19. Feeling deprived of all the foods I like makes it	-.05	.16	-.14	.17
Total Score	-.27*	.06	.01	.15
Stepwise Multiple Regression	.33**	.30*	.36**	.38**

* $p < 0.05$
** $p < 0.01$

Table 19: Correlations Between Obstacles to Eating Fruits and Vegetables and Macronutrient Intake

Item	Total Kcal	Total Fat	Protein	Carbohydrates
1. The time it takes to prepare fruits and vegetables makes it	-.04	-.01	-.01	-.07
2. The high cost of eating fruits and vegetables makes it	-.08	-.08	-.07	-.09
3. Liking other foods more than fruits and vegetables makes it	-.03	-.01	-.05	-.05
4. Changing the way I eat makes it makes it	.02	.05	-.02	.00
5. Eating in restaurants and fast food places makes it	.00	.03	.06	-.05
6. The time it takes to buy and prepare fruits and vegetables makes it	-.09	-.07	-.05	-.12
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	-.03	-.07	-.01	-.02
8. Not being able to get the fruits and vegetables I like all year round makes it	.09	.07	.11	.09
9. My liking to eat fast food makes it	.12	.13	.15	.09
10. Not being able to get fruits and vegetables at work makes it	.09	.05	.17	.08
11. The effort it takes to prepare fruits and vegetables makes it	-.11	-.09	-.07	-.14
12. My family not liking to eat fruits and vegetables makes it	.04	.04	.00	.05
13. Not having transportation to get to a store makes it	.03	.00	.05	.05
14. Forgetting to eat fruits and vegetables makes it	.04	.05	.04	.01
Total Score	.01	.01	.04	-.01
Stepwise Multiple Regression	N.S.[a]	N.S.	N.S.	N.S.

a No regression model was able to account for a significant amount of variance in macronutrient intake.

Table 20: Correlations Between Obstacles to Eating Fruits and Vegetables with Selected Micronutrient Intake from a Food Frequency Questionnaire

Item	Vitamin A (IU)	Vitamin C (mg)	Vitamin E (mg)	Fiber (grams)
1. The time it takes to prepare fruits and vegetables makes it	-.07	-.12	-.15	-.12
2. The high cost of eating fruits and vegetables makes it	-.08	-.16	-.16	-.20*
3. Liking other foods more than fruits and vegetables makes it	-.10	-.22*	-.10	-.12
4. Changing the way I eat makes it makes it	-.12	-.20*	.05	-.09
5. Eating in restaurants and fast food places makes it	-.14	-.07	-.10	-.18*
6. The time it takes to buy and prepare fruits and vegetables makes it	-.09	-.26**	-.18*	-.18*
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	-.05	-.24	-.07	-.04
8. Not being able to get the fruits and vegetables I like all year round makes it	-.02	.01	.03	.05
9. My liking to eat fast food makes it	-.01	-.10	-.05	-.07
10. Not being able to get fruits and vegetables at work makes it	.05	-.05	.04	.04
11. The effort it takes to prepare fruits and vegetables makes it	-.03	-.13	-.11	-.12
12. My family not liking to eat fruits and vegetables makes it	-.01	-.04	.04	.03
13. Not having transportation to get to a store makes it	-.07	.04	.01	.06
14. Forgetting to eat fruits and vegetables makes it	-.06	-.14	-.07	-.03
Total Score	-.07	-.16	-.08	-.09
Stepwise Multiple Regression	N.S.	.25**	.18*	.28**

a No regression model was able to account for a significant amount of variance in macronutrient intake.
* $p < 0.05$,
** $p < 0.01$

Table 21: Correlations Between Obstacles to Eating Fruits and Vegetables and Food Groups from a Food Frequency Questionnaire

Item	Grains	Fast food	Dairy	Fruits	Veggies	Meats	Snacks desserts
1. The time it takes to prepare fruits and vegetables makes it	-.03	-.14	-.09	-.15	-.08	-.02	.00
2. The high cost of eating fruits and vegetables makes it	.00	.09	-.25**	-.27**	-.12	.077	-.08
3. Liking other foods more than fruits and vegetables makes it	-.05	-.04	-.11	.08	-.12	.05	.04
4. Changing the way I eat makes it makes it	-.03	-.11	-.16	-.03	-.14	-.-3	.04
5. Eating in restaurants and fast food places makes it	.02	-.15	-.18*	-.10	-.13	.10	-.08
6. The time it takes to buy and prepare fruits and vegetables makes it	-.13	-.06	-.09	-.33**	-.16	-.02	-.05
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	.02	-.16	.00	-.11	-.03	.00	-.13
8. Not being able to get the fruits and vegetables I like all year round makes it	.20*	-.17	.14	-.12	-.11	.13	.00
9. My liking to eat fast food makes it	.20*	-.19*	.00	-.14	-.19*	.13	-.02
10. Not being able to get fruits and vegetables at work makes it	.00	-.16	.07	-.24**	-.02	.09	-.05
11. The effort it takes to prepare fruits and vegetables makes it	-.11	-.09	-.08	-.26**	-.08	.01	-.01
12. My family not liking to eat fruits and vegetables makes it	-.19*	-.17*	-.10	-.07	-.01	.04	-.02
13. Not having transportation to get to a store makes it	.07	-.11	.01	-.17	.12	.06	.08
14. Forgetting to eat fruits and vegetables makes it	.02	-.15	-.08	-.13	-.14	.06	.00
Total Score	.02	-.17	-.08	-.20*	-.11	.08	-.02
Stepwise Multiple Regression	.32**	.18	.38**	.43**	.33**	N.S.[a]	N.S.[a]

a No regression model was able to account for a significant amount of variance in micronutrient intake.
* $p < 0.05$
** $p < 0.01$

Table 22: Correlations of the Obstacles to Eating Fruits and Vegetables Questionnaire items with the Eating Behavior Patterns Questionnaire and the Eating Styles Questionnaire

Item	EPPQ Lowfat	EBPQ Snacking	EBPQ emotional	EBPQ Impulsive	EBPQ Meal skip	EBPQ Ethnic	ESQ Total
1	-.14	.20*	-.01	.05	-.11	.11	-.13
2	-.14	.13	.19*	.07	.00	.05	-.03
3	-.20*	.23*	.21*	.03	-.07	.23*	-.21*
4	-.23*	.07	.12	.07	-.10	.27**	-.09
5	-.12	.02	.00	-.06	-.05	.09	.03
6	-.25**	.03	.06	.14	-.09	.09	-.10
7	-.12	-.02	.14	.02	.10	.15	.01
8	-.05	-.04	.02	.02	-.12	.03	-.03
9	-.08	.12	.06	.00	-.14	.18	.02
10	-.05	.04	.02	-.02	-.09	.11	.02
11	-.19*	.11	-.03	.16	-.10	.09	-.09
12	-.16	.25**	.14	.22*	.13	.13	-.09
13	.04	-.01	.18	-.17	-.03	.05	.07
14	-.14	.10	.08	.11	.05	.14	-.14
Total score	-.19*	.12	.13	.06	-.05	.18	-.07
Stepwise Regression	.36**	.25**	.21*	.36**	N.S.	.27**	.19*

N.S. Regression model did not account for a significant amount of variance in the Dependent variable
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 23: Correlations of the Obstacles to Eating Fruits and Vegetables Demographic Variables (n=93)

Item	Age	Education	Activity	BMI
1. The time it takes to prepare fruits and vegetables makes it	-.22*	-.06	-.10	.05
2. The high cost of eating fruits and vegetables makes it	-.06	.15	-.18	.29**
3. Liking other foods more than fruits and vegetables makes it	-.09	-.06	-.25*	-.02
4. Changing the way I eat makes it makes it	-.06	-.05	-.29**	.29**
5. Eating in restaurants and fast food places makes it	-.07	.12	-.19	.15
6. The time it takes to buy and prepare fruits and vegetables makes it	-.12	.07	-.23*	.07
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	.00	-.10	-.25*	.25*
8. Not being able to get the fruits and vegetables I like all year round makes it	-.18	-.10	.00	.10
9. My liking to eat fast food makes it	-.04	-.05	-.13	-.12
10. Not being able to get fruits and vegetables at work makes it	-.04	.07	-.10	-.09
11. The effort it takes to prepare fruits and vegetables makes it	-.04	.03	-.18	.17
12. My family not liking to eat fruits and vegetables makes it	-.09	.01	-.19	.10
13. Not having transportation to get to a store makes it	.06	.05	-.20	.17
14. Forgetting to eat fruits and vegetables makes it	-.09	-.05	-.11	.00
Total Score	-.09	-.01	-.26*	.16
Stepwise Multiple Regression	.22*	N.S.	.29**	.48***

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

Table 24: Correlation of Obstacles to Breast Self-Examination with Screening Behaviors (n=95)

Item	Blood Pressure	Choles	Mammo-gram	Breast Self_exam	Skin Cancer	Pap Smear
1. Remembering to do a breast self-examination each month	-.15	-.15	-.11	-.44**	-.04	-.25*
2. Doing the breast exam correctly is	-.01	-.08	-.07	-.36**	.01	-.23*
3. My fear of doing breast self-examination makes it	-.00	-.01	-.09	-.22*	.09	-.14
4. My busy schedule makes it	.00	.00	-.10	-.14	.20*	-.06
5. Checking my breast **each month** for lumps is	-.06	-.05	-.09	-.40**	.06	-.26*
6. Spending so much time and energy on my job makes it	.01	.07	-.06	-.11	.20	-.09
7. My stressful life makes examining my breasts	-.05	-.06	-.09	-.18	.08	-.18
8. Not being good at doing breast self-examination makes it	-.02	.07	-.11	-.30**	.03	-.21*
9. Since nobody has ever shown me how to do a breast self-examination, I find it	.07	-.04	-.11	-.26**	.03	-.21*
Total	-.03	-.03	-.10	-.29**	.12	-.20*
Stepwise Multiple Regression	N.S.	N.S.	N.S.	.43***	.20*	.27**

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$
N.S. = regression model was not significant

Table 25: Correlations of Obstacles to Breast Self-Exam with Demographic Variables (n=93)

Item	Age	Education	Activity	BMI
1. Remembering to do a breast self-examination each month	-.20*	.13	-.12	.21*
2. Doing the breast exam correctly is	-.01	.00	-.10	.21*
3. My fear of doing breast self-examination makes it	-.09	.06	-.14	.25*
4. My busy schedule makes it	-.15	-.09	-.10	.20*
5. Checking my breast **each month** for lumps is	-.10	.06	-.07	.13
6. Spending so much time and energy on my job makes it	-.15	.05	-.16	.20*
7. My stressful life makes examining my breasts	-.12	.10	-.26*	.28**
8. Not being good at doing breast self-examination makes it	-.05	.11	-.14	.28**
9. Since nobody has ever shown me how to do a breast self-examination, I find it	-.12	-.08	.00	.28**
Total	-.14	.04	-.17	.27*
Stepwise Multiple Regression	.20*	N.S.	.34**	.29**

* $p < 0.05$
** $p < 0.01$
N.S. = regression model was not significant

Table 26: Correlation of Obstacles to Mammography with Screening Behaviors (n=47)

Item	Blood Pressure	Cholest	Mammo-gram	Breast Self_exam	Skin Cancer	Pap Smear
1. The fear of finding cancer makes it	.14	-.11	-.06	-.08	.01	-.21
2. My busy schedule makes it	.00	-.22	-.26	-.19	.05	-.24
3. Remembering to schedule a mammogram is	-.01	-.16	-.16	-.19	-.03	-.33*
4. Being very busy at work makes it	-.05	-.28	-.31*	-.24	.02	-.33*
5. The cost makes it	-.04	-.19	-.32*	-.12	-.05	-.23
6. The pain and discomfort makes it	-.03	-.29	-.13	-.16	-.02	-.17
7. The scary stressful process of having a mammogram makes it	.01	-.33*	-.22	-.17	.03	-.38*
8. The time and effort to care for my family makes it	.12	.03	-.07	-.07	-.22	-.03
9. Not knowing where to get a mammogram makes it	.07	-.13	-.27	-.07	.22	-.15
Total	.01	.01	-.20	.04	-.02	-.15
Stepwise Multiple Regression	N.S.	.33*	.32*	N.S.	N.S.	.45**

* $p < 0.05$
** $p < 0.01$
N.S. = regression model was not significant

Table 27: Correlations of Obstacles to Mammography with Demographic Variables (n=42)

Item	Age	Education	Activity	BMI
1. The fear of finding cancer makes it	-.23	-.19	-.26	.22
2. My busy schedule makes it	-.18	.01	.03	.15
3. Remembering to schedule a mammogram is	-.29	.18	-.10	.35*
4. Being very busy at work makes it	-.25	.03	-.09	.11
5. The cost makes it	-.17	-.40**	-.01	.16
6. The pain and discomfort makes it	-.32*	.18	-.03	.07
7. The scary stressful process of having a mammogram makes it	-.22	-.04	-.11	.11
8. The time and effort to care for my family makes it	-.16	.04	-.24	.39*
9. Not knowing where to get a mammogram makes it	-.22	.15	-.18	.39*
Total	-.31*	.06	-.03	.51**
Stepwise Multiple Regression	.32*	..54***	n.s.	.51**

* $p < 0.05$
** $p < 0.01$
*** $P < 0.001$

Table 28: Stage of Change and Obstacles to Low Fat Eating

Item	Pre-contemplation (n=35)	Contemplation (n=40)	Preparation (n=23)	Action (n=9)	Maintenance (n=8)
1. The time it takes to prepare low-fat foods makes it **	2.3 ± 1.2	2.2 ± 0.9	1.8 ± 1.1	1.3 ± 0.7	1.1 ± 0.3
2. The good taste of high fat foods makes it**	2.9 ± 1.0	3.0 ± 0.9	2.8 ± 1.0	1.9 ± 1.1	2.0 ± 0.5
3. Changing the way I eat makes it ***	2.9 ± 0.8	2.9 ± 0.7	2.7 ± 0.8	2.0 ± 0.5	1.8 ± 0.9
4. Eating in restaurants and fast foods places makes it	2.6 ± 1.1	2.8 ± 0.9	2.3 ± 1.0	2.7 ± 1.2	2.5 ± 0.9
5. The high cost of low-fat foods makes it	2.5 ± 1.1	2.4 ± 1.0	2.0 ± 0.9	1.9 ± 0.9	1.8 ± 0.7
6. My busy work schedule makes it *	2.2 ± 1.2	1.9 ± 1.1	1.4 ± 0.9	1.9 ± 1.2	1.3 ± 0.5
7. Keeping my family happy with the foods I cook makes it **	2.6 ± 1.1	2.5 ± 1.1	2.0 ± 1.0	2.1 ± 1.3	1.3 ± 0.5
8. My family's habit of eating high fat foods makes it	2.9 ± 1.1	2.6 ± 1.0	2.4 ± 1.0	2.4 ± 1.1	1.8 ± 0.9
9. Not knowing what foods to eat on a low-fat diet makes it **	2.7 ± 0.9	2.8 ± 0.9	2.4 ± 1.1	2.6 ± 1.1	1.4 ± 0.7
10. Not knowing what foods to avoid on a low-fat diet makes it **	2.7 ± 1.0	2.8 ± 0.9	2.5 ± 1.0	2.6 ± 1.1	1.4 ± 0.7
11. Eating a lot of fast foods makes it	2.7 ± 1.0	2.7 ± 0.9	2.4 ± 1.1	2.8 ± 0.9	2.8 ± 1.0
12. Not having the will power to pass up high fat foods that I enjoy makes it ***	3.2 ± 0.9	3.3 ± 0.8	2.8 ± 1.1	1.9 ± 1.0	1.9 ± 1.0
13. Enjoying high fat foods at church meals and other social functions makes it	2.3 ± 1.3	2.6 ± 1.0	2.5 ± 1.2	2.5 ± 0.8	2.2 ± 1.1
14. Family pressure to eat high-fat foods makes it	2.5 ± 1.1	2.4 ± 1.0	2.0 ± 0.9	1.8 ± 0.7	1.9 ± 1.2
15. Cravings for high-fat foods makes it	2.8 ± 1.1	2.8 ± 0.9	2.8 ± 1.2	2.4 ± 0.9	2.5 ± 1.2
16. Eating when I feel angry, upset, stressed, or depressed makes it	2.5 ± 1.2	2.4 ± 1.2	2.1 ± 1.0	2.0 ± 1.2	2.3 ± 0.9
17. Not being able to buy low-fat foods at work makes it	2.1 ± 1.2	1.9 ± 1.0	1.5 ± 0.8	1.9 ± 0.9	1.4 ± 0.7
18. Having to buy many special foods makes it **	2.5 ± 1.1	2.4 ± 0.9	1.9 ± 0.9	2.4 ± 0.7	1.4 ± 0.7
19. Feeling deprived of all the foods I like makes it	2.7 ± 1.1	2.7 ± 1.0	2.5 ± 1.2	2.5 ± 1.1	1.8 ± 1.2
Psychological Obstacles ***	2.8 ± 0.7	2.8 ± 0.5	2.6 ± 0.7	2.3 ± 0.6	1.9 ± 0.5
Environmental Obstacles **	2.5 ± 0.7	2.4 ± 0.5	2.0 ± 0.5	1.7 ± 0.5	2.3 ± 0.7

* The obstacle differs by stage of change $p < 0.05$
** The obstacle differs by stage of change $p < 0.01$
*** The obstacle differs by stage of change $p < 0.001$

Table 29: Stage of Change and Obstacles to Eating Fruits and Vegetables

Item	Pre-contemplation (n=11)	Contemplation (n=54)	Preparation (n=16)	Action (n=9)	Maintenance (n=22)
1. The time it takes to prepare fruits and vegetables makes it **	1.4 ± 0.7	1.6 ± 0.8	1.3 ± 0.6	1.2 ± 0.4	1.0 ± 0.0
2. The high cost of eating fruits and vegetables makes it *	2.4 ± 1.1	1.9 ± 1.0	1.9 ± 1.0	1.4 ± 0.7	1.4 ± 0.8
3. Liking other foods more than fruits and vegetables makes it	2.1 ± 0.7	2.4 ± 0.9	2.3 ± 1.0	2.3 ± 0.7	1.8 ± 0.7
4. Changing the way I eat makes it makes it	2.4 ± 1.1	2.4 ± 1.0	2.1 ± 0.8	2.0 ± 0.9	1.9 ± 1.1
5. Eating in restaurants and fast food places makes it	2.5 ± 1.2	2.1 ± 1.0	2.6 ± 1.0	1.7 ± 1.0	1.7 ± 1.0
6. The time it takes to buy and prepare fruits and vegetables makes it **	2.3 ± 1.1	1.7 ± 1.0	1.3 ± 0.5	1.3 ± 0.5	1.2 ± 0.6
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it	2.2 ± 1.3	1.9 ± 1.1	2.1 ± 1.2	1.8 ± 1.1	1.8 ± 1.1
8. Not being able to get the fruits and vegetables I like all year round makes it	2.0 ± 1.0	2.3 ± 1.1	2.4 ± 1.0	1.8 ± 1.1	1.9 ± 1.2
9. My liking to eat fast food makes it	2.1 ± 1.2	2.1 ± 1.1	2.7 ± 0.9	1.6 ± 0.9	1.8 ± 1.1
10. Not being able to get fruits and vegetables at work makes it	1.4 ± 0.7	1.8 ± 1.1	2.1 ± 1.2	1.3 ± 1.0	1.4 ± 0.9
11. The effort it takes to prepare fruits and vegetables makes it *	1.5 ± 0.8	1.8 ± 1.1	1.4 ± 0.7	1.1 ± 0.3	1.2 ± 0.7
12. My family not liking to eat fruits and vegetables makes it	1.5 ± 0.7	1.8 ± 1.0	1.9 ± 1.0	1.3 ± 1.0	1.4 ± 0.8
13. Not having transportation to get to a store makes it	1.6 ± 1.0	2.3 ± 1.2	2.4 ± 1.1	2.3 ± 1.4	2.0 ± 1.3
14. Forgetting to eat fruits and vegetables makes it **	1.3 ± 0.5	2.2 ± 1.1	1.8 ± 0.8	1.9 ± 1.2	1.5 ± 0.9
Psychological Obstacles	2.5 ± 0.7	2.8 ± 0.7	2.7 ± 0.6	2.3 ± 0.5	2.7 ± 0.7
Environmental Obstacles	2.2 ± 0.8	2.4 ± 0.7	2.2 ± 0.5	2.0 ± 0.4	2.3 ± 0.7

* The obstacle differs by stage of change $p < 0.05$
** The obstacle differs by stage of change $p < 0.01$
*** The obstacle differs by stage of change $p < 0.001$

Table 30: Stage of Change and Obstacles to Breast Self-Examination

Item	Pre-contemplation (n=9)	Contemplation (n=18)	Preparation (n=28)	Action (n=16)	Maintenance (n=43)
1. Remembering to do a breast self-examination each month ***	2.6 ± 1.2	2.1 ± 0.9	2.3 ± 0.7	1.6 ± 0.9	1.2 ± 0.7
2. Doing the breast exam correctly is **	2.6 ± 1.2	1.9 ± 1.0	1.7 ± 0.8	1.5 ± 0.8	1.4 ± 0.8
3. My fear of doing breast self-examination makes it	2.3 ± 1.3	1.9 ± 1.0	1.7 ± 0.8	1.8 ± 1.2	1.4 ± 0.9
4. My busy schedule makes it	1.6 ± 1.1	1.6 ± 0.8	1.3 ± 0.6	1.3 ± 0.9	1.4 ± 0.9
5. Checking my breast **each month** for lumps is **	2.2 ± 1.2	1.7 ± 0.8	1.6 ± 0.7	1.3 ± 0.7	1.2 ± 0.7
6. Spending so much time and energy on my job makes it	1.6 ± 1.1	1.6 ± 0.8	1.4 ± 0.8	1.6 ± 1.0	1.2 ± 0.7
7. My stressful life makes examining my breasts	1.9 ± 1.2	1.7 ± 0.9	1.6 ± 0.9	1.6 ± 1.0	1.3 ± 0.8
8. Not being good at doing breast self-examination makes it	2.0 ± 1.2	1.6 ± 0.8	1.2 ± 0.6	1.4 ± 1.0	1.2 ± 0.8
9. Since nobody has ever shown me how to do a breast self-examination, I find it *	2.1 ± 1.4	1.7 ± 0.9	1.7 ± 0.9	1.4 ± 1.0	1.2 ± 0.7
Psychological obstacles ***	2.3 ± 1.1	1.8 ± 0.7	1.7 ± 0.5	1.5 ± 0.8	1.3 ± 0.7
Environmental Obstacles	1.7 ± 1.1	1.6 ± 0.8	1.4 ± 0.7	1.5 ± 0.9	1.3 ± 0.7

* The obstacle differs by stage of change $p < 0.05$
** The obstacle differs by stage of change $p < 0.01$
*** The obstacle differs by stage of change $p < 0.001$

Table 31: Stages of Change and Obstacles to Mammography

Item	Pre-contemplation (n=8)	Contemplation (n=7)	Preparation (n=2)	Action (n=18)	Maintenance (n=17)
1. The fear of finding cancer makes it	2.1 ± 1.2	2.6 ± 1.1	3.5 ± 0.7	2.3 ± 1.0	2.4 ± 1.3
2. My busy schedule makes it **	1.3 ± 0.8	2.4 ± 1.3	1.0 ± 0.0	1.2 ± 0.5	1.2 ± 0.6
3. Remembering to schedule a mammogram is ***	1.7 ± 1.0	3.1 ± 0.7	1.0 ± 0.0	1.3 ± 0.8	1.2 ± 0.5
4. Being very busy at work makes it ***	1.3 ± 0.8	2.4 ± 1.4	1.0 ± 0.0	1.1 ± 0.3	1.1 ± 0.3
5. The cost makes it	1.6 ± 1.1	2.1 ± 1.1	1.0 ± 0.0	1.6 ± 1.1	1.1 ± 0.2
6. The pain and discomfort makes it	1.9 ± 1.1	2.0 ± 1.0	2.0 ± 1.4	1.6 ± 0.9	1.6 ± 0.9
7. The scary stressful process of having a mammogram makes it	2.0 ± 1.0	2.3 ± 1.1	3.0 ± 0.0	1.9 ± 1.1	1.7 ± 1.2
8. The time and effort to care for my family makes it	1.4 ± 0.8	2.1 ± 1.1	1.0 ± 0.0	1.3 ± 0.7	1.4 ± 0.9
9. Not knowing where to get a mammogram makes it	1.6 ± 1.0	2.1 ± 1.1	2.0 ± 1.4	1.2 ± 0.5	1.3 ± 0.8
Psychological Obstacles	1.9 ± 0.5	2.1 ± 0.5	1.8 ± 0.4	1.9 ± 0.6	2.3 ± 0.8
Environmental obstacles ***	1.4 ± 0.6	2.2 ± 0.9	1.2 ± 0.3	1.3 ± 0.4	1.2 ± 0.4

* The obstacle differs by stage of change $p < 0.05$
** The obstacle differs by stage of change $p < 0.01$
*** The obstacle differs by stage of change $p < 0.001$

Table 32: Obstacles to Reducing Dietary Fat Intake as a Function of Ethnicity and SES in a Community Sample

Item (1=not a problem – 4 = Extremely difficult)	African American			Caucasian			Sig
	Low SES n=74	Med SES n=85	High SES n=49	Low SES n=89	Med SES n=65	High SES n=46	
1. The time it takes to prepare low-fat foods makes it	1.5 ± 0.8	1.6 ± 0.9	1.8 ± 1.0	1.6 ± 0.8	1.6 ± 0.9	1.7 ± 0.8	
2. The good taste of high fat foods makes it	1.7 ± 1.0	2.0 ± 1.1	2.2 ± 1.2	2.0 ± 1.1	1.9 ± 1.1	2.1 ± 1.0	
3. Changing the way I eat makes it	1.6 ± 1.0	2.0 ± 1.1	2.1 ± 1.1	1.9 ± 1.0	1.9 ± 1.1	1.9 ± 1.0	
4. Eating in restaurants and fast foods places makes it**	1.4 ± 0.8	1.9 ± 1.1	1.7 ± 1.1	1.9 ± 1.0	2.0 ± 1.2	2.3 ± 1.1	E*** S**
5. The high cost of low-fat foods makes it	1.5 ± 0.9	1.8 ± 1.1	1.7 ± 1.0	1.6 ± 0.9	1.7 ± 1.0	1.7 ± 0.8	
6. My busy work schedule makes it	1.4 ± 0.7	1.7 ± 1.0	1.5 ± 0.9	1.4 ± 0.8	1.7 ± 1.0	2.0 ± 1.1	S**
7. Keeping my family happy with the foods I cook makes it	1.5 ± 0.9	1.7 ± 1.0	1.8 ± 1.1	1.7 ± 1.0	1.6 ± 1.0	1.9 ± 0.9	
8. My family's habit of eating high fat foods makes it	1.6 ± 0.9	1.8 ± 1.0	1.9 ± 1.2	1.8 ± 1.1	1.8 ± 1.1	1.8 ± 0.8	
9. Not knowing what foods to eat on a low-fat diet makes it	1.5 ± 0.8	1.5 ± 0.8	1.6 ± 1.0	1.5 ± 0.8	1.5 ± 0.8	1.4 ± 0.7	
12. Not having the will power to pass up high fat foods that I enjoy makes it	1.7 ± 1.0	2.0 ± 1.2	2.1 ± 1.2	2.0 ± 1.2	1.9 ± 1.1	2.1 ± 0.9	
13. Enjoying high fat foods at church meals and other social functions makes it	1.7 ± 0.9	1.8 ± 1.0	2.0 ± 1.1	2.0 ± 1.1	1.9 ± 1.2	2.3 ± 1.0	E*
14. Family pressure to eat high-fat foods makes it	1.5 ± 0.9	1.5 ± 0.9	1.6 ± 0.9	1.7 ± 1.0	1.5 ± 0.8	1.7 ± 0.8	
15. Cravings for high-fat foods makes it	1.6 ± 0.9	1.8 ± 1.1	2.1 ± 1.2	1.8 ± 1.1	1.8 ± 1.1	2.1 ± 0.9	
16. Eating when I feel angry, upset, stressed, or depressed makes it **	1.4 ± 0.7	1.5 ± 0.9	1.6 ± 0.9	1.8 ± 1.0	1.6 ± 0.9	2.0 ± 1.0	E**
17. Not being able to buy low-fat foods at work makes it	1.5 ± 0.8	1.5 ± 0.8	1.5 ± 0.9	1.5 ± 0.9	1.5 ± 0.9	1.8 ± 1.0	
18. Having to buy many special foods makes it	1.5 ± 0.9	1.6 ± 0.9	1.6 ± 1.0	1.6 ± 0.8	1.7 ± 1.0	1.8 ± 0.9	
19. Feeling deprived of all the foods I like makes it	1.5 ± 0.9	1.7 ± 1.0	1.7 ± 1.1	1.7 ± 1.0	1.7 ± 1.1	1.9 ± 1.0	
Psychological Obstacles	1.6 ± 0.8	1.8 ± 0.8	1.8 ± 0.9	1.8 ± 0.9	1.8 ± 0.9	1.9 ± 0.8	
Environmental Obstacles	1.5 ± 0.7	1.7 ± 0.7	1.7 ± 0.8	1.7 ± 0.8	1.7 ± 0.8	1.9 ± 0.7	

E Blacks and whites differ, $p < 0.05$
S There is a difference in SES groups
* $p < 0.05$
** $p < 0.01$
The number of items administered during the community survey was 17. Items 10 and 11 were eliminated.

Table 33: Obstacles to Increasing Fruits and Vegetables as a Function of Ethnicity and SES in a Community Sample

Item (1=not a problem – 4 = Extremely difficult)	African American			Caucasian			Sig
	Low SES n=74	Med SES n=86	High SES n=39	Low SES n=89	Med SES n=65	High SES n=46	
2. The high cost of eating fruits and vegetables makes it	1.3 ± 0.7	1.2 ± 0.5	1.3 ± 0.6	1.5 ± 0.8	1.5 ± 0.9	1.6 ± 0.9	E***
3. Liking other foods more than fruits and vegetables makes i t	1.3 ± 0.6	1.3 ± 0.7	1.4 ± 0.7	1.4 ± 0.8	1.6 ± 1.0	1.9 ± 0.9	E***, S*
4. Changing the way I eat makes it makes it	1.3 ± 0.6	1.4 ± 0.8	1.5 ± 0.7	1.5 ± 0.9	1.7 ± 1.0	1.8 ± 0.9	E***
5. Eating in restaurants and fast food places makes it ***	1.3 ± 0.7	1.4 ± 0.8	1.4 ± 0.7	1.6 ± 0.9	1.8 ± 1.1	2.0 ± 1.0	E***. S*
6. The time it takes to buy and prepare fruits and vegetables makes it ***	1.2 ± 0.5	1.3 ± 0.6	1.3 ± 0.6	1.5 ± 0.9	1.6 ± 0.8	1.8 ± 0.9	E***
7. Getting an upset stomach or gas when I eat fruits or vegetables makes it***	1.2 ± 0.5	1.2 ± 0.6	1.2 ± 0.5	1.4 ± 0.8	1.5 ± 0.9	1.4 ± 0.7	E***
8. Not being able to get the fruits and vegetables I like all year round makes it***	1.3 ± 0.6	1.4 ± 0.7	1.3 ± 0.6	1.6 ± 0.9	1.6 ± 0.9	1.7 ± 0.8	E***
10. Not being able to get fruits and vegetables at work makes it**	1.2 ± 0.5	1.4 ± 0.7	1.3 ± 0.7	1.3 ± 0.8	1.7 ± 1.0	2.0 ± 1.1	E***, S***
12. My family not liking to eat fruits and vegetables makes it ***	1.2 ± 0.6	1.3 ± 0.6	1.3 ± 0.6	1.5 ± 0.9	1.5 ± 0.8	1.5 ± 0.7	E***
13. Not having transportation to get to a store makes it	1.3 ± 0.8	1.1 ± 0.4	1.2 ± 0.4	1.4 ± 0.8	1.3 ± 0.6	1.3 ± 0.6	
14. Forgetting to eat fruits and vegetables makes it **	1.2 ± 0.6	1.3 ± 0.7	1.4 ± 0.6	1.4 ± 0.8	1.5 ± 0.8	1.5 ± 0.8	E**
Psychological obstacles***	1.3 ± 0.5	1.3 ± 0.5	1.3 ± 0.5	1.5 ± 0.7	1.6 ± 0.8	1.6 ± 0.7	E***
Environmental obstacles***	1.3 ± 0.5	1.3 ± 0.5	1.3 ± 0.5	1.5 ± 0.7	1.6 ± 0.7	1.7 ± 0.6	E***

E Blacks and whites differ
S There is a difference in SES groups
* $p < 0.05$
** $p < 0.01$
The number of items administered during the community survey was 11. Items 1, 9, and 11 were eliminated.

Table 34: Obstacles to Breast Self-Examination as a Function of Ethnicity and SES in a Community Sample

Item (1=not a problem – 4 = Extremely difficult)	African American			Caucasian			Sig
	Low SES n=74	Med SES n=85	High SES n=39	Low SES n=89	Med SES n=65	High SES n=46	
1. Remembering to do a breast self-examination each month	1.6 ± 1.0	1.4 ± 0.7	1.7 ± 1.0	1.7 ± 1.0	1.7 ± 1.1	1.6 ± 0.9	
2. Doing the breast exam correctly is	1.4 ± 0.9	1.5 ± 0.9	1.4 ± 0.7	1.5 ± 0.9	1.5 ± 0.8	1.3 ± 0.6	
3. My fear of doing breast self-examination makes it	1.4 ± 0.8	1.2 ± 0.6	1.3 ± 0.7	1.5 ± 0.9	1.5 ± 0.9	1.2 ± 0.7	
4. My busy schedule makes it	1.3 ± 0.6	1.3 ± 0.8	1.4 ± 0.8	1.4 ± 0.8	1.6 ± 0.9	1.3 ± 0.6	
6. Spending so much time and energy on my job makes it	1.2 ± 0.6	1.2 ± 0.7	1.4 ± 0.8	1.4 ± 0.8	1.4 ± 0.7	1.3 ± 0.6	
7. My stressful life makes examining my breasts	1.3 ± 0.8	1.2 ± 0.7	1.3 ± 0.8	1.5 ± 0.9	1.5 ± 0.8	1.3 ± 0.7	
8. Discomfort or embarrassment makes examining my breasts	1.3 ± 0.8	1.2 ± 0.6	1.2 ± 0.5	1.4 ± 0.8	1.3 ± 0.7	1.2 ± 0.5	
9. Since nobody has ever shown me how to do a breast self-examination, I find it	1.3 ± 0.8	1.2 ± 0.6	1.1 ± 0.4	1.5 ± 0.9	1.4 ± 0.8	1.2 ± 0.5	S*
Psychological obstacles	1.4 ± 0.7	1.3 ± 0.6	1.3 ± 0.5	1.5 ± 0.8	1.5 ± 0.7	1.3 ± 0.4	
Environmental Obstacles	1.2 ± 0.6	1.3 ± 0.7	1.4 ± 0.8	1.4 ± 0.8	1.5 ± 0.7	1.3 ± 0.5	

E Blacks and whites differ
S There is a difference in SES groups
* $p < 0.05$
** $p < 0.01$
The number of items administered during the community survey was 8. Item 5 was eliminated.

Table 35: Obstacles to Mammography as a Function of Ethnicity and SES in a Community Sample

Item (1=not a problem – 4 = Extremely difficult)	African American			Caucasian			Sig
	Low SES n=60	Med SES n=64	High SES n=30	Low SES n=80	Med SES n=55	High SES n=40	
1. The fear of finding cancer makes it	1.3 ± 0.8	1.2 ± 0.7	1.3 ± 0.8	1.5 ± 0.9	1.1 ± 0.4	1.2 ± 0.6	
2. My busy schedule makes it	1.1 ± 0.5	1.1 ± 0.4	1.4 ± 0.8	1.3 ± 0.7	1.2 ± 0.4	1.4 ± 0.9	S*
3. Remembering to schedule a mammogram is	1.3 ± 0.7	1.2 ± 0.7	1.1 ± 0.3	1.3 ± 0.8	1.2 ± 0.5	1.4 ± 0.9	
4. Being very busy at work makes it	1.1 ± 0.5	1.1 ± 0.5	1.4 ± 0.8	1.2 ± 0.7	1.2 ± 0.6	1.6 ± 1.1	S**
5. The cost makes it	1.2 ± 0.7	1.3 ± 0.7	1.1 ± 0.6	1.3 ± 0.8	1.2 ± 0.6	1.3 ± 0.8	
6. The pain and discomfort makes it	1.4 ± 0.9	1.3 ± 0.8	1.2 ± 0.6	1.4 ± 0.9	1.2 ± 0.6	1.3 ± 0.7	
7. The scary stressful process of having a mammogram makes it	1.3 ± 0.8	1.2 ± 0.7	1.3 ± 0.8	1.4 ± 0.9	1.2 ± 0.5	1.1 ± 0.2	
8. The time and effort to care for my family makes it	1.1 ± 0.6	1.1 ± 0.4	1.1 ± 0.3	1.2 ± 0.6	1.1 ± 0.4	1.2 ± 0.5	
9. Not knowing where to get a mammogram makes it	1.2 ± 0.7	1.1 ± 0.5	1.0 ± 0.2	1.2 ± 0.7	1.0 ± 0.2	1.1 ± 0.2	
Psychological Obstacles	1.3 ± 0.7	1.2 ± 0.6	1.2 ± 0.4	1.3 ± 0.7	1.2 ± 0.3	1.2 ± 0.3	
Environmental Obstacles	1.1 ± 0.5	1.1 ± 0.4	1.3 ± 0.5	1.2 ± 0.6	1.2 ± 0.4	1.4 ± 0.7	

E Blacks and whites differ
S There is a difference in SES groups
* $p < 0.05$
** $p < 0.01$

Table 36: Stages of Change as a Function of Ethnicity and SES in a Community Sample

Behavior and Stage		African American			Caucasian			TOTAL
		Low SES n=74	Med SES n=86	High SES n=40	Low SES n=89	Med SES n=65	High SES n=46	
Lowfat	Precontemplation	14 (19%)	14 (16%)	5 (13%)	20 (23%)	17 (26%)	11 (24%)	81 (20%)
	Contemplation	7 (10%)	18 (21%)	13 (33%)	10 (11%)	4 (6%)	2 (4%)	54 (14%)
	Preparation	4 (5%)	9 (11%)	2 (5%)	5 (6%)	6 (9%)	3 (7%)	29 (7%)
	Action	11 (15%)	7 (8%)	4 (10%)	12 (14%)	10 (15%)	6 (13%)	50 (13%)
	Maintenance	38 (51%)	38 (44%)	16 (40%)	42 (47%)	28 (43%)	24 (52%)	186 (47%)
Fruits and Vegetables	Precontemplation	3 (4%)	3 (4%)	1 (3%)	11 (12%)	9 (14%)	2 (4%)	29 (7%)
	Contemplation	2 (3%)	9 (11%)	5 (13%)	8 (9%)	3 (5%)	4 (9%)	31 (8%)
	Preparation	4 (5%)	7 (8%)	1 (3%)	4 (5%)	8 (12%)	8 (17%)	32 (8%)
	Action	11 (15%)	10 (12%)	6 (15%)	9 (10%)	10 (15%)	8 (17%)	54 (14%)
	Maintenance	54 (73%)	57 (66%)	26 (67%)	57 (64%)	35 (54%)	24 (52%)	253 (63%)
Breast Self-Exam	Precontemplation	14 (19%)	14 (16%)	5 (13%)	19 (21%)	12 (19%)	6 (13%)	70 (18%)
	Contemplation	5 (7%)	6 (7%)	5 (13%)	8 (9%)	6 (9%)	3 (7%)	33 (8%)
	Preparation	3 (4%)	4 (5%)	1 (3%)	5 (6%)	4 (6%)	3 (7%)	20 (5%)
	Action	14 (19%)	11 (13%)	7 (18%)	11 (12%)	7 (11%)	4 (9%)	54 (14%)
	Maintenance	38 (51%)	51 (59%)	21 (54%)	46 (52%)	36 (55%)	30 (65%)	222 (56%)
Mammography	Precontemplation	2 (3%)	4 (6%)	2 (7%)	12 (15%)	4 (7%)	1 (3%)	25 (8%)
	Contemplation	4 (7%)	7 (11%)	1 (3%)	2 (3%)	0 (0%)	3 (8%)	17 (5%)
	Yes, in past	7 (12%)	7 (11%)	4 (13%)	5 (6%)	5 (9%)	3 (8%)	31 (10%)
	Yes, as recommended	45 (78%)	46 (72%)	23 (77%)	61 (76%)	46 (84%)	32 (82%)	253 (78%)

E Blacks and whites differ, $p < 0.05$
S There is a difference in SES groups
* $p < 0.05$
** $p < 0.01$
The number of items administered during the community survey was 17. Items 10 and 11 were eliminated.

Table 37: Clusters of Items on the Obstacles to Low Fat Eating Questionnaire

1. Family

7 Keeping my family happy with the food I cook makes it.
8 My family's habit of eating high fat foods makes it.

2. Emotional pressure

12 Family pressure to eat high-fat foods makes it.
17 Feeling deprived of all the foods I like makes it.
16 Eating when I feel angry, upset, stressed, or depressed makes it

3. Buying foods

15 Not being able to buy low-fat foods at work makes it.
16 Having to buy many special foods makes it.

4. Too busy

6 My busy work schedule makes it.
9 Not knowing what food to eat on a low-fat diet makes it.
1 The time it takes to prepare low-fat foods makes it.

5. Resisting temptation

10 Not having the will power to pass up high fat foods that I enjoy makes it.
11 Enjoying high fat foods at church meals and other social functions makes it.

6. Taste for high fat foods

3 Changing the way I eat makes it.
13 Cravings for high-fat foods makes it.
2 The good taste of high fat foods makes it.
4 Eating in restaurants and fast food places makes it.

Table 38: Clusters of People on the Obstacles to Low Fat Eating Questionnaire

People Clusters	Description
1 - No obstacles	No obstacles to adherence, no problems, tend to be older, slightly lower SES
2 - Psychological obstacles	Specific obstacles with family, emotions, temptation, and taste
3 - Temptation & taste	A little difficulty, especially with temptation and taste
4 - Intermediate obstacles	Some difficulty in all areas
5 - Severe obstacles	Great difficulty in all areas

Table 39: Clustering of Items on the Obstacles Increasing Fruits and Vegetables Questionnaire

1. Home environment problems

12. My family not liking to eat fruits and vegetables makes it
14. Forgetting to eat fruits and vegetables makes it
6. The time it takes to buy and prepare fruits and vegetables makes it

2. Taste

3. Liking other foods more than fruits and vegetables makes i
4. Changing the way I eat makes it makes it

3. Availability away from home

5. Eating in restaurants and fast food places makes it
10. Not being able to get fruits and vegetables at work makes it

4. Overcoming difficulties

7. Getting an upset stomach or gas when I eat fruits or vegetables makes it
13. Not having transportation to get to a store makes it

5. High cost

2. The high cost of eating fruits and vegetables makes it
8. Not being able to get the fruits and vegetables I like all year round makes it

Table 40: Clustering of People on the obstacles to Eating Fruits and Vegetables Questionnaire

Cluster of Persons	Description
1. No difficulty	no difficulties, older and more likely to be African American, slightly lower SES
2. Some difficulty	Difficulty with all obstacles with slight variations, youngest and highest SES
3. Greatest difficulty	Problems with all obstacles, most likely to be white, and lowest SES

Table 41: Clustering of Items on the Obstacles to Breast Self-Examination Questionnaire

1. Stress

4. My busy schedule
5. Time and energy on my job
6. My stressful life

2. Technical Knowledge

2. Doing it correctly
8. Nobody has ever shown me

3. Emotional

3. My fear of doing a breast self-exam
7. Discomfort or embarassment makes examining my breasts

4. Memory

1. Remembering to do a breast self-examination each month

Table 42: Clustering of People on the Obstacles to Breast Self-Examination Questionnaire

Cluster of People	Description
1. No problems	no problems in any areas with a very small number of problems with memory
2. Intermediate problems	some difficulty with all areas and greater difficulty with memory
3. Major problems	High level of barriers on all but especially stress and memory

Table 43: Clustering of Items on the Obstacles to Mammography Questionnaire

1. Busy

2. My busy schedule makes it
4. Being very busy at work makes it

2. Emotional

1. The fear of finding cancer makes it
7. The scary stressful process of having a mammogram makes it
6. The pain and discomfort makes it

3. Perceived Difficulties

3. Remembering to schedule a mammogram makes it
5. The cost makes it
9. Not knowing where to get a mammogram makes it
8. The time and effort to care for my family makes it

Table 44: Clustering of People on the Obstacles to Mammography Questionnaire

Cluster	Description
1. No problems	No obstacles at all
2. Fearful	No difficulties except with emotional
3. Intermediate problems	Tend to have intermediate level of difficulty, especially being too busy. Are the youngest group
4. High problems	High level of difficulty with emotional and with perceived difficulties in getting a mammogram done. Tend to be an elderly group with lowest SES

Figures

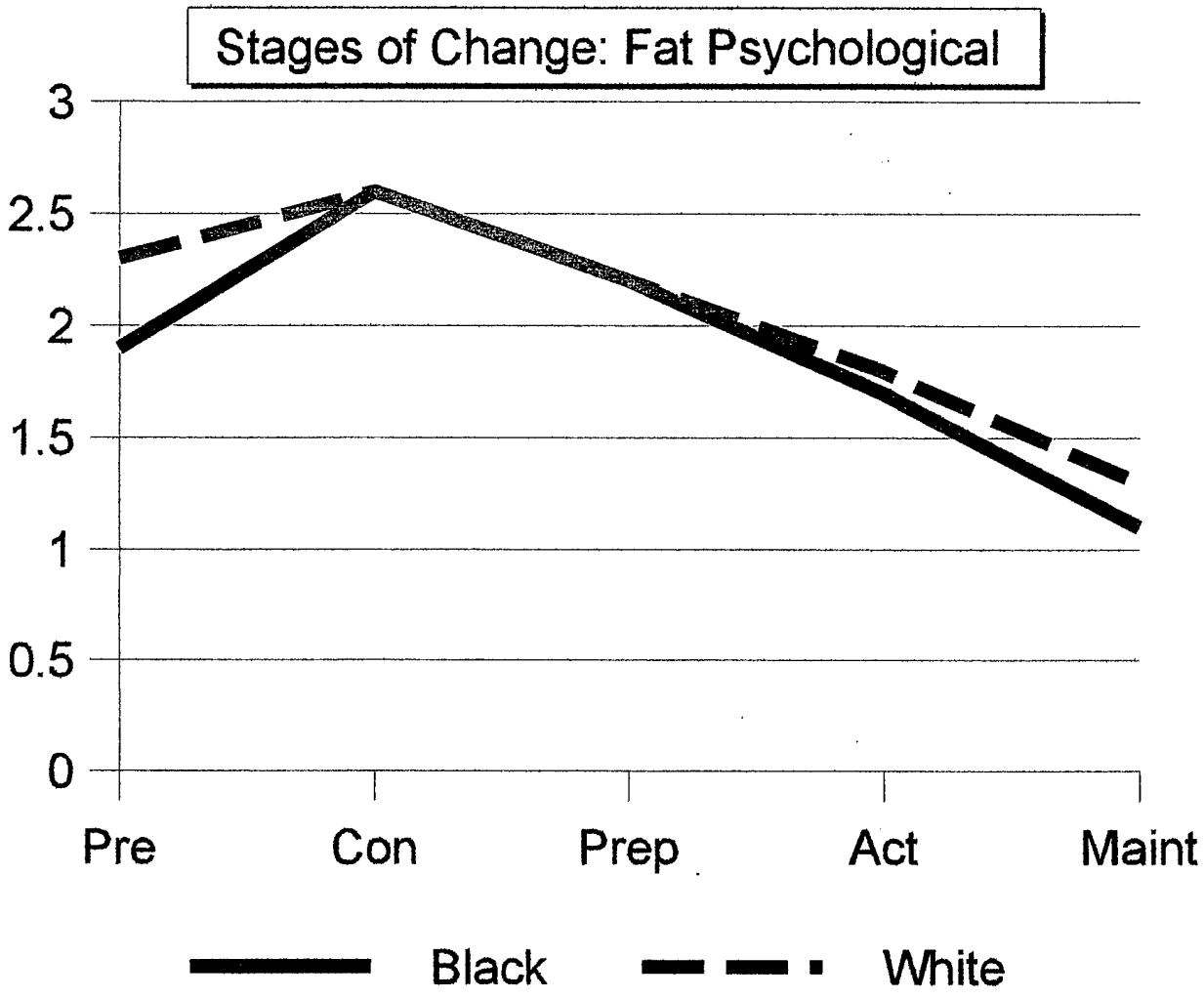


Figure 1: Mean Ratings of Psychological Obstacles by Ethnicity and Stage of Change for Reducing Dietary Fat

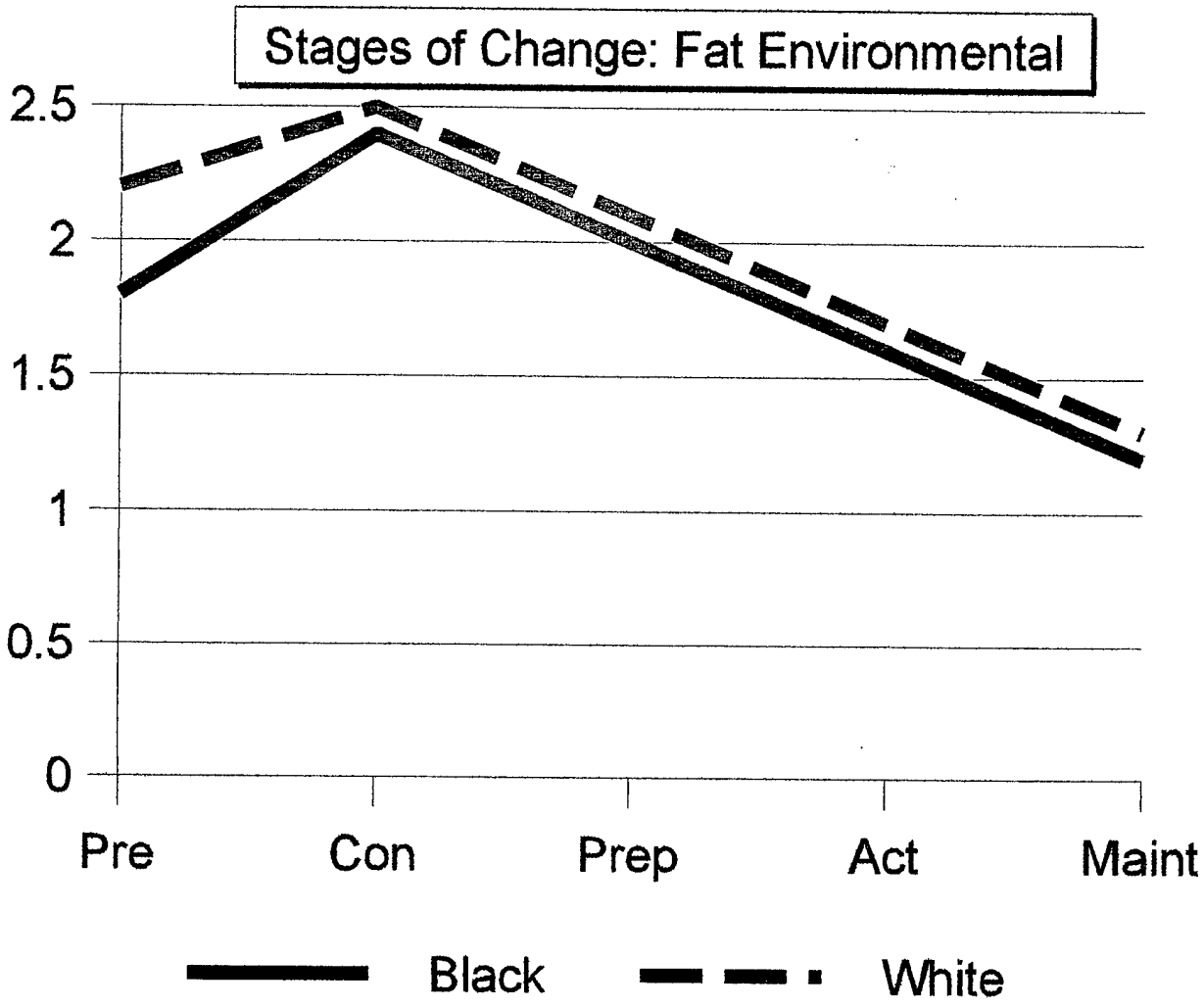


Figure 2: Mean Ratings of Environmental Obstacles by Ethnicity and Stage of Change for Reducing Dietary Fat

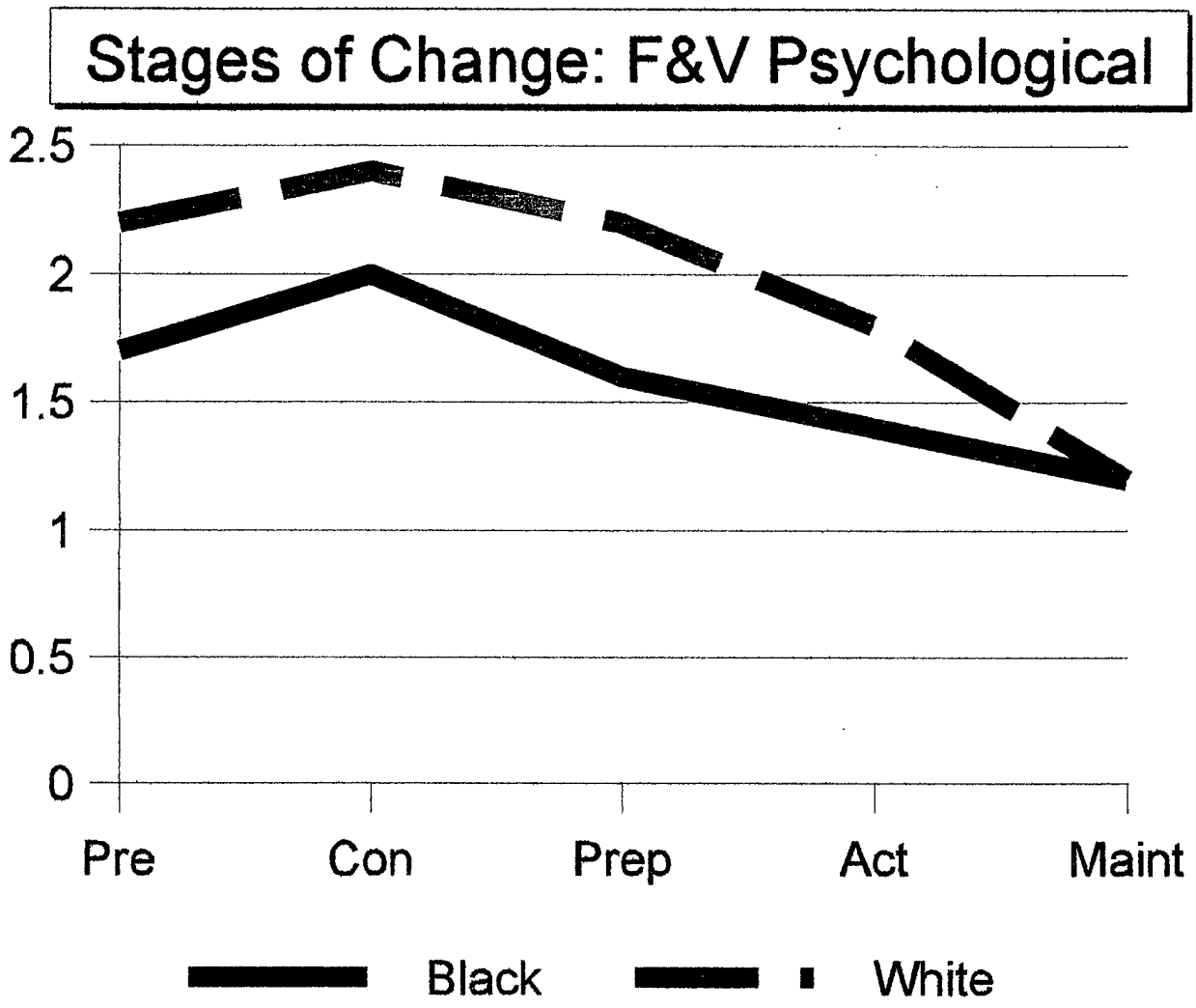


Figure 3: Mean Ratings of Psychological Obstacles by Ethnicity and Stage of Change for Increasing Fruits and Vegetables

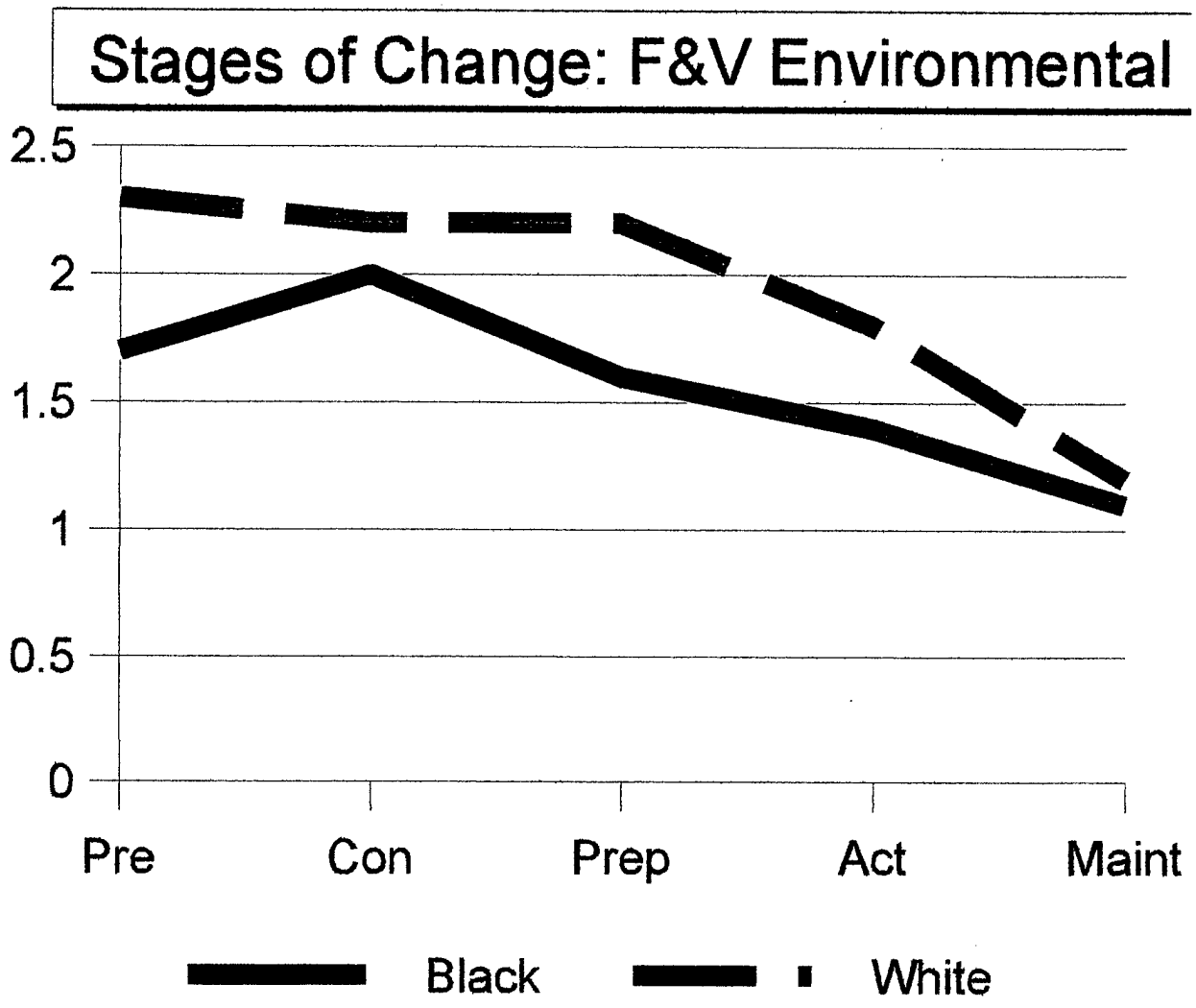


Figure 4: Mean Ratings for Environmental Obstacles by Ethnicity and Stage of Change for Increasing Fruits and Vegetables

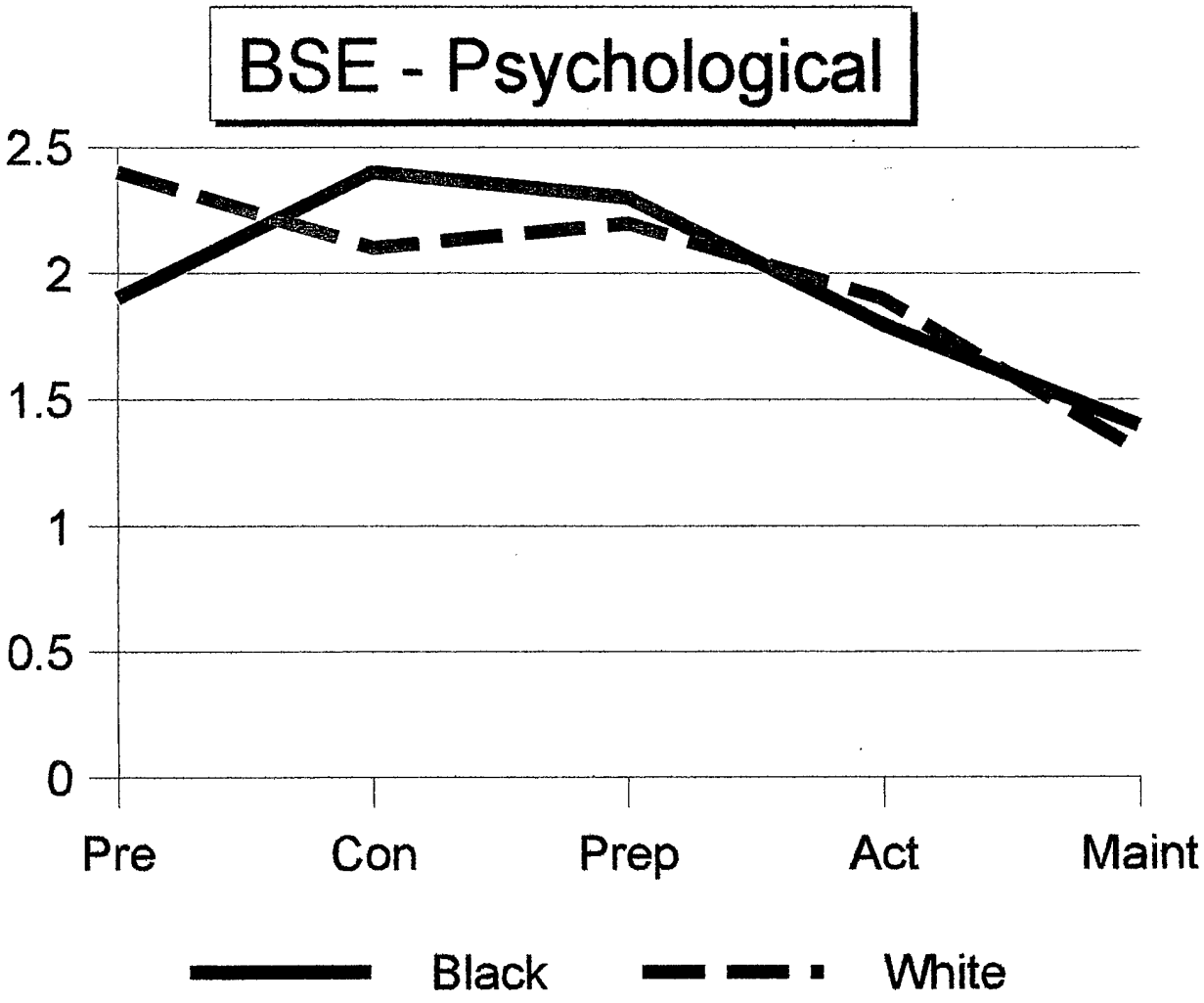


Figure 5: Mean Ratings of Psychological Obstacles by Ethnicity and Stage of Change for Doing Breast Self-Examination

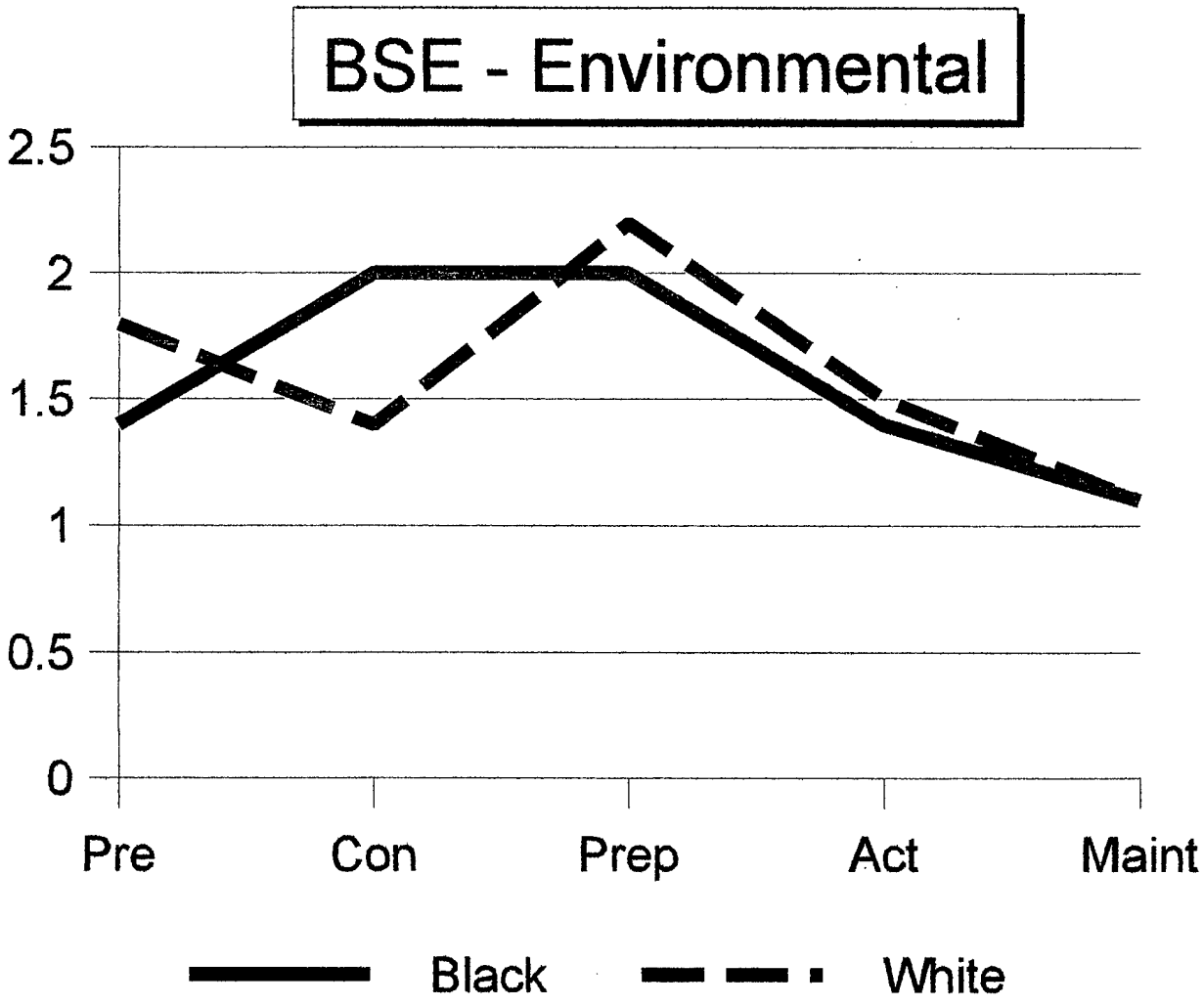


Figure 6: Mean Ratings of Environmental Obstacles by Ethnicity and Stage of Change for Doing Breast Self-Examination

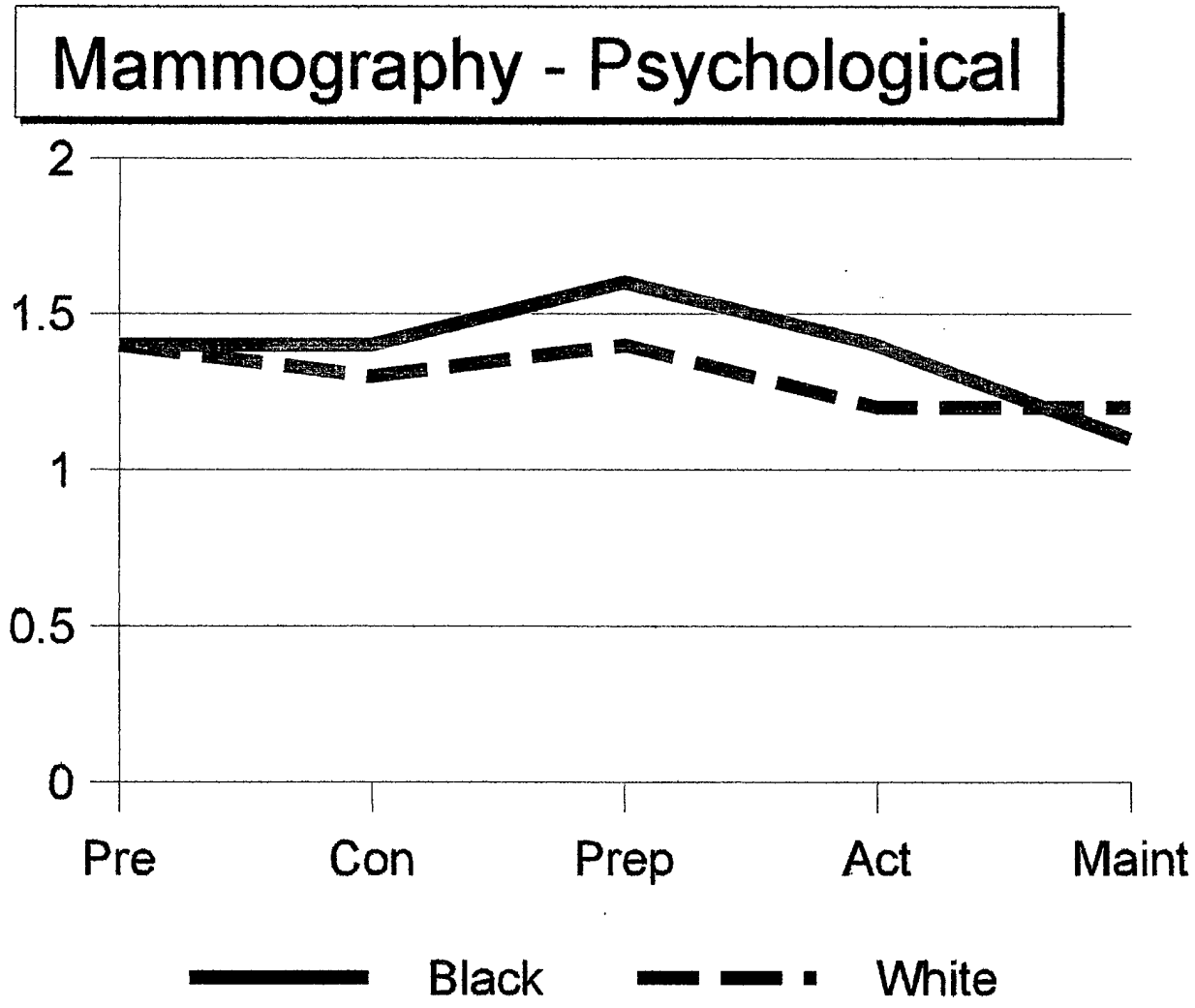


Figure 7: Mean Ratings of Psychological Barriers by Ethnicity and Stage of Change for Getting a Mammogram

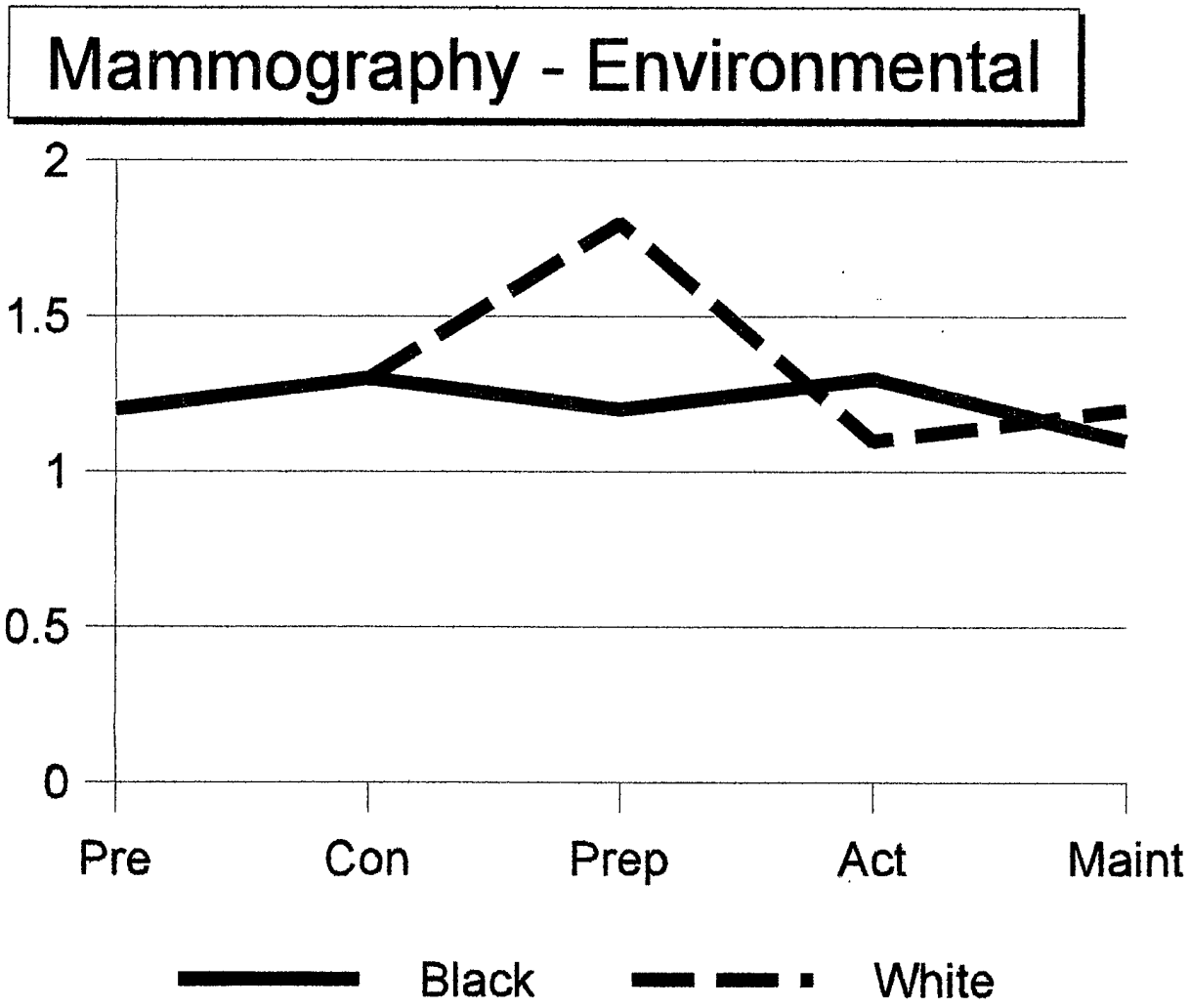


Figure 8: Mean Ratings of Environmental Obstacles by Ethnicity and Stage of Change for Getting a Mammogram

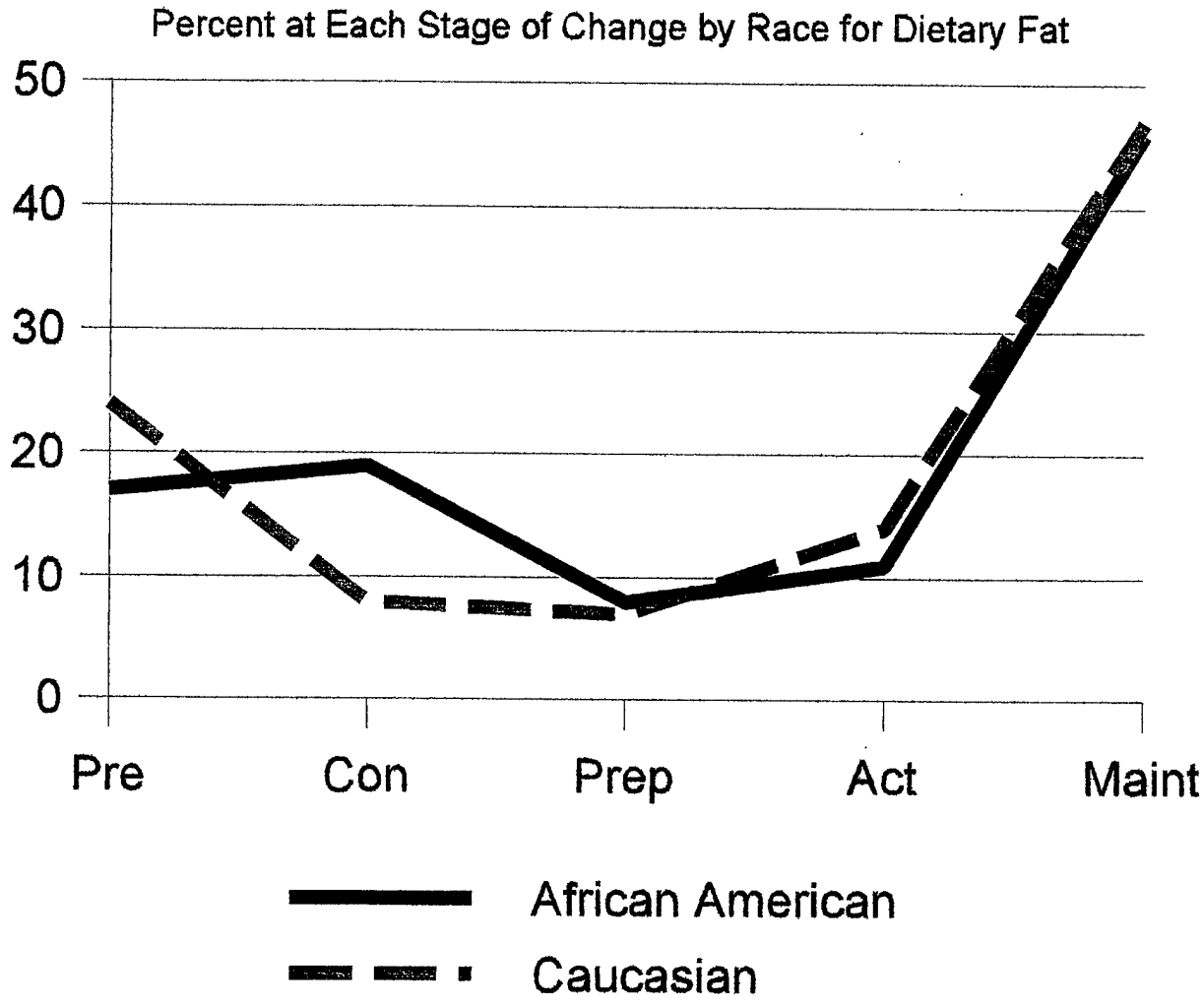


Figure 9: Percent of Women at Each Stage of Change for Reducing Dietary Fat Intake by Ethnicity

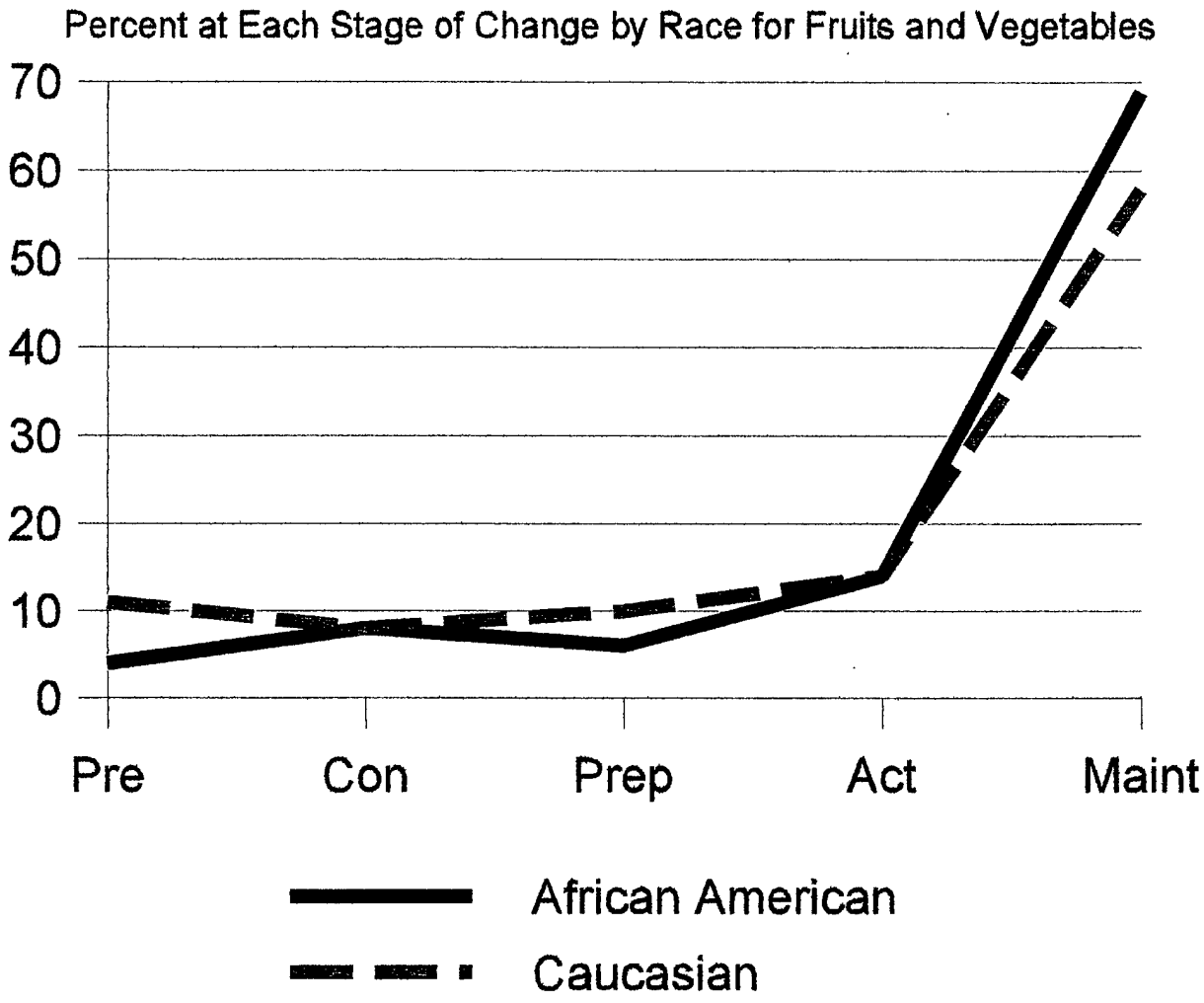


Figure 10: Percent of Women at Each Stage of Change for Increasing Fruits and Vegetables by Ethnicity

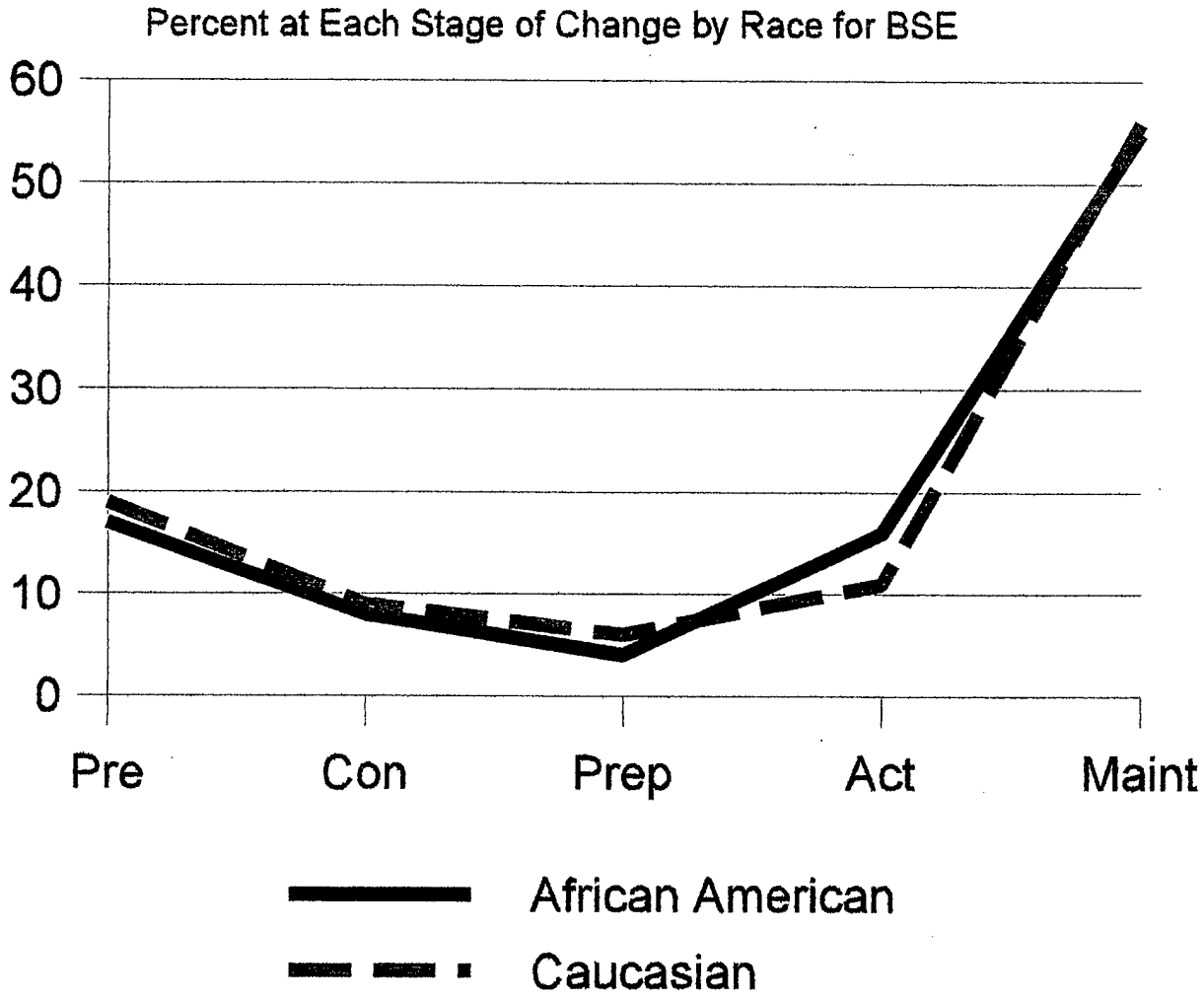


Figure 11: Percent of Women at Each Stage of Change for Doing a Breast Self-Examination by Ethnicity

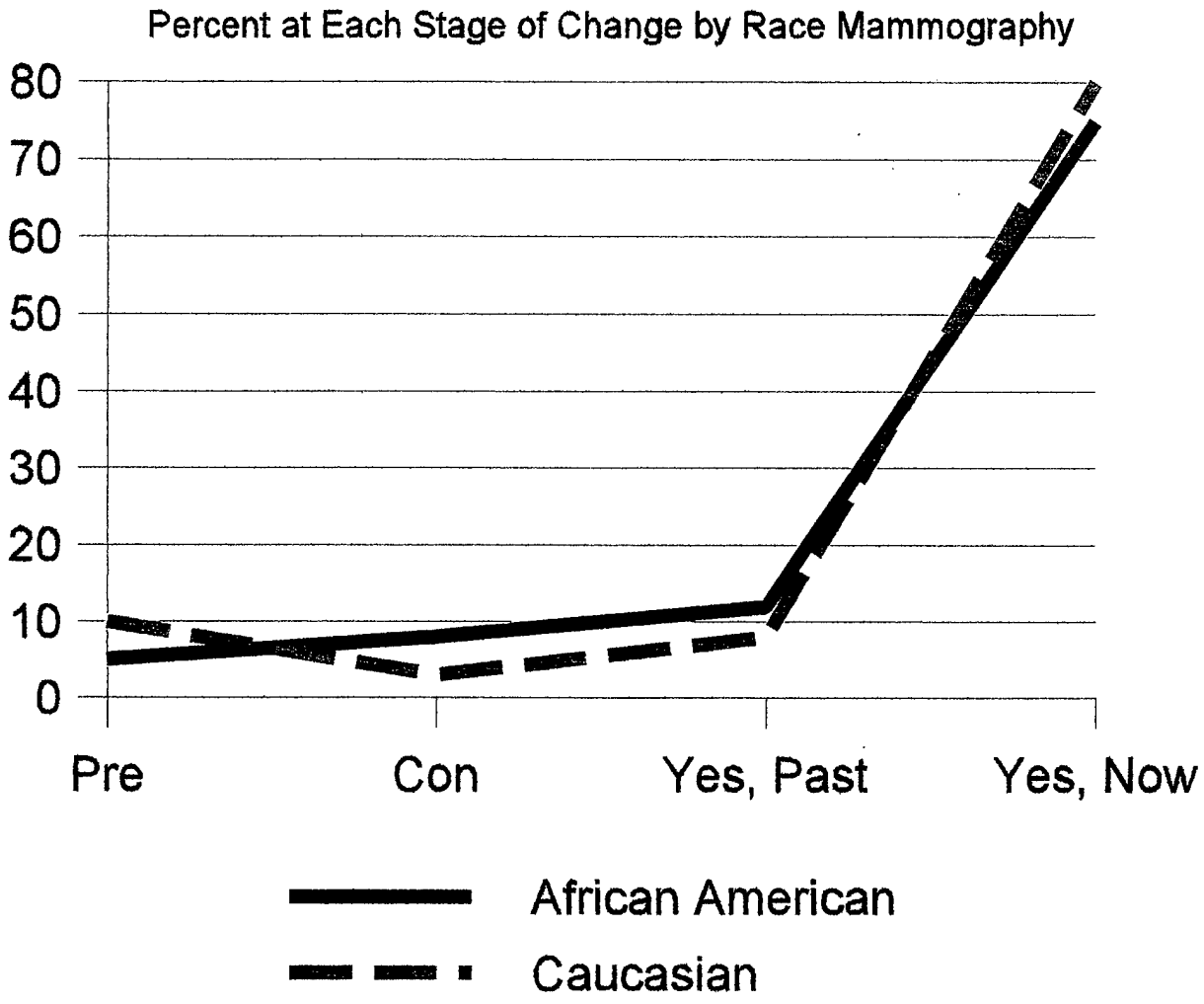


Figure 12: Percent of Women at Each Stage of Change for Getting a Mammogram by Ethnicity

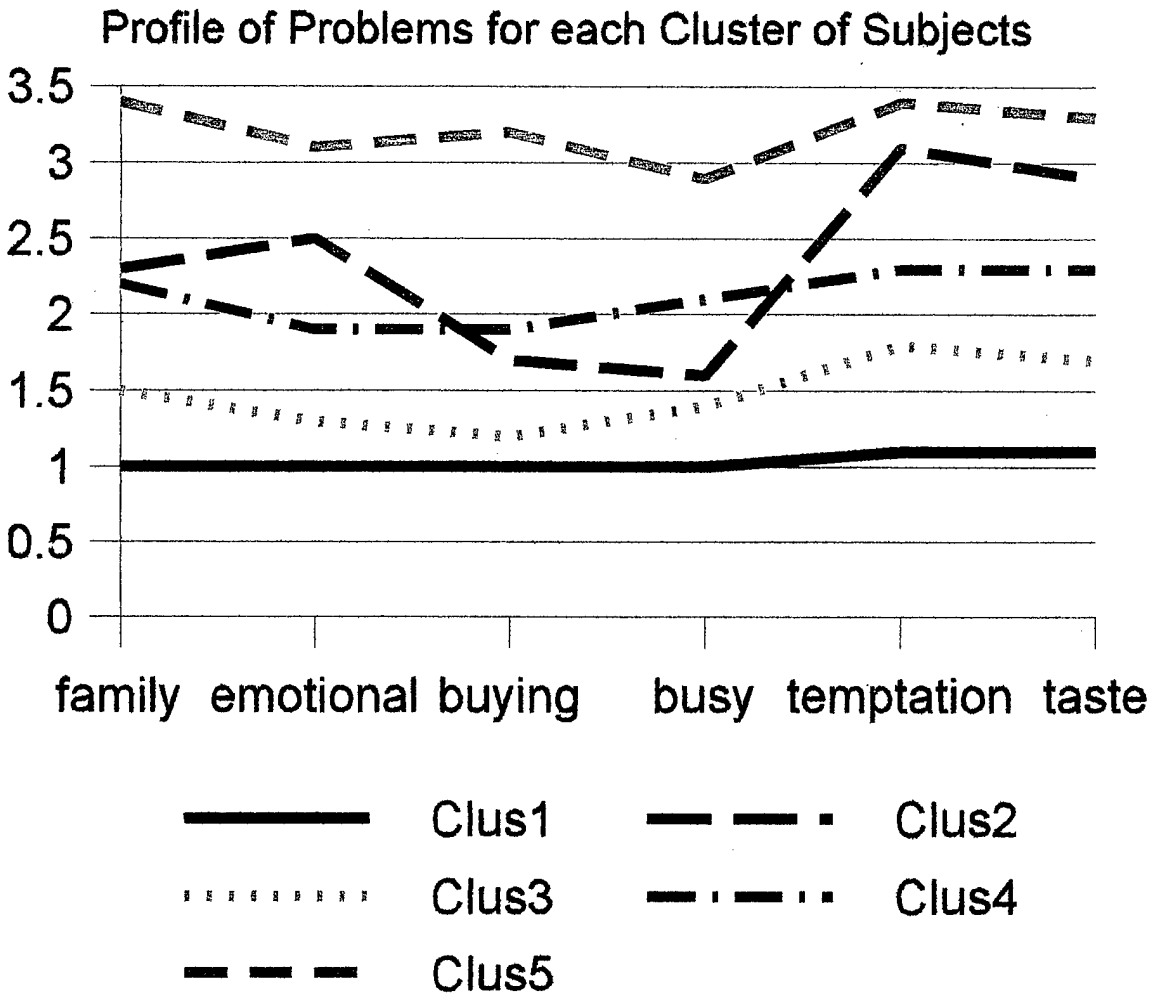
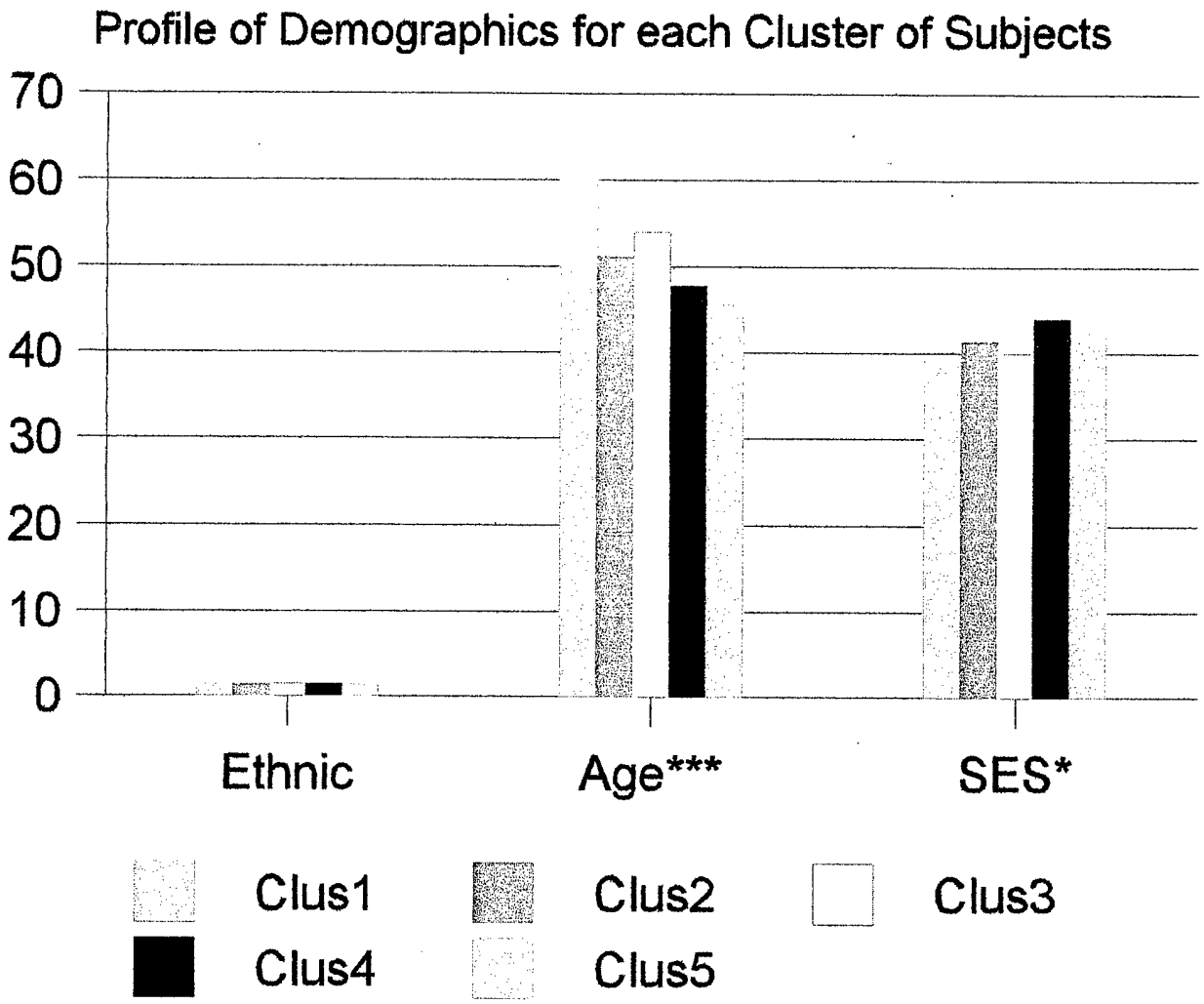


Figure 13: Differences in Five Clusters of Subjects on the Barriers to Reducing Dietary Fat Intake



* $p < 0.05$ *** $p < 0.001$

Figure 14: Differences in Five Clusters of Subjects on Demographic Variables for Reducing Fat Intake

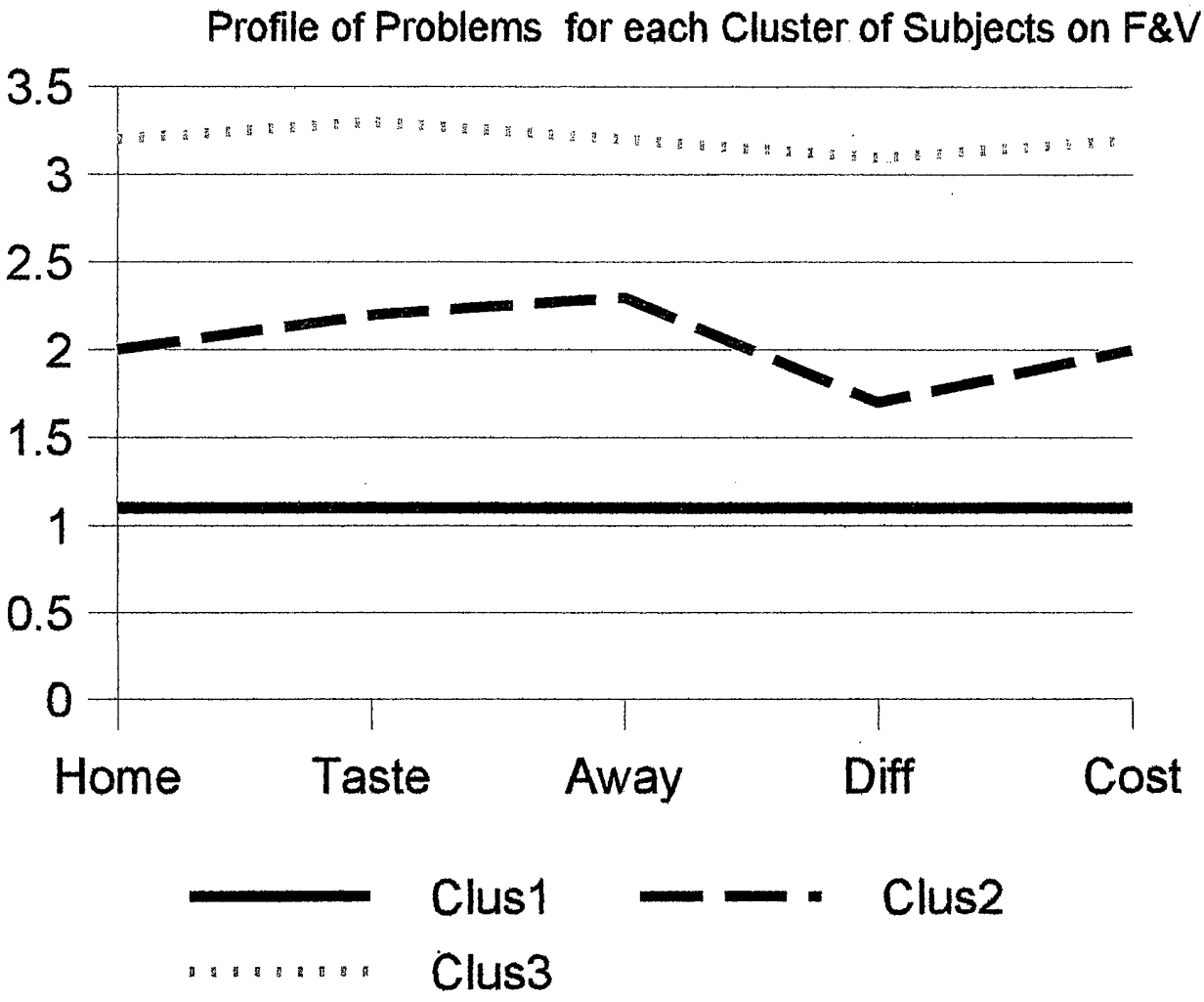
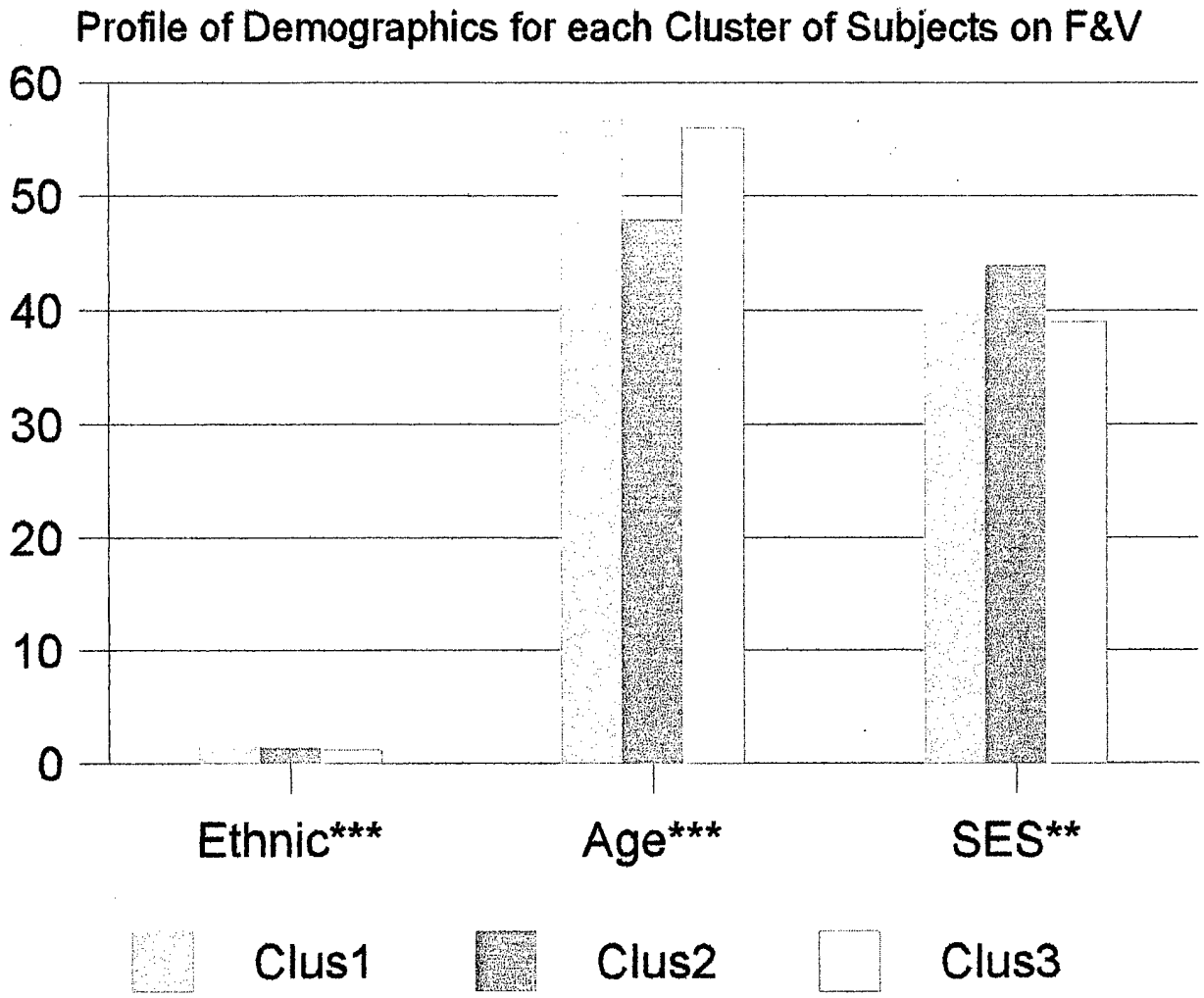


Figure 15: Differences in Three Clusters of Subjects on the Barriers to Increasing Fruit and Vegetable Intake



** $p < 0.01$ *** $p < 0.001$

Figure 16: Differences in Three Clusters of Subjects on Demographic Variables for Increasing Fruit and Vegetable Intake

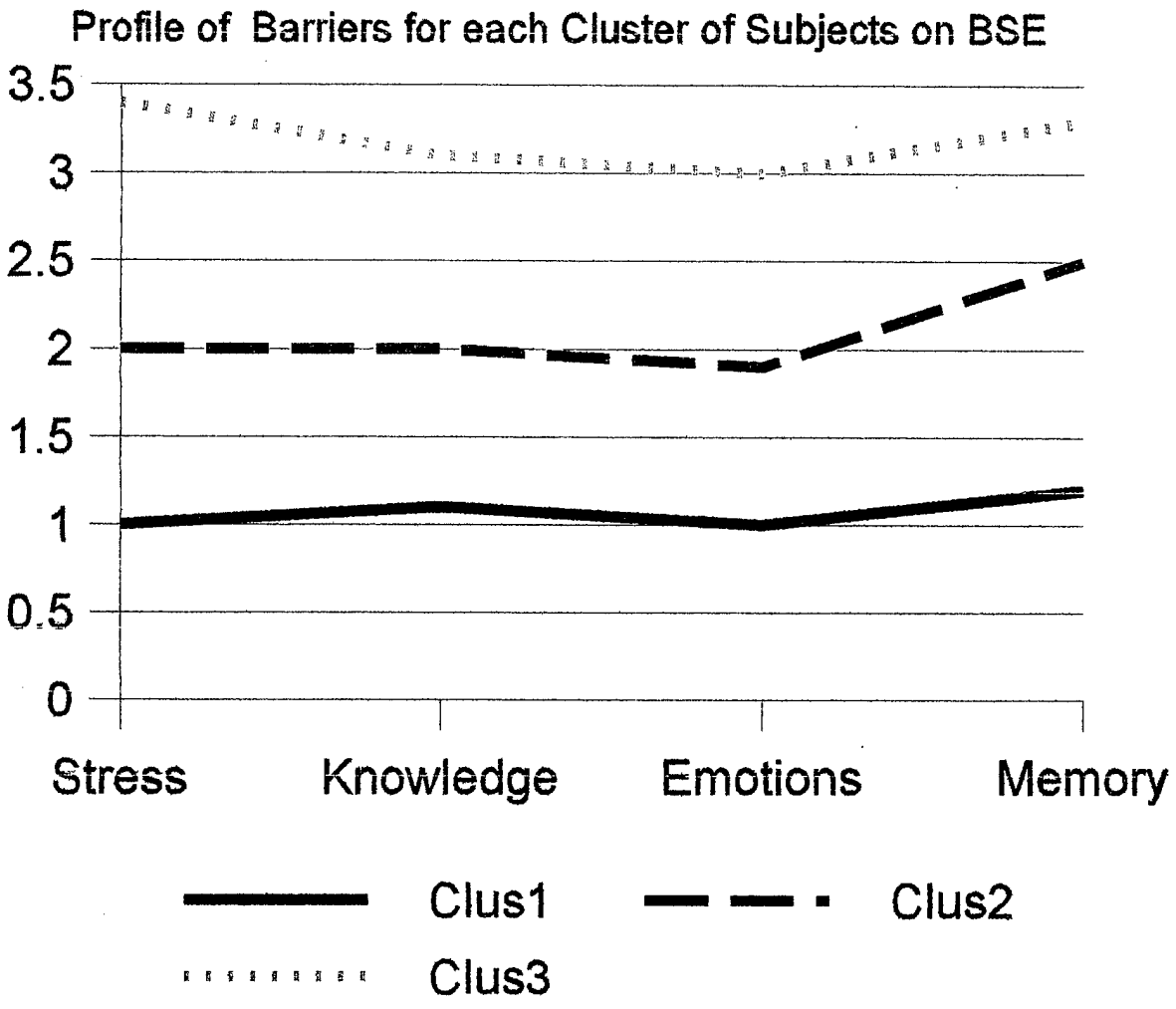


Figure 17: Differences in Three Clusters of Subjects on the Barriers to Doing a Breast Self-Examination

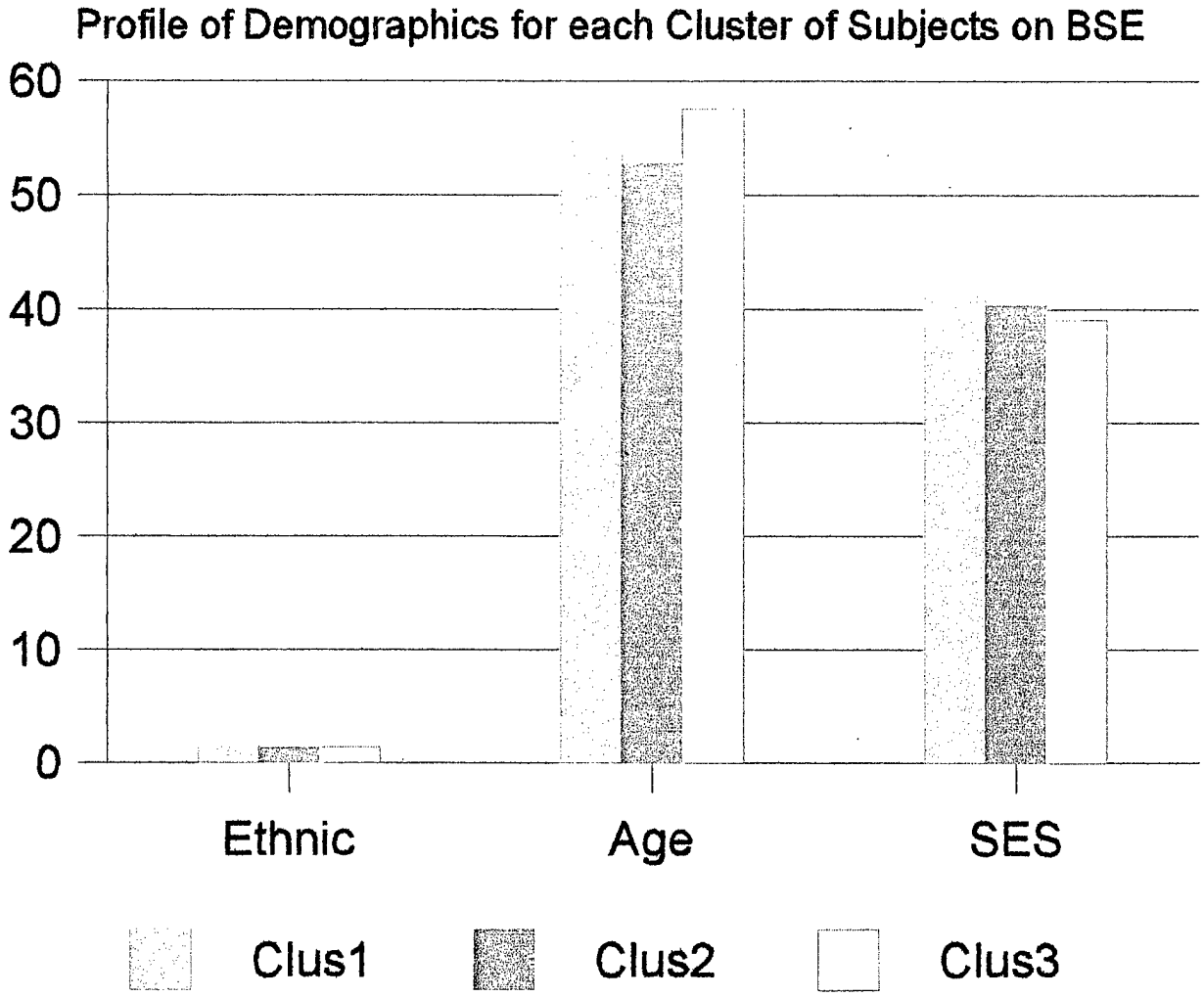


Figure 18: Differences in Three Clusters of Subjects on Demographic Variables for Doing a Breast Self-Examination

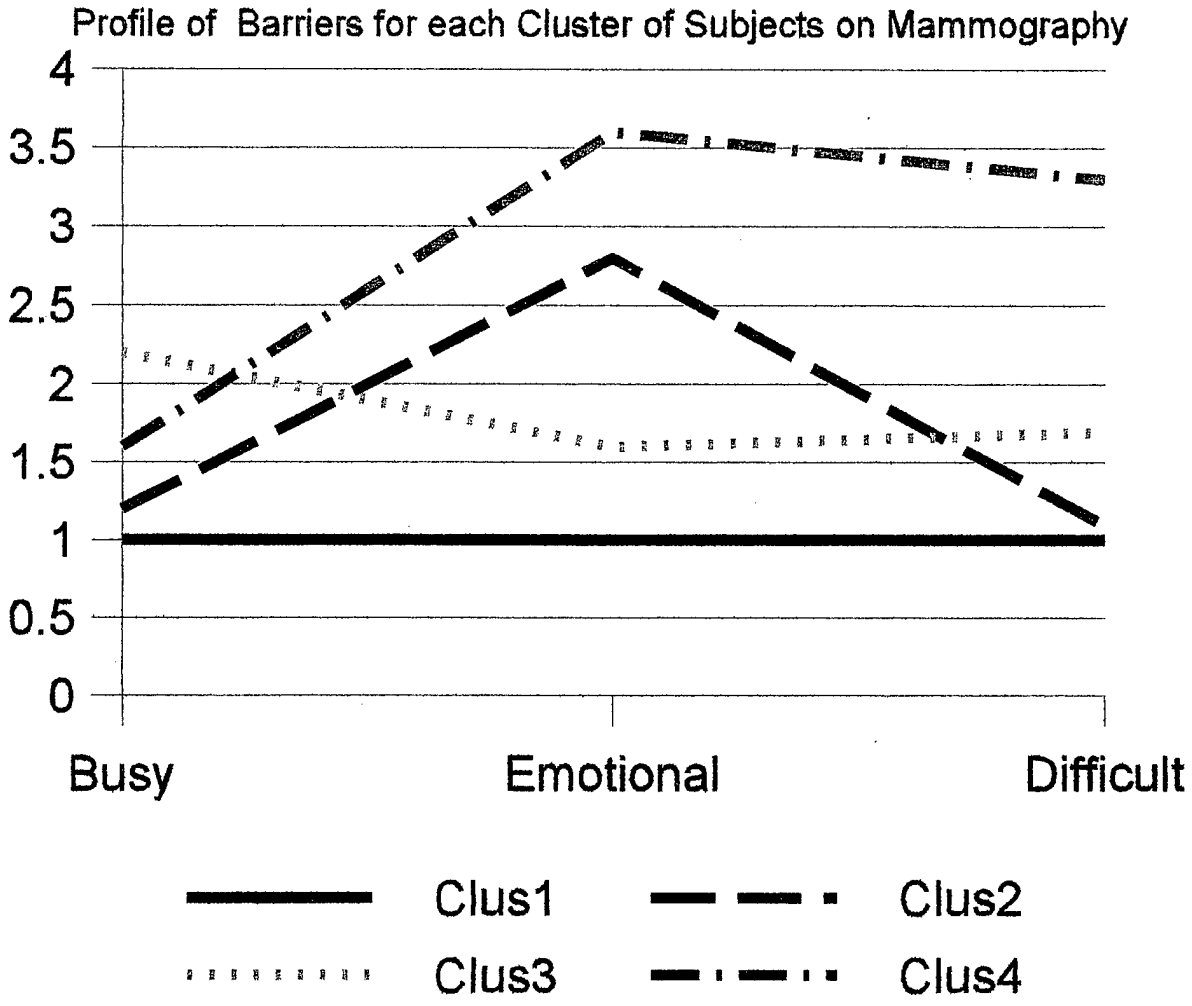


Figure 19: Differences in Four Clusters of Subjects on the Barriers to Getting a Mammogram

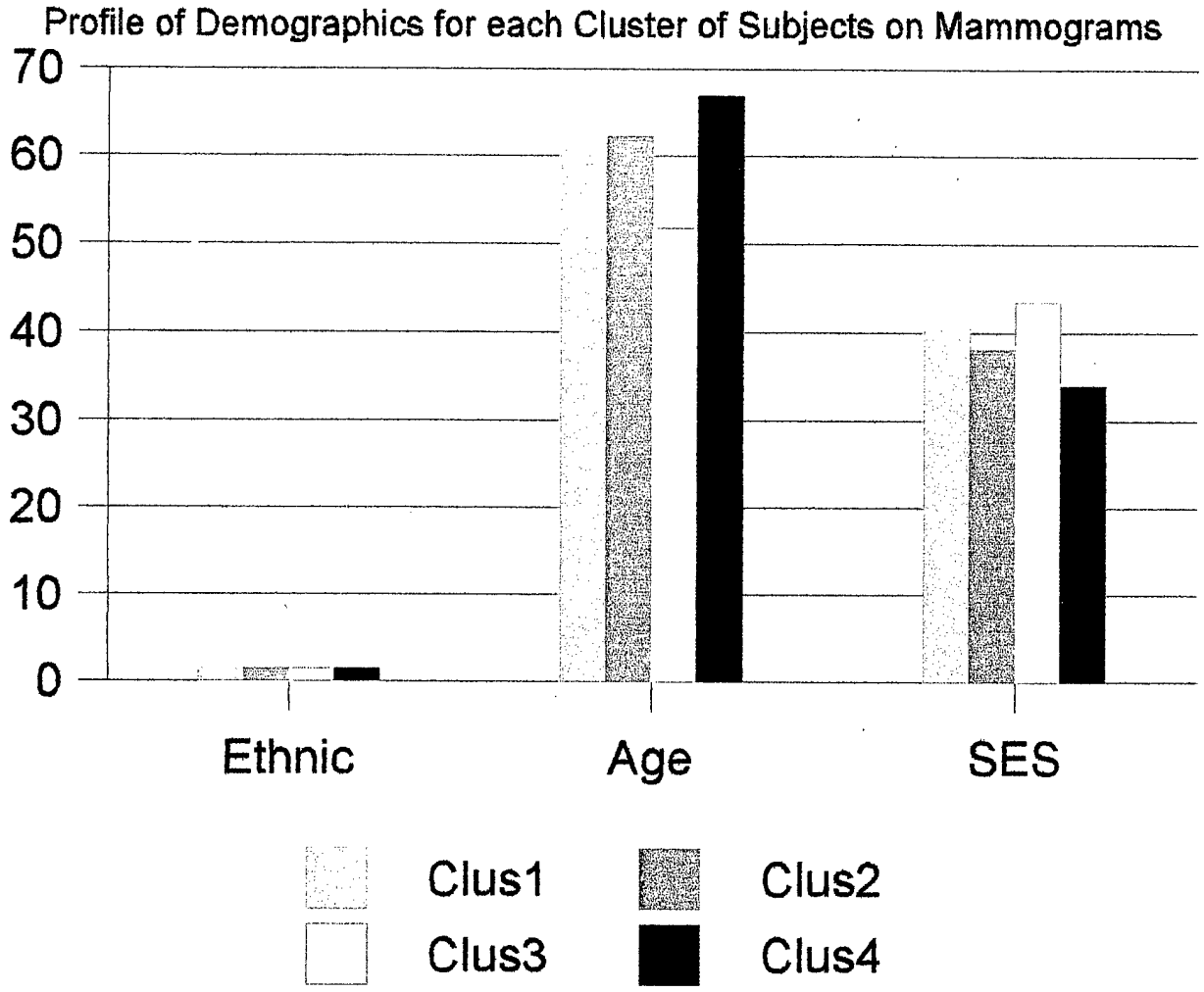


Figure 20: Differences in Four Clusters of Subjects on Demographic Variables for Getting a Mammogram

APPENDICES

Appendix A – Obstacles to Adherence Coding System Manual

David G. Schlundt, Ph.D.
Vanderbilt University

The purpose of this system is to code and classify the reasons or explanations people give for being unable to adhere to medical, health, behavioral, or preventive recommendations.

The system is used in two stages. In the first stage, an individual's self-report is reviewed and subdivided into discrete explanatory statements. These statements need not be whole sentences or phrases, but instead represent the occurrence of a single explanation for adherence difficulties.

Consider the following example.

When I eat lunch at work, the only place to eat is the cafeteria and they cook the food their with a lot of fat and grease. I could get a salad, but I am usually so hungry by lunch time that I go ahead a get a whole plate of food, even though I know it's high in fat.

There are 4 explanations in this statement

at work, the only place to eat is the cafeteria

they cook the food with a lot of fat and grease

I could get a salad, but I am usually so hungry by lunch time that I go ahead and get a whole plate of food

I get a whole plate of food even though I know it's high in fat

Note that the phrase "I get a whole plate of food" contributed to two different ideas in this description. This is allowed as long as you can separate the sentences and descriptions into distinct ideas. Some words and phrases can contribute to more than one idea.

The second stage involves placing each idea into one of the categories of the coding system. The coding system is hierarchically organized. You first decide which major category the explanation belongs in, then search for a sub category within that major category. If there are further subcategories, you continue until you find a category that best fits the explanation.

You then record your result on the coding sheet. A separate coding sheet should be prepared for

each interview you code. Be sure to complete all the sections of the coding sheet so that the characteristics of the subject can be associated with the number and kind of reasons given.

1.0 Psychological Explanations - Psychological explanations attribute adherence problems to some aspect of the person, her psychological make up, her emotions, or her physiological and metabolic needs and responses. Consider whether the explanation is referring in some way to a state, reaction, property, or predisposition of the self. If it does, then the response is coded as a psychological explanation.

1.1 Emotional explanations. Emotional explanations attribute adherence problems to a feeling state.

1.1.1 Feeling trigger – An emotional state triggers or stimulates a behavior that is incompatible with adherence.

1.1.1.1 Negative emotional trigger – The feeling is negative or an unhappy such as a feeling of anger, sadness, anxiety, or depression.

1.1.1.2 Fear trigger - being afraid or what might happen or what consequence might occur leads to failure to adhere or selection of an incompatible behavior instead. If no specific source of the fear is described or can be reasonably inferred from the context, then code it as a negative emotional trigger. This category is to be used with a specific fear event or outcome is identified.

1.1.1.3 Positive emotional trigger – The feeling is a positive or happy feeling such as a feeling of happiness, joy, satisfaction, or excitement.

1.1.1.4 Boredom emotional trigger – the feeling described that triggers an incompatible behavior is boredom.

1.1.1.5 Deprivation emotional trigger – a feeling of being deprived triggers an incompatible behavior. May use other words such as punished or left out to indicate their reaction to not being able to do what others do, or what they enjoy doing.

1.1.2 Feeling consequence – An emotional state occurs as a consequence of the adherence behavior or of an incompatible behavior and this consequential feeling is the obstacle.

1.1.2.1 Negative emotional consequence – adhering provokes negative feelings like depression, anger, anxiety, or sadness. General statements about actions being stressful are coded with this category.

1.1.2.2 Positive emotional consequence – a nonadherent behavior has a positive mood state as its consequence such as feeling happy, satisfied, or comforted.

1.1.2.3 Embarrassment - Performance of the behavior leads to feelings of embarrassment.

1.1.2.4 Guilt or shame – the person anticipates that choosing to adhere would result in feelings of guilt or shame.

1.2 Personality trait explanations – the reason for nonadherence attributed to a stable personality factor or trait.

1.2.1 Personality trait laziness – the failure to adhere is attributed to laziness

1.2.2 Other personality trait – the failure to adhere is attributed to a stable personality trait or characteristic

1.3 Physiological explanations – the reason for not adhering to recommendations has to do with a physical state or symptom

1.3.1 Cravings – the person describe having a craving for a particular food or type of food. Cravings may also refer to a taste such as sweet or salty.

1.3.2 Hunger – the physical state of hunger is described as the reason for not being able to adhere.

1.3.3 Pain trigger – physical aches and pains trigger an incompatible behavior.

1.3.4 Pain consequence – the consequence of adhering is aches and pains. These can include headaches, stomach aches, muscle cramps, or feelings of tenderness or discomfort.

1.3.5 Health – the anticipated effect of adherence on one's health is negative or is insufficiently positive. The state of one's health might be such that it prevents the individual from adhering. Health conditions include things like physical handicaps, lack of teeth, chronic fatigue, incontinence, unable to get out of the house, and so forth.

1.3.6 Taste – the taste, texture, or quality of food influences one's choices. Healthy foods, low-fat foods, or foods preferred for disease prevention lack taste compared to unhealthy alternatives or high fat foods, and unhealthy foods taste so much better that they are preferred. Taste may also refer to specifically liking the taste of certain foods such as butter, meat, or cheese.

1.4 Cognitive explanations - A thought or idea is described as an reason for being unable to adhere to recommendations.

1.4.1 Thoughts as triggers – a thought or idea triggers a behavior that is incompatible with adherence

1.4.1.1 I failed – the idea that one failed or somehow did not live up to implied or explicit standards provides an opportunity or excuse to engage in incompatible behavior.

1.4.1.2 Lack of confidence - the behavior was not performed or another behavior was chosen instead because of a lack of confidence that one could effectively or successfully carry out the behavior.

1.4.1.3 Difficulty – the action is perceived as too difficult or beyond one's ability or skill.

1.4.1.4 Lack of knowledge or information – the behavior is not selected because the individual does not have sufficient knowledge or information necessary to perform the behavior.

1.4.1.5 Lack of will power/motivation – the individual describes struggling with making choices of healthy behaviors over unhealthy alternatives and explains that she lacks will power to

make the healthy choice. When someone describes lacking motivation, or not having enough motivation to do something (and is not more specific about motivational factors), then code using this category.

1.4.1.6 I forgot – the individual explains that memory problems or forgetting is the reason for not engaging in a behavior. This may be expressed as a failure to think about something or a failure to recognize when it is an appropriate time to do something.

1.4.1.7 I never thought of it – the individual explains that they have never engaged in the behavior because it never occurred to them to do so.

1.4.1.8 Other thoughts – another kind of thought or style of thinking is described that triggers incompatible behaviors.

1.4.2 Thoughts as consequences - a thought or idea occurs or is anticipated to occur as a consequence of adherence and the person chooses not to adhere in order to avoid thinking this thought or having this idea.

1.4.2.1 Negative self-evaluation – adhering to recommendations would result in a negative evaluation or appraisal of one's self such labeling one's self stupid, a failure, childish, etc.

1.4.2.2 Loss of pride or self-esteem. Choosing to adhere is anticipated to result in a change of mind about one's self that effectively is a loss of pride or self-esteem.

1.4.2.3 Not liking to change – choosing to adhere would involve making a change in one's habits or routines. The individual expresses the idea that she does not like to make changes and this is the reason she cannot adhere. This may also be stated in terms of having habits that are difficult to change or that the individual does not want to change.

1.4.2.4 Unsure of benefits. The individual does not choose the behavior because she is unsure of what benefits might occur from doing so. This category may also be used when the individual knows what the benefits are, but is unsure that the benefits are powerful or worthwhile. This can also refer to knowing what the benefits are and not valuing those benefits, for example not being interested in losing weight. This category can also be used when specific benefits are mentioned as not being relevant or desirable to the individual. For example, the individual may state that she is not overweight so therefore she would not benefit from cutting her fat intake.

1.4.2.5 Failure experience. The individual tried the behavior and had a bad experience with it. It may have been too difficult, it may not have lived up to expectations, or it may not have given the desired results.

2.0 Environmental explanations - The reason for not being able to adhere to

recommendations is external to the self and resides somewhere in the environment.

2.1 Time – the inability to adhere is attributed to a lack of time or to competing demands or obligations that take away time from making healthy choices. Or complains that healthy choices take to much time to follow as opposed to unhealthy alternatives.

2.2 Financial – the inability to adhere is attributed to money or finances

- 2.2.1 Poverty – a general statement is made that one is too poor or lacks the financial resources to be able to adhere to recommendations
- 2.2.2 Specific costs - the inability to adhere is attributed to the high cost of an item, service, medication, food etc. This can include the direct cost of the item, or an indirect cost such as short shelf life which makes you have to throw food away.
- 2.2.3 Competing costs – an obligation to spend money on something else prevents one from adhering to the recommendations.

2.3 Family – the inability to adhere is attributed to some aspect of the individual's family situation or to the behavior of family members.

- 2.3.1 Emotional support – a lack of emotional support from family members is cited. Emotional support involves behaviors like giving encouragement, providing comfort, expressions of sympathy or empathy.
- 2.3.2 Tangible support – a lack of tangible support is cited as the reason for nonadherence. Tangible support involves performing specific tasks that would make it easier to follow medical advice or to practice preventive behaviors.
- 2.3.3 Conflict – the performance of a behavior would create a conflict, disagreement, argument, or heated discussion with another family member.
- 2.3.4 Sabotage – the actions or lack of actions on the part of family members sabotages the individual's attempts to adhere to recommendations. The actions may vary from trying to talk the person out of it .
- 2.3.5 Family tradition – the behavior would violate a norm of family behavior or somehow go against family traditions. Family here can mean both immediate family and extended family.
- 2.3.6 Family demands – the action could not be done because the level of demands for time, energy, effort, or attention from family members was too high or got in the way. Use this category whenever a person describes having to make a choice between adherence and the needs or demands of family life.

2.4 Work – The lack of adherence is attributed to some aspect of the person's work, school, or career activity.

- 2.4.1 Work demands – the demands of work are too high in terms of time, energy, attention, or effort to allow the person to be adherent.
- 2.4.2 Work environment – there is something about the work environment that interferes with or prevents adherence
  - 2.4.2.1 Actions of coworkers - The behaviors and attitudes of coworkers prevent or impede adherence.

2.4.2.2 Rules of workplace – the rules of the workplace do not allow the time or the freedom to adhere.

2.4.2.3 Resources of workplace – the resources in the workplace are such that it makes it difficult or impossible to adhere.

2.4.2.4 Other aspect of work – there is some other aspect of the working or school environment that prevents adherence.

2.5 Home environment – some aspect of the home environment does not allow or encourage adherence.

2.5.1 Resources – there is a lack of resources at home. This could mean that foods are not available to eat, or that the utensils needed to prepare the foods are not there. It could mean that there is no place to store foods, or that a piece of equipment is broken or malfunctioning.

2.5.2 Space – there is not enough room at home either do to overcrowding and a lack of privacy or due to the cramped nature of the living quarters.

2.5.3 Other aspect of home 0 there is some other aspect of the home environment that prevents adherence.

2.6 Community – the inability to adhere is attributed to some aspect of the community in which the individual lives. Living in a community can be both a matter of proximity, the geographic area in which you live, and a matter of identification, the people you see as similar to yourself. Identification communities can be defined in many ways including income, education, religion, and race.

2.6.1 Travel and transportation – the lack of access to transportation of the distances that must be traveled are a barrier to adherence.

2.6.2 Resources – there is something lacking in the community in terms of resources needed in order to facilitate adherence.

2.6.2.1 Restaurants – the foods one should eat are not available in restuarants

2.6.2.2 Fast food – fast food establishments do not sell healthy foods

2.6.2.3 Groceries – the kinds of foods one needs are not available at grocery stores

2.6.2.4 Vending machines – the individual describes eating inappropriate foods because they are obtained from vending machines.

2.6.2.5 Medical resources – medical services are not readily available in the community.

2.6.2.6 Seasonal, regional, or weather – variations in season, location, or weather limit the availability of healthy choices.

2.6.3 Health beliefs , practices, and traditions – the cultural beliefs, health behaviors, and traditions of the community in which one lives are barriers to adherence.

2.6.3.1 Religious traditions – the religious beliefs of one's peers or peer group create problems for adherence

2.6.3.2 Social events – attending social events in one's community creates a problem for adherence. This might include ball

games, parties, school events, church socials, or getting together with neighbors and friends.

2.6.3.3 Social sanction – the individual anticipates criticism or social sanction from peers if she were to adhere to recommendations

2.6.3.4 Folk beliefs – the individual describes an idea or belief in the community that is not an established part of medical science yet is a way of understanding, explaining, preventing or treating medical problems. Use of many alternative therapies, faith healing, and cures based on attitude would fall into this category.

2.6.3.5 Attitudes towards medicine – the individual expresses a cultural belief or attitude towards medicine, doctors, or the medical establishment that prevents or impedes adherence. An example is the idea that doctors are only interested in making money, or drug companies cannot be trusted, or public health officials are all telling lies. Any expression of distrust of doctors or health professionals, even if you cannot tell specifically if it is a cultural attitude, should be coded using this category.

2.6.3.6 Health recommendations – the individual describes recommendations from health professionals or the lack of recommendations from health professionals as the reason for not engaging in a behavior.

2.7 Interpersonal – the individual describes interpersonal situations not involving family members that create adherence difficulties

2.7.1 Social facilitation – the people one is with or around are engaging in incompatible behaviors and this makes it difficult or impossible to adhere to recommendations.

2.7.2 Conflict – choosing to adhere creates or is anticipated to create interpersonal conflict.

2.7.3 Lack of social support - the behavior of others in a social situation is creating a lack of social support, either active or emotional.