BREAST CANCER SCREENING HEALTH BEHAVIORS IN OLDER WOMEN

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Marsha V. Hammond, B.S., M.A.

Denton, Texas

August, 1994

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health beliefs of 221 postmenopausal women were assessed to predict the Breast Cancer Screening Behaviors of breast self-examination (BSE) and utilization of mammography. Champion's (1991) revised Health Belief Model (HBM) instrument for BSE, which assesses the HBM constructs of Seriousness, Susceptibility, Benefits, Barriers, Confidence and Health Motivation, was utilized along with her Barriers and Benefits instrument for mammography usage. Ronis' and Harel's (1989) constructs of Severity-Late and Severity-Early were evaluated along with Cuing and demographic variables. These exogenous latent constructs were utilized in a LISREL path model to predict Breast Cancer Screening Behavior.

Results indicated that Champion's constructs of Confidence and Barriers as they are related to BSE, along with the demographic variable Education fit the data. In terms of endogenous variables, BSE Frequency was maintained in the full causal model.

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Much inspiration was received from Robert Lockwood, M.D., mammographer par excellence, who always advises his women patients, "to get to know their own lumps."

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CHAPTER I

INTRODUCTION

The History of Breast Cancer, Screening and Treatment in the Context of Screening Health Behaviors

Breast cancer has been recognized as a disease process since the time of the ancient Egyptians. Hippocrates considered no treatment superior to surgery. During the Renaissance, special diets were prescribed which sought to avoid the accumulation of black bile, thought to be the causative agent. Le Dran (1685-1770) was probably the first to note the increased mortality when the axillary nodes are involved (Ray & Baum, 1985). Surgical interventions were noted by Sir James Paget in 1853. Perhaps as a results of improved selection of operable patients versus those with advanced disease, the 10-year survival rate following mastectomy improved from about 10% in the 1920's to about 50% in the 1950's (Ray & Baum, 1985).

The Health Belief Model, a health behaviors model which has been in use for approximately thirty years and the main model to be utilized for this dissertation project, has focused on the study of both Screening Health Behaviors (SHBs) and Preventive Health Behaviors (PHBs). In contrast to diagnosis, the purpose of screening is to detect the existence of a particular disease at the smallest size

and/or stage threshold possible. Therefore, the screening device must be highly sensitive, specific, and accurate (Moskowitz, 1983). That breast cancer screening devices are but screening devices and not truly preventive, places the behaviors associated with their performance in the SHBs category.

Other researchers have noted that while breast cancer screening is not a method of primary prevention it is one of secondary prevention (Mamom & Zapka, 1983). Nevertheless, for the purposes of clarity, breast cancer screening techniques (BSE) or devices (mammography) will be as denoted being circumscribed by a set of behaviors called SHB's.

In the United States, cancer is the leading cause of death for women ages 35-50 (Wallis, 1991). The risk of breast cancer increases rapidly from age 30 to menopause and more slowly after age 50, and then even more slowly after age 80 (Leis, 1980). Prognosis depends directly upon the stage of the breast cancer at time of diagnosis (Korltchouk & Stjernsward, 1990).

Predisposing Factors and the Occurrence of Breast Cancer

Recent statistics indicate that the five-year survival rate for early, localized breast cancer approaches 100%; but, if the cancer has spread, this rate is only 60% (American Cancer Society, 1989).

Moreover, there appear to be genetic and life-style factors that affect and influence, or are related to the

occurrence of breast cancer. These include age of first full-term pregnancy (MacMahon, Cole, & Lin, 1970); age, (85% over age 45); family history; race (Caucasians have a higher incidence than Blacks who have a higher incidence than Hispanics and Asians); history of breast cancer in one breast; whether a woman has had uterine, ovarian or colon cancer (American Cancer Society, 1991); being overweight (Ingram et al., 1989); alcohol intake (Schatzkin, Jones, Hooever, & Taylor, 1987); and, being heterozygous for ataxia-telangiectasia, an autosomal recessive syndrome (Swift, Morrell, Massey, & Chase, 1991). In that only one-fourth of breast cancer cases can be accounted for on the basis of risk factors, it is obvious, at least at this time, that efforts in the area of primary prevention will not eradicate breast cancer and that what is called for is superior screening methods (Robischon, 1988). Appropriately, this dissertation has attempted to focus on SHB's.

Screening Utilizing Breast Self-Examination

Several large ongoing epidemiological investigations are attempting to ascertain whether any, or which one, of the breast cancer screening techniques actually reduce mortality (Semiglazov & Moiseenko, 1987; Tabar & Dean, 1987; Baines, To, & Walla, 1990). For a variety of reasons, research indicates that the screening devices for breast cancer are not equally efficacious. Screening devices yet

under investigation have rendered ambiguous mortality and morbidity data which certainly must have an impact on medical personnel's recommendations. It is in light of this and other questions that some epidemiological data is presented for discussion.

Some researchers have emphasized the point that the BSE must be adequate, periodic and systematic (Feldman et al., 1981; Foster, Lang, Constanza, Worden, Haines, & Yates, 1978; Huguley & Brown, 1981). General support has been noted for BSE, and Feig (1990) has cited five reasons why women should perform BSE: (a) it is simple, self-generated, repeatable at monthly intervals and inexpensive, (b) formal programs to teach BSE are inexpensive and there is no cost to continue performing it subsequently, (c) BSE promotes self-awareness of breast problems and leads to earlier detection than does accidental discovery, (d) those women who regularly perform BSE may be more inclined to comply with other breast cancer screening guidelines, and (e) BSE may detect some tumors which are missed by mammography and Clinical Breast Examination (CBE), or which grow rapidly between annual screenings, namely interval tumors.

As of merely 15 years ago, women were observed to be poorly educated regarding breast cancer and breast cancer screening as indicated by their beliefs and behaviors. Chrvala and Iverson (1989) reported that the most frequently

reported reasons for not doing BSE by 969 women was forgetfulness (46.9%) and lack of confidence (18.3%).

Other reasons that women have reported are: having never been shown how to perform BSE; perceiving themselves to be at low risk for breast cancer; and, uncertainty about practice benefits (Amsel, Grover, & Balshem, 1985; Kelly, 1979). As to which women concern themselves with breast cancer screening behaviors, Calnan (1985) noted that among 1084 women, social class and to a lesser degree education, were consistently amongst the strongest discriminators of women's participation in multiple health behaviors, inclusive of breast cancer screening behaviors.

Current recommendations are that BSE should be performed once a month by all women, and for menstruating women it should be done following the menstrual period. The procedure involves a number of specified steps which require approximately 5-10 minutes and take proper positioning for the procedure to be useful (American Cancer Society, 1987). BSE has frequently been viewed as a practical solution as it is a cost-effective screening method for developing countries as well as developed countries (Miller, Chamberlain & Tsechkowskik, 1985). Some researchers, however, make the point that BSE may be most effective under ciscumstances where CBE and mammography are not available (Cole & Austin, 1981).

Alagna and Reddy (1984) have noted, "(T)hat BSE is a simple procedure without risk (which) gives it advantages over other screning procedures only if there is accumulated evidence that routine, competent performance increases a women's ability to detect lesions." (pp. 123-124). Not only must women be able to palpate small tumors, but they must be able to palpate affected lymph nodes within the armpit area as nodal involvement is a better predictor of future outcome than tumor size.

Evidence indicates that despite current efforts to encourage systematic earlier detection, as many as 70% to 90% of all cases of breast cancer are detected by the women themselves, either accidentally or in the process of self-examination (Boyle, Michale, Bersani, Nemoto, & Mettlin, 1981; Gastrin, 1981; Howe, 1980). The National Surgical Adjuvant Breast Project (NSADP), a large ongoing epidemiological study has found that women who perform BSE have smaller primary tumors and fewer involved axillary lymph nodes (Feldman et al., 1981; Mant et al., 1987). Significantly smaller tumor size has been noted in women performing BSE (Greenwald et al., 1978) as well as an increased five-year survival rate (Huguley, Brown, Greenberg, & Scott, 1988). In a meta-analysis of eight studies investigating BSE and the extent of disease in women with breast cancer, significantly fewer women who had practiced BSE before their illness had a tumor of 2 cm or

more in diameter compared with women who had not practiced BSE (Hill, White, Jolley, & Mapperson, 1988).

In any case, the utilization of BSE as a screening device for breast cancer has been both heralded and disclaimed. O'Malley and Fletcher (1987) have proposed that BSE has not been adequately evaluated as a useful screening tool. Moreover, as per their analysis, there are few grade I i.e., randomized and controlled studies, outlining the occurrence of breast cancer within the context of breast cancer screening devices.

O'Malley and Fletcher (1989) note than an important issue that is not being addressed by any of the large, ongoing epidemiological studies concerns whether BSE should be used as a primary or supplemental screening device for breast cancer. They hypothesize that in the United States, the apparent rationale behind the advocation of BSE is that it is may detect some of the tumors missed by CBE and mammography. Specifically, these misses are considered to be interval tumors. Indeed, even in a program such as the Breast Cancer Detection Demonstration Project (BCDDP), in which women were screened every year with mammography and CBE, advanced interval tumors were discovered, particularly among women aged 40-49.

In light of the above research, one of the questions that must thus be entertained pertains to women's competence to perform BSE well. The most efficient mechanism for

finding smaller tumors has been noted to be x-ray, particularly in large, fatty breasts. Moreover, mammography was seen to be less effective than BSE in small, dense breasts (O'Malley & Fletcher, 1987). It is therefore suggested that younger women with small, dense breasts (younger women) may be candidates for more intensive educational efforts on BSE coupled with a more formalized program of CBE and perhaps mammography.

Older, post-menopausal women have much to gain in terms of the screening efficacy of mammography on their less fatty, less dense breasts. Thus, impacting on this dissertation project with older, post-menopausal women is the fact that as women age, breast tissue changes so that it is less dense or fibrocystic or lumpy. BSE could thus be hypothesized to be more clear-cut and less confusing for older women in contrast to younger women. As regards mammography in older, post-menopausal women, mammography misses only about 1-2% of tumors in contrast to its miss-rate in younger, pre-menopausal women which can be up to 33% (Rubin, 1992).

The competence of BSE practice has been studied far less than has frequency of practice. Increasingly, however, its importance has been an item for research (Boyle et al., 1981; Foster et al., 1978; Foster & Constanze, 1984; Smith & Burns, 1985). For the purposes of this dissertation, competence has been evaluated in terms of knowledge about

breast cancer and the steps necessary to perform an adequate BSE.

The American Cancer Society has advocated that the more thorough and lengthy the BSE, the better the potential for detecting a tumor. A total of 19 separate steps or activities has been noted in an ACS-advised BSE (Mamon & Zapka, 1983). However, it has also been hypothesized that the more steps are carried out, the greater the fatigue and the less the efficiency (Kegeles, 1985).

Rubber breast models have been utilized to teach women BSE (Pennypacker, 1980). Trotta (1985) proposed that while the use of breast models may help increase women's confidence in their ability to find a lump, the avoidance responses, such as being too busy or too lazy, or fear of finding a lump are more difficult to amend and requires the judicious use of factual information in order to increase motivation and reduce fear. She further proposes that, "(T)he answer may lie in teaching women to take more responsibility for the care of their own health after years of overdependence on the medical profession." (Trotta, 1985, p. 17).

In conclusion, many questions regarding BSE appear to be unanswered at this time. The debate continues as to its effectiveness as a screening device; moreover, much of the research attempting to distinguish between BSE performers and non-performers as well as the proficiency of the

performance has not been guided by the theoretical models of health behavior but by a post-hoc, non-systematic selection of predictors variables (Chrvala & Iverson, 1989). If women report that they perform BSE, but are in fact not following the specified procedures, then any study attempting to test the efficacy of BSE as a screening device may not, in fact, be evaluating the effects of BSE but only a behavior presumed to be BSE by the respondents (Holtzman & Celentano, 1983).

The role of BSE alone in reducing the mortality rate is unknown and is currently being researched in Russia (Semisglazov & Moiseenko, 1987) and the United Kingdom (UK Trial, 1988). However, at this time, both mammography and BSE are deemed necessary as when they are overlapped as SHB's the two modalities are able to uncover early carcinomas independently (Moskowitz, 1983).

Mammography in the Context of Screening Health Behaviors

Mammography has a history in the United States of being the most controversial of the three screening methods. Earlier, there was professional hesitancy to recommend it due to the higher radiation dosage of non-dedicated mammogram machines. Prohibitive radiation has become less of an issue with the newer, low-dose or dedicated machines.

In 1982, the American College of Radiologists (ACR) recommended that women between 40 and 50 years of age obtain mammograms every year or two and women older than 50 should

obtain annual mammograms. They also recommended that women practice monthly BSE and obtain regular CBE (Miller, Chamberlain, & Tsechkovski, 1985). In something of a contrast, however, the U.S. Preventive Services Task Force and the American College of Physicians recommend that women begin getting mammograms at age 50 as there appears to be little benefit, in terms of mortality, to be gained for women aged 40-49 (Rubin, 1992).

Pertinent to this matter is the construal of BSE as a more active SHB whileas mammography could be seen as a more passive SHB. BSE ability scores have been noted to be positively and significantly associated with other types of cancer prevention tests and/or examinations but not with obtaining CBE, history of mammography, and perceived susceptibility to breast cancer (Celentano & Holtzman, 1983). Having had a Pap smear, which screens for cervical cancer, in the previous year, is predictive of breast cancer screening (Fulton et al., 1991; Hayward, Shapiro, Freeman, & Corey, 1988).

BSE is time consuming and calls for personal knowledge and expertise in contrast to mammography which requires a yearly or bi-yearly visit to an expert. Calnan's (1985) study attempted to find out if there were differences between women who engaged actively in PHBs and those who more frequently engaged in what could be construed as passive PHBs. Calnan's study indicated that PHBs may be

made up of many different dimensions and that there is no clear differentiation between those women who take an active stance and those who take a more passive one in terms of their health behavior. The research suggests that if multi-dimensions are to be identified, the analysis should perhaps include a wider range of activities. Additionally, he suggests that, "...different types of preventive health behaviors may be products of specific contexts which might included specific beliefs about the behavior or the object of that behavior and specific circumstances which might surround the decisions to adopt the preventive health behavior in question." (p. 268).

Only 15-20% of American women over age 50 have ever had a mammogram (Howard, 1987). As of 1990, however, there has been a substantial increase in the number of mammograms obtained for women 40 years or older. However, less than one-third of women over the age of 40 have followed mammography screening guidelines. Indeed, use of mammography is highest among women 50-59 years of age, then decreases with age (Massachusettes Medical Society, 1991).

Related to this less than optimum usage, it has been documented that physicians poorly utilize the modality of mammography as a screening instrument (Albanes, Weinberg, Boss, & Taylor, 1988). Sobel, Gordon, Kristal, Eklund, Curtin, and Kennedy (1989), in a state-wide screening program in Oregon, found that the most prevalent reason

women gave for not obtaining mammography was because their doctor had "not ordered it" (30%). The second most cited reason was that they "did not think it necessary" (10.6%). Other researchers have even suggested that the greatest impact as to removal of barriers pertaining to mammography, may be made by modifying women's encounters with health care providers rather than attempting to modify women's attitudes and beliefs (Fulton et al., 1991; Reynolds, West, & Aiken, 1990).

All the large ongoing screening studies (mammography only or in conjunction with some form of physical exam)in Sweden, Britain, and Canada have been effective in reducing mortality from breast cancer by approximately 40%. In some of the European studies this order of effectiveness was achieved through mammography alone (The Workshop Group, 1989). Moreover, there is some indication that if mammography and CBE were available to all women over age 50 on the prescribed basis, there would perhaps be no need to utilize BSE which is, in any case, subject to various types of BSE performance.

In summary, BSE appears to be less sensitive than mammography. BSE might be expected to have the greatest value when screening by mammography and CBE have not been widely used. Moreover, if BSE is included in a screening program with mammography, competence of BSE performance must be very high and frequency of BSE performance should be

monthly if there is to be detection of interval cancers (Feid, 1990). The usefulness of mammography in older women has remained unquestioned (Rubin, 1992). Indeed, mammography will continue to be useful as it is the one method by which the diagnostic threshold is lowered (Tabar & Dean, 1987). This is particularly so in older women as only 1-2% of tumors are missed utilizing mammography in 75 year-old women in contrast to the miss-rate in younger women of 33% (Rubin, 1992).

It could be argued that of these two SHBs, namely BSE and mammography, BSE calls for women to be personally responsible where as mammography asks women to be amenable to medical suggestion. Unlike mammography, and in contrast to a health-related behaviors preventive in nature such as quitting smoking, BSE requires women to remember to perform an infrequent behavior, to learn to perform a specific skill, and to maintain a behavior that, because of its private nature, may receive little external reinforcement (Meyerowitz & Chaiken, 1987).

The Health Belief Model

The Health Belief Model (HBM) is an attempt to describe the relationship between a person's beliefs and the performance of various preventive and screening health behaviors. Moreover, the HBM has been credited with generating more new research on health beliefs and related

behaviors than any other theoretical approach (Rosenstock, Strecher, & Becker, 1988).

The HBM has been viewed as a rational, probabilistic, decision-making model (Lauver & Angerame, 1988). This model has systematically approached the problem of how to engage people in PHBs as well as SHBs, in contrast to the confusion of the general medical compliance literature (Becker & Maiman, 1975). Indeed, the early researchers of the HBM had a strong committment toward theory building and not merely the solving of practical problems one at a time (Rosenstock, 1974a; 1974b).

The HBM was created by the U.S. Public Health Service in order to understand the failure of the public to accept preventive measures, such as immunizations or screening tests, and thus to predict compliance of recommended health behaviors for asymptomatic individuals (Rosenstock, 1974a; 1974b). It was derived from the social-psychological theory of Lewin and Becker (Rosenstock, 1966) which allows analysis of an individual's motivation toward health behaviors at the level of individual decision making (Mikhail, 1981).

Adler, Kegeles, and Genevro (1992) have noted that although the HBM is consistent with expectancy-value models, its roots also issue from Tolman's theory of learning. Consistent with expectancy-value theory, the HBM hypothesizes that behavior depends primarily on the value of a particular goal to the indivual and his or her estimate of

the probability that a given action will result in the realization of that goal (Maiman & Becker, 1974). Moreover, an individual will not undertake the realization of the goal unless he or she is ready to act.

Cognition or thinking about the elements and the relations in question and subsequently noticing that matters are not in equilibrium is necessary for the dissonance to occur which motivates possible attitude changes (Maiman & Becker, 1974). Thus, motivation is a necessary condition for action in the HBM. Diseases would be hypothesized to be undesirable and would be expected to exert a force causing the individual to alter his or her actions.

The early researchers of the HBM model believed there to be an optimal balance of the constructs within the model. Maiman and Becker (1974) have suggested that although no mathematical formulation is given for the interactions among the components of the HBM, that the HBM's components are multiplicative. These constructs were believed to include the perception of health motivation, vulnerability, severity, and the psychological cost/benefit ratio. Moreover, it was hypothesized that where balance is grossly unequal there will be a lack of compliant or adherent behavior (Rosenstock 1974a; 1974b).

In the HBM model, Susceptibility, Severity, Benefits, and Barriers interact to augment the intention to comply which results in compliance or adherence to medical

suggestion. First, a person must have the perception of Vulnerability or Susceptibility. Susceptibility refers to the subjective risks of contracting a condition (Rosenstock 1974a; 1974b). Secondly, the person must perceive that the potential illness could have serious personal consequences. The degree of Seriousness may be determined by the degree of emotional arousal created by the thought of a disease as well as by the kinds of difficulties the individual believes a given health condition will create. Seriousness may include broad and complex implications, such as the effects of the disease on a job, on family life, and on social relations.

Within the HBM, the constructs of Susceptibility and Severity have strong cognitive components as they have been deemed to be, at least in part, dependent on knowledge (Rosenstock, 1974a; 1974b). A person must perceive that taking some particular action would be beneficial in reducing the threat of personal susceptibility to the illness or decrease the seriousness of the illness. Lastly, a person must have the perception that the Barriers, such as cost, embarrassment, pain or fear, do not outweigh the Benefits of taking the action.

An indivual may believe that a given action will be effective in reducing the threat of disease but concommitantly see that action as perhaps being inconvenient, expensive, unpleasant, painful or upsetting.

If alternative actions of nearly equal efficacy are available, the matter may be satisfactorily settled in this way. If the situation does not provide such alternative means to resolve the conflict, the person is hypothesized to either psychologically remove herself from the conflict by engaging in activities such as vacillating or have increased fear or anxiety (Rosenstock 1974a; 1974b).

As for the constructs Benefits and Barriers, Cummings, Jette, and Rosenstock (1978) have suggested that these constructs may represent opposite ends of a single continuum and perhaps should not be treated as separate health beliefs. Their finding of a substantial negative correlation between Benefits and Barriers suggested that as one's perceptions of Benefits increases, one's perception of Barriers (in the context of the same health action) concommitantly decreases.

In addition to these four constructs, Rosenstock (1966) introduced the concept of internal or external Cues which lead to action, as critical in producing initiation of the PHB or SHB. Indeed, Cues were hypothesized to be necessary to trigger health action in individuals psychologically prepared to act based on their health beliefs regarding their perceptions of Severity, Susceptibility, Benefits and Barriers. These then are the constructs of the original HBM. Rosenstock (1974a; 1974b) notes that this model

clearly has an avoidance orientation in contrast to health seeking orientation.

A fifth construct, namely, Health Motivation or Salience, defined as a person's concern about general health, was added to the overall HBM model by Becker, Maiman, Kirscht and Drachman (1977). The construct of Health Salience as regards health and illness for an individual, was purposefully not utilized as early researchers were not able to devise what they considered to be a good operational variable. They came to believe that the perception of Susceptibility to, and Severity of, a particular condition would itself be motivating (Rosenstock, 1974a; 1974b).

Lastly, a sixth construct, that of Control, was amended to the other constructs of the HBM and it was defined as an individual's perception of personal influence over events (Hersey, Morton, Davis, & Reichgott, 1980). For the purposes of this dissertation, the construct of Confidence attempts to capture this control dimension.

The Health Belief Model and Breast Cancer Screening Behavior

The development of a standard, flexible, widely useful instrument to measure HBM variables has not been fruitful. Weissfeld, Brock, Kirscht and Hawthorne (1987) have noted that this is in part due to the need to target questions which are specific to health behavior, disease states, and populations. In keeping with this suggestion, the targeted

health beliefs and behaviors that are pertinent to this dissertaiton specifically pertain to breast cancer and more particularly to breast cancer screening.

As far as women's other health behaviors, the HBM has been utilized for studying the decision to attend clinics for mammography or screening for cervical cancer (Fink, Shapiro & Lewis, 1968; Kegeles, 1969). The HBM has been tested retrospectively for BSE practices (Calnan & Rutter, 1986; Champion, 1984; Hallal, 1982; Hirshfield-Bartek, 1982). Moreover, it is the major conceptual framework that has been utilized to explain BSE practice (Lauver & Angerame, 1988).

Champion's (1984) approach to the development of valid and reliable scales for measuring health beliefs as regards breast cancer and BSE is the most comprehensive to date (Wyper, 1990). Only recently, however, have there been attempts to construct an instrument as regards health behaviors and beliefs within the context of mammography (Champion, 1991).

Champion's (1985) adaptation of the HBM as regards BSE, which will hereafter be called the Champion Health Belief Model/ Breast Self-Examination (CHBM/BSE), has been used to predict the relationships among women's health beliefs regarding breast self-examination, and BSE frequency. Multiple regression analysis of the combined influence of all HBM variables on BSE performance has explained

approximately one-fourth of the variance as regards BSE frequency (Champion, 1984; 1987). In these studies, Barriers accounted for most of the explained variance and BSE was operationally defined as frequency of performance. More recently, Champion has reworked the CHBM/BSE to include perceived competence as regards BSE and general health beliefs (Champion, 1991).

The Constructs of the Health Belief Model in Relation to Breast Cancer Screening

The following are the major constructs of the HBM. Each has specific purposes in terms of investigating how people perceive the prevention of disease or the screening of disease. The major constructs of the HBM model are: Susceptibility, Severity, Benefits, Barriers, Cuing, and Health Motivation.

Susceptibility. Generally, Susceptibility to breast cancer is highest in women who possess the following high-risk characteristics: personal or close family history of breast cancer, nipple discharge, palpable mass, or previous history of proliferative breast disease with atypia (Gold, Bassett & Fox, 1987). While these are among those determining medical susceptibility, they certainly are among those also contributing to women's perceived Susceptibility. Calnan and Moss (1984), Hirst (1986), and Williams (1988), found Susceptibility to be positively related to BSE behavior. Fink (1968) noted that

Susceptibility as well as a concern with Severity distinguished participants from non-participants in a breast cancer screening program. Massey (1986) noted that rural women who practice BSE six or more times a year had an increased perception of Susceptibility as compared to BSE-practicers who performed the behavior less than six times a year. Redeker (1989) found that suburban women who scored high on Susceptibility and Benefits were more frequent practicers of BSE than those who did not.

Susceptibility and Seriousness have been combined to form a Threat of Breast Cancer construct (Wyper, 1990). Results indicated that there was no significant relationships between the Threat construct and any measure of BSE performance. Moreover, in this study, Barriers and Susceptibility in their original form explained more variance in BSE practice than did attempts to combine the variables into the above Threat construct and a Benefits plus Barriers Construct.

Stillman (1977) likewise noted there to be an association between women who believe themselves to be susceptibile and BSE. Her conclusions have been questioned, however, by Champion (1985) since no statistical tests were reported concerning the measurement of health beliefs. Moreover, other studies did not find Susceptibility to be positively associated with BSE practice (Champion, 1984; Howe, 1981; Rutledge, 1987; Trotta, 1980; Zapka & Mamon,

1982). In a study by Fulton et al. (1991), only one-fourth of 853 women felt especially susceptible to breast cancer. Champion (1985) and Rutledge (1987) hypothesized that Susceptibility to breast cancer and BSE may not have been shown to be related positively as BSE practice does not reduce a woman's chances of having breast cancer. Therefore, the relationship of Susceptibility and BSE practice is difficult to evaluate (Champion, 1985).

Typically, the HBM has been utilized to explain PHBs, with SHBs being given the same sort of treatment. Although not addressed in terms of PHBs being fundamentally different from SHBs, that the two behaviors are truly different is a topic that is being addressed, perhaps, by Champion in her note of Susceptibility being difficult to address as regards BSE (Champion, 1985).

Seriousness. Public attitudes regarding cancer and cancer tests indicate that although the public markedly underestimates the incidence of cancer and overestimates the mortality in the population (the true incidence for all types of cancer is one out of four), people are, nevertheless, highly aware of, and concerned about, cancer (Lieberman Research, Inc., 1980). As far as breast cancer is concerned, it has been largely assumed that women perceive breast cancer as serious. Nevertheless, studies that have included the Seriousness construct have reported non-significant associations between this construct and BSE

frequency (Champion, 1984; Champion, 1985; Rutledge, 1987; Trotta, 1980). Fulton et al. (1991) noted that only one-third of the 853 women they studied perceived breast cancer as an especially serious, life-threatening disease.

As regards perceived Seriouness, Becker and Maiman (1975) emphasize:

> ... that this variable refers to the person's subjective perceptions rather than to some medical or 'objective' estimate of how serious the illness may be. There is ample evidence from a wide variety of studies that no (or even negative) association exists between medical views of the problem's severity and patient compliance. (p. 14)

Becker and Maiman (1975) hypothesize, that for the asymptomatic individual, very low levels of Severity are not seen as sufficiently motivating, while very high levels of Seriousness, including fear, are inhibiting. This could be understood in terms of a very serious illness as indicating a terminal diagnosis; and, if a diagnosis is terminal, then there is likely no benefit to action. Moreover, not only is it perhaps the person's subjective estimation of the seriousness of a condition that is important, but seriousness may be contextualized according to whether a woman discerns that she has some control on the degree of seriousness or not.

Seriousness or Severity is a construct that has been addressed utilizing LISREL causal modeling by Ronis and Harel (1989). These researchers altered this construct so that it has the dimensions of Severity-Early and Severity-Late. Their multi-dimensional construct of Severity was amended to this dissertation project's instrument.

Benefits. Brailey (1986), Hallal (1982), and Zapka and Mamon (1982) noted positive associations between BSE practice and Benefits. Kelley (1979) noted that urban women had two main reasons for beginning and continuing BSE, namely, Benefits as expressed by an awareness that it is desireable to detect breast cancer early, along with an awareness of high Susceptibility. Hallal (1982) reported a correlation, explaining 8.2% of the variance, between Benefits and BSE practice. In support of these findings, Stillman (1977) administered a questionnaire to 122 mostly lower middle class housewives and noted that although 97% scored high in Benefits as regards BSE in reducing the threat of breast cancer and 87% scored high in Susceptibility, only 40% practiced BSE monthly. As to Benefits and Costs, or Barriers, Becker and Maiman (1975) noted even if an individual is at a high-state of readiness to be screened, these constructs are still a function of the probable effectiveness of the recommended action in reducing the health threat. Financial difficulties, for instance,

might prevent one from taking action to prevent the occurrence of the disease.

Barriers. Within the context of breast cancer screening, Barriers' studies have included embarrassment when doing BSE, fear of finding a lump which might be cancerous, the time involved in performing BSE, concern about not being able to identify lumps, difficulty remembering to do BSE on a monthly basis (Champion, 1987), embarrassment about obtaining a mammogram, the painfulness of a mammogram, the expense of a mammogram, the time consumed in obtaining a mammogram, and the worry engendered due to having a routine mammogram (Champion, 1991). Rimer, Engstrom, Keintz, Myers, and Rosan (1989) have noted that a major Barrier remains regarding the purpose of mammography. In these researchers' structured interview with 601 randomly selected women, which sought to differentiate compliers versus non-compliers as regards mammography, non-compliers had a significantly higher Barrier scores than compliers.

Champion (1985) adapted the HBM and found a greater frequency of BSE practice in urban women who have few Barriers to BSE, high Health Motivation, and high Benefits to their actions. She found no relationship between the sociodemographic variables and personal experience of breast disease and frequency of BSE practice. Gray (1990) utilized Champion's (1985) adaptation of the HBM (CHBM/BSE) to measure Barriers, Susceptibility, Seriousness, Benefits,

Health Motivation, sociodemographics, breast cancer knowledge variables and frequency of BSE in 370 mostly White, rural, married, high-school educated women. Multiple regression analysis indicated that the CHBM/BSE accounted for 26% of the variance in BSE practice. Similarly, Champion (1985) noted that 26% of the variance on BSE practice was accounted for by the HBM variables and moreover that 23% of the HBM variables' variance was accounted for by the Barriers construct alone. In her study, women who perceived more Benefits from BSE in terms of reducing the severity of breast cancer were more likely to report more frequent BSE. Additionally, women who perceived fewer Barriers to performing BSE and those who scored high on Health Motivation were more likely to report performing monthly BSE.

A noteworthy point is that Gray's (1990) study can perhaps be critiqued on the grounds that she did not examine women's proficiency or competence at BSE. Examination of proficiency is becoming more common but many of the earlier studies relied solely upon BSE frequency. This dissertation can be sited as having the same short coming.

Trotta (1980) utilized the HBM to investigate how frequently and thoroughly women practice BSE, how they learn about BSE, and what influences their compliance. Multiple regression analysis revealed that of all the study variables, the number of Barriers had the most significant

influence on both the frequency and thoroughness components of compliance.

Wyper (1990), in noting that approximately 75% of the variance in frequency of BSE remains unexplained by the HBM, proposed that the four variables of the HBM be combined to form two independent constructs. Susceptibility and Seriousness were combined to form a Threat construct and Benefits and Barriers were combined to form Net Perceived Efficacy construct. This did not improve the explanatory value of the HBM for Wyper's (1990) sample. Wyper (1990) also utilized two different approaches to weighing Benefits against Barriers. Though producing variables that were positively associated with all measures of BSE, these constructs still explained less variance in performance than when Barriers was included in a regression model in the original form of the HBM. Moreover, this researcher noted that as in many previously reported studies, Barriers was the most powerful dimension of the model in both univariate and multivariate analyses. Indeed, Barriers has been the most consistent predictor of health-related behavior in general (Janz & Becker, 1984). Across the research, Seriousness has been a poor predictor when the behavior being studied is preventive-oriented rather than illness-oriented (Janz & Becker, 1984).

The effects of Barriers as they pertain to mammography is one of the interests of this study. Moreover, there is

much less research as regards the HBM and mammography. Use of the HBM and mammography has been recently investigated in 853 Rhode Island women. Of the health beliefs studied, Barriers and Benefits of mammography were more predictive of this screening behavior than Susceptibility or Severity (Fulton et al., 1991).

Cuing. Cuing, Rosenstock's fifth dimension of the HBM, has been noted to be important. However, this element of the original HBM model has not been consistently included in research (Adler, Kegeles, & Genevro, 1992). Craun and Deffenbacher (1987) utilized three different formats in attempting to teach college-aged women to do BSE. Results showed that the examination frequency increased over time and was significantly higher in the prompt conditions. In this study, the information and demonstration programs alone did not increase BSE frequency. However, the frequency also increased in the control group and these researchers hypothesize that assessments may have also prompted BSE behavior.

Cuing as a critical component has been underlined by the Canadian National Breast Screening Study (NBSS). This study revealed that of the active respondents, forgetfulness appeared to be a major impediment to BSE (Baines, To & Walla, 1990).

Health Motivation. Over the years, as the HBM has been applied to an increasingly larger area of heatlh beliefs and

complementary behaviors including illness behaviors such as coming for follow-up visits for diagnosed conditions or following recommended regimens for the treatment of disease and as such, it has been modified and reformulated to include a general motivation for health (Becker & Maiman, 1975). This has been deemed to be one of the more significant modifications (Adler, Kegeles, & Genevro, 1992). In some studies, Health Motivation has been treated as a single variable and in others it has been separated into two variables, namely orientation toward health and health locus of control.

Normandeau (1988) utilized a non-experimental descriptive correlational study format in investigating BSE and mammography utilization in 143 rural women 55 years and older. She utilized a modified version of the Champion (1984) HBM questionnaire. The results of the multiple regression analysis indicated that the combined constructs of Susceptibility, Seriousness, Benefits, Barriers, and Health Motivation explained frequency and competency of BSE and frequency of memmography at a significant level. Almost all of the participating women had medium to high scores on Health Motivation.

Health Motivation accounted for 26% of the variance, along with Susceptibility, Seriousness, Benefits, and Barriers in Champion's (1985) multiple regression analysis.

Moreover, this construct was second only to the Barriers construct in explaining variance captured by the HBM.

Criticism of the Health Belief Model for Breast Cancer Screening Behaviors

The Health Belief Model has been widely used even though few studies have supported the utility of all of the components (Janz & Becker, 1984; Mikhail, 1981; Rosenstock, 1974a). Studies have not infrequently examined only selected components of the HBM rather than their combined effects (Wyper, 1990). Researchers have presented varying results as regards support of the various constructs of the HBM.

Jette, Cummings, Brock, Phelpe, and Naessens (1981) have cautioned researchers as to mixing general with specific questionnaire items within the context of same construct. Condition-specific measures of Susceptibility and Severity and situation-specific measures of Barriers are empirically distinct from general measures of these beliefs. Cummings, Jette, and Rosenstock (1978) have also cautioned researchers as to conclusions to be drawn from various studies that might have used different questions intended to measure the presence and magnitude of the same health beliefs.

Just how predictive the HBM is of BSE has been addressed by Calnan and Moss (1984) in their study of women attending a BSE teaching class. The HBM was utilized in

this study to show how well the HBM could predict the outcome of an intervention in contrast to some of the above studies which have evaluated the HBM for its ability to predict BSE. In Calnan and Moss's study, a random sample of 825 women in Britain were interviewed at home before attending a BSE class. Utilizing the outcome variables of, (1) attendance/non-attendance at the BSE class, and (2) satisfactory/not satisfactory BSE practice at the second interview, the results indicated that there was support for the HBM as regards these behaviors. The best predictor, however, of BSE practice was previous BSE practice.

The methodology and statistical technique utilized for investigating frequency of BSE as well as proficiency appears to be important in investigating the HBM as regards BSE. Chrvala and Iverson (1989) reported that the use of HBM questions explained only 1.4% of the total variance where as the Theory of Reasoned Action questions explained 19% and a regression model explained 36.5% of the variance. They suggest selection of variables beyond these two models as well as the use of path analysis to uncover more of the variance.

Reynolds, West and Aiken (1990) utilized three variations of educational and psychological programs to evaluate the HBM using LISREL VI causal path analysis. Although this study did not evaluate BSE, its importance lies, perhaps, in its evaluation of the intention to assess,

in part, the screening available for breast cancer. Moreover, this study attempts to tease apart belief from behavior, a criticism Kegeles (1973) had of the HBM. Kegeles submitted that there was no way of knowing whether beliefs caused behavior or vice versa. Reynolds, West and Aiken (1990) proposed that the mechanism for change in mammography use would be the manipulation of the components of the HBM. At the beginning of the study, participants were asked to make a committment to obtain a mammogram in the next three months by signing a contract. Lisrel VI causal path analysis indicated that Benefits were significantly related to intention and that the path from Barriers to intention approached significance.

Perhaps surprisingly, only a small percentage of the women obtained a mammogram during the three month follow-up period. These researchers discussed that perhaps this was not a long enough follow-up time. Additionally, they concluded that the finding that beliefs and intention could be altered without producing changes in behavior should be examined carefully. This is a phenomenon that other researchers have noted (Ajzen & Fishbein, 1980).

At the conceptual level, while the HBM has undoubtedly moved beyond the aforementioned criticism of the compliance research and beyond simple denotation of risk factors, it has been critiqued in that its constructs are at the level of individual beliefs and there is no consideration of risk

factors in the social environment. Syme (1987) emphasizes the importance of studying the social determinants of disease in order to prevent the development of risk behaviors and risk situations from developing in the first place (e.g., as smoking among older males diminishes, smoking among younger people is increasing).

Along these lines, while there has come to be a prevention orientation towards infectious diseases as evidenced by a classification system including such vector-borne concepts as air-borne, food-borne, and water-borne, for PHBs and SHBs there is no such classification system. Utilizing the results of several public health studies, Syme hypothesized a "control of destiny" (p. 45) concept which would supplant unsupported hypotheses (i.e., the lack of evidence as to the critical influence of socioeconomic status on PHBs) (Haan, Kaplan, & Camacho-Dickey, 1988; Marmot, 1982).

Other Useful Models in the Context of Breast Cancer Screening Behaviors

Edwards' Subjective Expected Utility Model. Ronis and Harel (1989) utilized the HBM and Edwards' (1954) theory of Subjective Expected Utility (SEU) in surveying 619 women in order to understand why women do, or do not, perform BSE and obtain or not obtain CBE. Like the HBM, the SEU model attempts to describe individuals' actions in situations involving risk taking or decision making under conditions of

uncertainty. Separate sets of questions sought to discriminate between Severity of breast cancer given protective action and Severity of breast cancer given inaction.

Ronis and Harel (1989) proposed the construct of Severity to have the two components: severity of outcome given a delayed treatment (Severity-Late); and, severity of outcomes given prompt treatment (Severity-Early). Additionally, Ronis and Harel have suggested that Severity-Early and Severity-Late questions include clinical and social consequences, [i.e., need for extensive surgery (clinical) and a bad effect of a woman's sex life (social)]. More particularly for this dissertation project, Ronis and Harel (1989) have noted that Severity was a significant correlate of screening behaviors in only about one-third of the studies. In contrast, the effects of Susceptibility, Benefits, and Cost (or Barriers) have been fairly reliable among breast cancer screening behaviors within the context of the HBM.

Within Ronis' and Harel's path analysis model, Severity and Susceptibility are multiplicative and they interact in their effects on Benefits. Additionally, as predicted by the SEU model, high Severity-Late increased Benefits and high Severity-Early decreased Benefits. Severity-Late-Clinical, Severity-Late-Social, as well as Severity-Early-Clinical and Severity-Early-Social questions were included

in this dissertation project in conjunction with the CHBM/BSE and CHBM/mammography in order to better explain Severity as one of the constructs of the HBM. Severity is not a construct that is utilized in the CHBM/BSE or CHBM/mammography instruments. Thus, in order to include as many of the original constructs of the HBM as possible, Ronis' and Harel's (1989) conceptualization of Severity was added to the Champion HBM instrument.

Bandura's Self-efficacy model. Rosenstock, Strecher, and Becker (1988) proposed that the concept of Self-efficacy (or, for the purposes of this dissertation, Confidence) be incorporated into the HBM as an explanatory variable. While this may not have been a critical variable in the early HBM model, more complex health behaviors call for mapping out whether people believe themselves capble of performing a complex or difficult health behavior.

Self-efficacy is usually measured with a simple self-rating scale and people are commonly asked to note how confident they are regarding their performance of a particular behavior within a given situation. Indeed, Bandura (1977) has argued that self-efficacy underlies all behavior change, including those pertaining to health promotions (Peterson & Stunkard, 1992).

The relationship between confidence and BSE has shown a significant positive association in several studies (Brailey, 1986; Celentano, 1983; Edgar, Shamian, &

Patterson, 1984; Lauver & Angerame, 1988). Baker (1989), within the context of BSE, has argued that belief in one's ability to succeed in performing appropriate behavior is predictive of coping behavior initiation, effort, and persistence. She utilized Champion's CHBM/BSE instrument (1984) along with developing self-efficacy questions in keeping with Bandura's (1977) model within the context of BSE in working with women whose mean age was 73 years (range: 60-95). In this intervention study, T-test analyses revealed significant increases from pretest to posttest for Benefits, Susceptibility and Self-efficacy. Overall, use of the HBM model appeared successful at documenting decreasing Barrier beliefs and increasing Susceptibility, Benefit and self-efficacy beliefs.

Champion's Adaptation of the Health Belief Model. Most recently, Champion (1991) has further refined the measurement scales of the HBM for the constructs of Susceptibility, Seriousness, Benefits, Barriers, Health Motivation, and Confidence. In a random sample of 322 mostly high-school educated, White women, 35 years and over, Champion utilized a Likert-type format to evaluate these constructs of the HBM. The construct validity of her instrument was established using confirmatory factors analysis and exploratory factor analysis.

Champion's (1991) study differs from her earlier (1984) study in two basic ways. Exploratory factor analysis

loadings are higher for the new scales than for those reported earlier (Champion, 1984). Secondly, Champion's 1991 study differs in that it includes a Confidence scale in keeping with Bandura's (1977) self-efficacy model. Moreover, as mentioned by Gray in her (1989) study, this is in keeping with recent work and suggestions by Rosenstock, Strecher, and Becker (1988). Champion equates the term confidence with Bandura's construct of self-efficacy (1977).

As noted by Champion (1991) and Adler, Kegeles, and Genevro (1992), it has been difficult to compare effect sizes across studies using HBM variables because the operational definitions of the constructs and the measures used have varied greatly. In an attempt to gain some clarity, Champion's (1991) newest instrument has been completely re-evaluated and this instrument was utilized for this dissertation project. To this researcher's knowledge, it has not been administered to a population of older women. As noted earlier, it is referred to as the CHBM/BSE instrument.

Additionally, this dissertation project utilized questions developed by Champion (1991) which attempted to evaluate the constructs of Benefits and Barriers as regards mammography. This questionnaire has not been evaluated by her or anyone else, as far as this author knows. This instrument will be referred to as the Champion Health Belief Model/Mammography (CHBM/Mammo). These two instruments of

Champion (1991) were utilized in this dissertation research in an effort to standardize the usage of a well-researched HBM questionnaire as it pertains to BSE and mammography.

Breast Cancer Screening Behavior and Older Women

Minimal research has been done with older women and their use of BSE and/or mammography. Williams (1988) utilized the scales of Champion's (1985) instrument along with her Williams Breast Inventory to evaluate 253 women between the ages of 62 and 93. Multiple regression results revealed that four of the five HBM constructs were predictive of BSE frequency. Health Motivation accounted for 18% of the variance, with Barriers accounting for 8%. Susceptibility and Benefits were also significant predictors of BSE practice. No significant relationship was found between frequency of BSE and Seriousness.

Rimer et al. (1989) specifically studied Barriers and facilitators to compliance in obtaining a mammogram and found that, in contrast to younger women, older women (greater than 65 years) were more likely to rate the educational materials as useful and believe mammograms to be unnecessary in the absence of symptoms. Jenest (1991) performed a cross-sectional correlational study on 37 women 64-93 years of age. She found no correlation between higher scores on Benefits of BSE practice, Seriousness of breast cancer, nor Health Motivation behavior and the frequency of

BSE. There was a significant negative correlation between Susceptibility to breast cancer and more frequent BSE.

Hypotheses

The goal of the dissertation project was to develop a parsimonious causal path model utilizing the CHBM/BSE instrument, CHBM/Mammography instrument, Ronis' and Harel's questions which are the result of a reconceptualization of Severity, and, in an attempt to complete the HBM, the inclusion of questions assessing the Cuing construct.

Hypotheses I. Benefits, Barriers, Susceptibility, Severity, Confidence, Health Motivation, Cuing and demographic data were hypothesized to have significant direct effects on breast cancer screening behaviors. Specifically, the greatest degree of screening behavior was hypothesized to be associated with high Benefits, low Barriers, high Susceptibility, high Severity-Late, low Severity-Early, high Confidence, high Health Motivation, and high Cuing.

Hypotheses II. Severity was hypothesized to have the sub-constructs of Severity-Late-Clinical, Severity-Late-Social, Severity-Early-Clinical, and Severity-Late-Social.

CHAPTER II

METHOD

Subjects

The 221 women participating in this project were postmenopausal women, ages 50-79, participating in the UAB Women's Health Trial Study, a dietary intervention feasibility study funded by National Cancer Institute (NCI) and National Heart, Lung, and Blood Institute (NHLBI) for cancer prevention among women. Women who had had any sort of cancer within the past ten years, excepting basal cell carcinoma or other life-threatening illnesses, including insulin dependent diabetes, were excluded from the WHT study. This study was taking place at several large medical center across the United States. In the WHT 12 month study, a total of 600 women, from among those who were randomized to the WHT control and intervention groups, were randomized to either a two-session breast cancer screening intervention or the control group. The intervention of the WHT study involved educational and behavioral strategies specifically designed to enhance compliance with breast cancer early detection measures and included three components: (1) monthly breast self-examination; (2) clinical breast examination; and, (3) annual mammography. The proposed

primary outcome measures of the WHT study utilized to evaluate compliance were: (1) self-reported compliance with BSE and, (2) change in knowledge of breast self-exam method. The secondary outcome measures of the WHT study included: (1) change in clinical breast examination usage; (2) change in mammogram usage and, (3) changes in knowledge about breast cancer, CBE, and mammography. Primary and secondary outcome measures of the WHT were collected at baseline, six and twelve month follow-up periods. The health beliefs questionnaire, which is the bulk of this dissertation, was collected at baseline for a randomized sample of women within the WHT study. This health beliefs questionnaire was also utilized at the six and twelve month follow-up. Along with Mona Fouad, M.D., this dissertation candidate was closely involved teaching BSE classes to those women randomized into the experimental group of the WHT study. The candidate's interest in working with this population of women stems from the fact that there is limited available research with older women. Additionally, in contrast to younger women, older women have an increased risk of breast cancer.

Apparatus

The goals of this dissertation were to determine which health behavior beliefs have strong effects on older, postmenopausal women's: (1) frequency and knowledge as regards BSE, and (2) utilization of mammography. The WHT

study also collected data documenting women's use of the other breast cancer screening method, namely, clinical breast examination or CBE.

First, measures of the exogenous variables (CHBM/BSE, Severity construct, CHBM/mammography, Cuing, and demographics) are described followed by measures of the endogenous variables (Breast Cancer Screening Behaviors). Additionally, the WHT researchers developed two questionnaires which attempted to map out knowledge regarding BSE and knowledge regarding breast cancer, CBE, and mammography. These two questionnaires were utilized in the LISREL path analysis.

Champion's Health Belief Model/Breast Self-Examination Questionnaire

The CHBM/BSE was one of the instruments utilized in order to evaluate some of the constructs of the HBM. The instrument used here is a refinement and revision of earlier scales (Champion, 1984). The CHBM/BSE utilized for this dissertation project, and taken from Champion's (1990) research, was designed to measure six health belief constructs that pertain to BSE, namely: Susceptibility, Seriousness, Benefits, Barriers, Confidence, and Health Motivation. This questionnaire consists of forty-two items measured on a 5-point Likert scale ranging from strongly agree to strongly disagree. Five items address Susceptibility; seven items address Seriousness; five items

address Benefits; seven items address Barriers; eleven items address Confidence; and, seven items address Health Motivation.

After the assessment of content validity by an advisory panel of HBM experts, the validity of these scales was assessed using confirmatory factory analysis to test the underlying theory for fit with the hypothesized data. Fit of the model to the data was tested in LISREL using the chi square statistic. In addition, an exploratory factor analysis was performed which resulted in the removal of four items with a low factor loading.

Criterion-related validity of the CHBM/BSE was assessed by correlating the six attitudinal scales with BSE behavior. Regression analysis of the scales of Susceptibility, Seriousness, Benefits, Barriers, Health Motivation and Confidence indicated that all scales were acting as theoretically predicted, thus confirming criterion-related validity. Multiple regression showed significant beta coefficients for all six variables. Internal consistency reliabilities for all scales was good, ranging from Cronbach's alpha for Susceptibility of .93 to an alpha of .78 for Benefits and Seriousness. For the sample of Champion's (1990) study, Barriers, Confidence, and Health Motivation all had internal consistency reliabilities of .82 or above.

The following conceptual definitions were used by Champion (1990) and thus are utilized here in the CHBM/BSE instrument: (as shown in Figure 1)

Susceptibility: perceived likelihood of developing breast cancer.

Seriousness: perceived personal harm related to breast cancer.

Benefits: perceived positive attributes related to BSE action.

Barriers: perceived negative attributes related to BSE action.

Confidence: perceived ability/competence to detect abnormal breast lumps.

Health Motivation: perceived desire to engender good health.

The questionnaire, marked appropriately with the abreviated construct name, is shown in Appendix A.

Ronis' and Harel's Construct Severity

In an attempt to further increase utility of the HBM and render it more useful in predicting women's BSE performance and utilization of breast cancer screening behaviors, Ronis' and Harel's (1989) questions measuring Severity of breast cancer when it is treated, (1) late (Severity-Late) and, (2) promptly (Severity-Early) were amended to the CHBM/ BSE. The following conceptual

definitions issuing from Ronis' and Harel's (1989) research were thus utilized:

Severity-Late-Clinical: health threat conditioned on late clinically mediated action.

Severity-Late-Social: health threat conditioned on late socially mediated action.

Severity-Early-Clinical: health threat conditioned on early clinically mediated action.

Severity-Early-Social: health threat conditioned on early socially mediated action.

Thus, the measures of Severity were made conditional on the timing of treatment, namely, Severity-Late and Severity-Early. Moreover, both of these sub-constructs will be mediated socially and clinically. These questions are in Section III of the questionnaire, listed in Appendix A.

Chamion's Health Belief Model/Mammography Questionnaire. The CHBM/Mammography questionnaire was utilized in order to assess health beliefs within the context of mammography. Twelve questions assayed the constructs of Benefits and Barriers within the context of mammography. These questions are in Section V of the questionnaire, listed in Appendix A.

As Champion (1990) has made note, the scales within the CHBM/BSE for the constructs of Susceptibility, Seriousness, and Health Motivation can be used for any breast screening behaviors, namely BSE, mammography, or clinical breast

examination. For the constructs of Benefits and Barriers, there were seven questions assaying Benefits and its relationship to mammography (in contrast to five questions assaying Benefits on the CHBM/BSE) and five questions assaying Barriers and its relationship to mammography (in contrast to seven questions assaying Barriers on the CHBM/BSE). There was no reliability or validity data available on the CHBM/mammography. Alpha coefficients are available in Table 3. These alpha coefficients are for constructs which include those pertaining to BSE and mammography.

Of the seven questions assaying Benefits on the CHBM/mammography, five were identical in construct to those on the CHBM/BSE. The other two questions were: "When I get a recommended mammogram, I feel good about myself," and "My doctor or nurse will praise me if I obtain the recommended mammogram."

As regards the questions evaluating Barriers within the CHBM/Mammography, four were identical. One question was obviously related to a Barrier unique to mammography, namely, "Having a mammogram or x-ray of the breasts would cost too much money."

The following conceptual definitions were utilized for the following constructs within the CHBM/mammography:

Barriers: Perceived negative attributes

related to mammography action.

Benefits: Perceived positive attributes related to mammography action.

Cuing. One question attempting to assess the HBM construct of cuing within the context of BSE was added. This was created for the purpose of this dissertation project. Specifically, it was: "I am reminded by something or someone to do breast self-exam." In accord with other questions, this one was answered in terms of a 5-point Likert format ranging from very often to never.

Additionally, one question was utiized in order to assay the construct of Cuing within the context of mammography utilization. This quesiton was created specifically for this dissertation project. Specifically, this question was, "I am reminded by someone or something to get an x-ray or mammogram of my breasts." In accord with the other questions, this question was answered within a 5-point Likert format ranging from very often to never.

Demographics and Breast Cancer Screening Behaviors. The demographics of age, marital status, education, ethnic background and breast disease history was assessed. Frequency of BSE performance was measured utilizing, in part, Gray's (1990) methodology for assessing BSE frequency, namely, frequency over the past year, frequency over the past three months and frequency over the past month. This is a forced-choice format in contrast to an open-ended one. This has been done in order to ascertain as accurately as

possible women's true rate of BSE and is based, in part, on research done by the Gallup Organization (1977) which indicated there to be as much as a 12 percent variability in reporting of monthly performance. Women were also asked an open-ended, qualitative question, namely, "Women practice BSE for different reasons. What are your personal reasons for practicing, or not practicing, breast self-exams?" This qualitative data was not utilized in the LISREL causal modeling analysis but was an attempt to uncover other reasons women do, or do not, engage in BSE.

Knowledge of BSE practice was measured using questions validated by Champion in her (1991) study. Specifically, Champion's instrument covered examining the breasts with the pads of the fingers and looking at breasts in the mirror. In addition, three areas of knowledge were added as suggested by Champion's earlier (1988) study. Specifically, these questions covered looking for puckerng or dimpling of the skin, looking for discharge from the nipples, and feeling the areas between the armpit and breasts. Items for knowledge of breast self-examination were based on the research of Ronis (1985) and judged by experts for content validity (Champion, 1988).

Frequency of mammography usage was assessed similarly to BSE frequency. These questions were developed for the purpose of this dissertation project. Specifically, women were asked: (1) if they had ever had a mammogram (yes or

no); (2) if yes to this question, how often had they had a mammogram (twice a year or more, yearly, every 2-4 years, once every 5 years, only once in the last 10 years); (3) to include the date when they last had a mammogram; (4) and, a qualitative question, namely, "Women obtain x-rays or mammograms of their breasts for different reasons. What are your personal reasons for getting, or not getting a mammogram?" Question "2" was the one utilized in this project's LISREL analysis.

Procedure

The answering of the questionnaires was on a voluntary basis and was part of the initial screening questionnaire administered by researchers in the UAB Women's Health Trial study. As to the analysis of the data, a LISREL causal model was utilized in an attempt to move beyond simply identifying variables that have been correlated with BSE and the use of mammography in older women. It has been noted that one of LISREL's major advantages is that results are not biased by the presence of measurement error in working with large matrices of data (Joreskog & Sorbom, 1984).

Specifically, Joreskog's maximum likelihood technique partitions the variance of a measure into three portions, namely valid variance (reflecting what the measure is intended to measure), correlated error variance (reflecting influences other than those the measure was designed to tap which also affect other measures), and residual variance

(variance which is not otherwise accounted for). LISREL may assist in determining the relative importance of the various predictor variables as well as determine the effects of the more distal variables as regards breast cancer screening behaviors (Ronis & Kaiser, 1989).

CHAPTER III

RESULTS

The approach to the afore mentioned goals of determining which health behavior beliefs would have strong effects on older, postmenopausal women's frequency and knowledge regarding BSE, and utilization of mammography, included four steps, namely: (1) identifying potential predictor variables based on past research and theory, (2) hypothesizing a causal model based on past research and theory, (3) assessing BSE frequency and knowledge and utilization of mammography and the health behavior belief predictors using multiple measures of each variable in a questionnaire, and (4) refining and testing the model by analyses of linear structural relations (LISREL).

The Women's Health Trial, University of Alabama at Birmingham (UAB) data demographics indicated that of the 222 subjects, 106 (47.7%) were in the WHT control group and 107 (48.2%) were in the WHT experimental group. Nine subjects (4.1%) were unknown or missing. Control and experimental group categorization as noted here refers to interventions not given, and given, women after the collection of this health belief behaviors data. This rendered 212 possible subjects for the purpose of this health belief behaviors study.

Forty-nine (22.1%), of these women had an immediate blood relative who had had breast cancer. Ninety-six (43.2%), indicated that they have had fibrocystic or "lumpy" breasts. Please see Table 1 for other pertinent demographic data.

The constructs Barriers, Benefits, and Cuing were combined for the Champion HBM/BSE questionnaire and the Champion HBM/Mammography questionnaire. In the present study, alpha coefficients ranged from .52 for Severity-early and Cuing, to .93 for Susceptibility. All alpha coefficients, even including that for Barriers (which included Barriers questions pertinent to mammography utilization), were very similar to those seen in Champion's (1990) study. However, utilizing identical questions for the Confidence construct, the alpha coefficient for the UAB sample was poorer (.77) than that for Champion's (1990) sample (.88).

Measurement Model

The first step of the modeling was to discover the best fitting model for the UAB women's population within the context of the Champion/BSE and Champion/Mammo questionnaire. Utilizing a seven factor model, the post-menopausal UAB subjects' responses were analyzed utilizing LISREL VII (Joreskog & Sorbom, 1984). The seven factors were: Susceptibility, Severity (which included Severity-early and Severity-late for the purposes of this

discussion), Seriousness, Benefits, Barriers, Confidence and Cuing. The variables Susceptibility, Seriousness, Benefits, Barriers, and Confidence were the variables of Champion's Health Belief Model while the variables of Severity-early, Severity-late and Cuing were added based on additional research. Results indicated that chi-square with 1748 degrees of freedom (df) = 6826.50 (p = .000). The goodness of fit index (gfi) = .604 with a root mean square residual (rms) = .083. This indicated that this model with this population was a poor fit. The BSE Cuing item, was noted to have an insignificant T-value. Thus, it, along with the one other Cuing item, which referred to Mammography Cuing, were dropped for the purposes of running the next model.

The six remaining factors, (Susceptibility, Severity, Seriousness, Benefits, Barriers, and Confidence) utilizing 59 items were analyzed. The gfi = .607; the chi-square with 1637 df = 3703.56 (p = .000). Thus, the goodness of fit remained poor. There was not much improvement in the model having dropped the two Cuing factors. Therefore, on all subsequent models the error terms were fixed in a symmetric matrix with the diagonal free instead of being allowed to be diagonal and free. This was done to allow inspection of correlated errors.

Items that had large multiple loadings were dropped to create a 48 item, 6 factor model. This yielded a chi-square

with 1065 df = 2329.99 (p = .000). The gfi = .675 with a rms = .075.

Using the same procedure for dropping variables, the model was then pared down to a 41 item, 6 factor model. This new model yielded a chi-square with 764 df = 1667.26 (p = .000). The gfi = .714 with a rms = .069. In order to improve the goodness of fit, four correlated error terms were freed to render a model with a chi-square with 760 df = 1367.49 (p = .000). The gfi improved to = .758 with a rms = .066.

The items of the construct Seriousness were seen to have large multiple loadings in the modification indices. Thus, this Seriousness construct was dropped, rendering a model with five remaining constructs: Susceptibility, Severity, Benefits, Barriers, and Confidence. This rendered a model with a chi-square = 855.81 (p = .000), a gfi = .787 and a rms = .081. This model was then re-run, freeing three theta delta correlated error terms between items on the same construct. The chi-square, with 337 df = 571.97 (p = .000). The gfi= .844 with a rms = .061.

Using the same above mentioned procedure for dropping individual items, the model was then pared down to produce one with 22 items and five factors: Susceptibility, Severity, Benefits, Barriers and Confidence. Four individual correlated errors were freed. Chi-square, with 195 df = 210.63 (p = .211). The gfi was much improved and

was equal to .920, with a rms = .047, with a chi-square with 195 df = 210.63 (p = .211). It was noted in the factor intercorrelation matrix that the factors Benefits, Barriers and Confidence grouped together well and the factors Severity and Susceptibility grouped together well.

Two more items were dropped that had large cross loadings leaving a model with 20 individual items and the same five factors. With this model, chi-square, with 156 df = 167.28 (p = .254), with a gfi = .931, and a rms = .043. The gfi was satisfactory and it was speculated that the number of questions, or factors, had been abbreviated sufficiently so that should a researcher wish to have women quickly answer such a questionnaire, it would be both efficient and valid. Thus, the Champion/BSE and Champion/Mammo questionnaire were not further modified and these 20 items and five factors were utilized in the full causal model.

Causal Model

The first run of the full causal model utilized: (1) the above 20 items pertaining to Benefits, Severity, Susceptibility, Barriers, and Confidence, of the Champion/BSE and Champion/Mammo which loaded on a second order construct called Champion-Hbm; the marker was on the construct Confidence, (2) a construct called Knowledge which included the two UAB questionnaires relating to (a) BSE knowledge, called BSE Knowledge, and (b) breast cancer, CBE,

and mammography, called Knowledge General; the marker was on Knowledge General, and (3) a construct Socioeconomic Status, which included Income and Education level of the UAB women; the marker was on Education. These exogenous latent constructs caused a single cause indicator construct, Breast Cancer Screening Behaviors, which had (Bollen, 1989): (1) an endogenous Frequency of BSE construct; the marker was on Lastyear ("How often have you examined your breasts in the last year?"), and (2) an endogenous single indicator construct, Frequency of Mammography. The model was not able to be run as it failed the admissibility test. Please see Figure 2 for a visual representation of this first run of the full causal model.

The second run of the full causal model utilized: (1) all of the above factors, and (2) changed the marker on Champion-Hbm to Barriers instead of Confidence as, (a) Confidence is a new construct developed by Champion, and not well researched and, (b) there is good support in the literature regarding Barriers as uniformly important in terms of breast cancer screening behaviors. The model was not able to be run. Moreover, the construct Mammography was dropped as it was indicated by modification indices to be causing the full causal model to fit poorly. Additionally, for the purposes of future research, mammography utilization would not be useful in comparing a group of younger

premenopausal, college-age women with a group of older postmenopausal women (this UAB group of women).

Thus, the third run of the full causal model utilized all of the above factors indicated in the first full causal model except, (a) BSE Knowledge was the knowledge marker instead of Knowledge General for the construct Knowledge, and (b) the construct Mammog was excluded. This model also would not run. LISREL VII indicated that the constructs Severity and Susceptibility, which were noted earlier to group together, to be possibly rendering a poorly fitting model. Thus, these constructs were dropped from the construct Champion-Hbm subsequent to this run.

The fourth run of the full causal model utilized: (1) the constructs Benefits, Barriers, and Confidence for the exogenougous construct Champion-Hbm; Barriers was the marker, (2) the exogenous construct Knowledge; the marker was on BSE Knowledge, and (3) the exogenous single indicator construct SES which included Education only. These preceeding exogenous constructs caused the cause indicator construct, Breast Cancer Screening Behaviors, which had a cause indicator path to the endogenous construct Frequency of BSE, the marker having been changed to load on the factor Lastmon ("How often have you examined your breasts in the last month?"). This model would not run.

The fifth run of the full causal model utilized: (1) the constructs Barriers and Confidence for the Champion-Hbm;

Barriers was the marker, (2) the single indicator construct Socioeconomic Status which included Education. These exogenous constructs caused a single cause indicator construct, Breast Cancer Screening Behaviors, which had a path to: (1) the Frequency of BSE construct; the marker was Lastmon. This very pared down model rendered a chi square, with 8 df = 7.61 (p = .472), with a gfi =.988. Please see Figure 3. When Barriers was utilized as a marker for the Champion-Hbm, exactly the same results were obtained.

CHAPTER IV

DISCUSSION

Hypothesis I submitted that Benefits, Barriers, Susceptibility, Severity, Confidence, Health Motivation, Cuing and demographic data would have significant direct effects on Breast Cancer Screening Behaviors. Specifically, the greatest degree of screening behavior was hypothesized to be associated with high Benefits, low Barriers, high Susceptibility, high Severity-late, low Severity-early, high Confidence, high health Motivation, and high Cuing. Hypothesis II submitted that Severity would have the sub-constructs of Severity-late-clinical, Severity-late-social, Severity-early-clinical, and Severity-late-social supported.

The UAB sample was composed of mostly Caucasian, postmenopausal, middle-aged women of whom approximately one-third had received some college education, and about half were living with one other person and had a household income of $15,000-$49,900. Approximately one-fifth of them stated that a blood relative had had breast cancer and about half stated that they had "lumpy" or fibrocystic breasts.

Approximately one-third of the UAB women indicated that they do monthly BSE and about one-half stated that they received yearly mammograms. About 85% stated that they had

received a CBE and about 60% stated that they had been given instructions on how to do a BSE. In terms of mammography, in a 1990 study, only one-third of women over age 40 were following mammography screening guidelines, namely, that they obtain yearly mammography. Women between the ages of 50-59 were also seen to adhere best to mammography screening guidelines (Massachusettes Medical Society, 1991). The UAB population is in keeping with these findings as regards their use of mammography.

The proposed causal model is quite different from the final causal model in several important ways. First of all, only the constructs of Barriers and Confidence from the CHBM/BSE questionnaire was useful in creating a well-fitting model. Secondly, only the demographic variable Education was useful. Thirdly, the knowledge questionnaires, developed by UAB researchers to assess women's knowledge regarding (1) BSE (Knowledge BSE), and (2) breast cancer, CBE, and mammography, (Knowledge General), were not useful in creating a well fitting full causal model. Fourthly, Ronis' and Harel's supposition that Edwards' (1954) Subjective Expected Utility theory and the concommitant constructs of Severity-early and Severity-late was both supported and disconfirmed. Fifthly, mammography and BSE were seen to be incompatible exogenous variables in the final causal model. Each one of these matters will now be addressed.

The Health Belief Model Constructs

As only the constructs of Benefits and Confidence from the CHBM/BSE questionnaire were useful in the final causal model, and in that Confidence is a new item proposed by Champion (1990), it behooves us to understand why. The Confidence construct scale had an alpha internal consistency of .77 and yet it fitted well within the final full causal model. It is speculated that in terms of BSE, this construct is most directly related to BSE performance, moreso than any of the other constructs of the HBM.

One of the constructs of the HBM, namely Cuing, while acknowledged to be an important, though belated, construct of the original HBM, was not perhaps adequately addressed in this dissesrtation project in that only two questions created an unstable construct. The alpha internal consistency of Cuing as utilized in this dissertation project was .52, indicating it to have low reliability. The reliability could possibly be expanded by exploring some of the additional dimensions of Cuing such as Cuing in terms of calendar reminders and American Cancer Society Cuing reminders. In any case, the questionnaire needs to utilize an improved Cuing construct. Additionally, in terms of utilizing Cuing as one of the sub-constructs of a LISREL model, a revised LISREL model could be created which would place Cuing as the link between cognition and screening behavior performance. In the present model, Cuing is a sub-

construct amongst all the other HBM constructs. It may be that Cuing precedes thinking about the Seriousness, Severity, Benefits, and Barriers associated with Breast Cancer Screening Health Behaviors.

As regards Seriousness, Rosenstock (1974a;1974b) noted, serious personal consequences and the degree of seriousness may be determined by the degree of emotional arousal created by the thought of disease as well as by the kinds of difficulties the individual believes a certain health condition will create. It is speculated by this researcher that this emotional arousal is of a confused sort e.g., confusion as regards whether one is doing BSE correctly, can one actually palpate a tumor at an early enough stage to be useful, and that this emotional arousal is dissipated, in our culture, and particularly among this populaton of mostly middle-aged, fairly well-to-do, women as they access themselves easily to mammography. This confusion has ramifications for the Confidence construct in that increased Confidence may supplant some of the concerns reflected in the other constructs of the HBM, for instance Seriousness. Additionally, in our technologically-oriented culture, it is most probably assumed that mammography will find any BSE misses.

Additionally, as regards Seriousness and the kinds of difficulties that might be created due to a health condition, breast cancer surgery is frequently not the

disfiguring surgery it once was, especially if discovered early. Increased knowledge about the availability of breast reconstruction subsequent to mastectomy and lumpectomy in lieu of mastectomy is now more generalized.

Seriousness and Susceptibility have been deemed to be similar in that both have strong cognitive components (Rosenstock, 1974a; 1974b) and thus are deemed to be dependent on knowledge---about breast cancer, BSE, mammography and CBE. In that Susceptibility is theoretically assumed to have strong cognitive components, both of these constructs did not do well within the final full causal model, regardless of the good internal reliability of Susceptibility (.92).

Susceptibility has been hypothesized to be a poor discriminator of BSE utilization by Champion (1985) and Rutledge (1987) as BSE does not reduce a woman's chance of having BSE. Indeed, the UAB population of women were women who had been without cancer for at least ten years, if indeed they had ever had cancer. Thus, they perhaps deemed themselves to be less susceptible than women in the less selected general population who have had breast cancer. On the other hand, it could be argued that in that these women had chosen to voluntarily participate in a breast cancer screening program, perhaps they considered themselves to be more susceptible.

Benefits and Barriers have been proposed to be at opposite ends of a continuum (Cummings, Jette, Rosenstock, 1978). This was not supported in this study as Benefits did not act to legitimate the full causal model. Along these lines, Rosenstock (1974a; 1974b) noted that the HBM has an avoidance orientation rather than health seeking. Perhaps this explains why this might be so. Also, Barriers can be argued to be qualitatively more concrete (i.e., embarrassment, cost, pain, or fear), whereas Benefits is a vaguer, less clear-cut entity.

In that the Benefits construct did not contribute to the final causal model, it is hypothesized that these women did not believe that BSE ultimately increases survival rates. As the WHT study is to be continued for 12 months, and evaluations will be obtained at 6 and 12 months, it will be interesting, in terms of the experimental group, to assess whether Benefits increases. The experimental group received one-on-one training with sophisticated breast models in order to teach them how to perform an adequate BSE. Thus, it is hypothesized that along with Benefits, Confidence and Severity-late will increase.

Just as in this causal modeling study Barriers was one of the two constructs of the HBM contributing to the final model, in Champion's (1984 & 1987) studies Barriers accounted for most of the explained variance. This dissertation project utilizes the same instrument to a great

degree. In further support of Barriers as a useful construct as it relates to BSE, Wyper (1990) also utilized Champion's instrument and Barriers was the most powerful dimension of the HBM in both univariate and multivariate analyses.

Champion (1984) has noted that Health Motivation accounted for much of the explained variance, second only to the Barriers construct. The UAB population was of a different demographic strata than Champion's (1984) population in that the UAB population is older. It is speculated that younger women generally have a greater and more consistent sense of health motivation.

Demographic Constructs

Social class and to a lesser degree education, have been found to be the strongest discriminator of women's participation in multiple health behaviors, inclusive of breast cancer screening behaviors (Calnan, 1985). Relatedly, Education was an important demographic variable as indicated by its inclusion in the full causal model in this project.

In terms of this population of UAB women, one would assume that as education was useful in the full causal model, the implications of education, namely increased knowledge, would also be useful. However, the knowledge construct did not contribute to a better fitting model. In terms of future research it is proposed that a locus of

control instrument be utilized in an attempt to tap into a more universal locus of control concept.

Knowledge Constructs

In that the cognitively oriented constructs Severity and Susceptibility did not fit well into the final causal model, so then the possibly related construct of Knowledge similarly did not. The Knowledge BSE construct had an even poorer alpha internal consistency of .45 as did the other Knowledge construct, namely Knowledge General (.70) than did even Susceptibility and Severity. These poor alpha internal consistencies offer a good reason as to why the constructs of Seriousness, Knowledge BSE and Knowledge General did not alter favorably the full causal model.

Severity-Early and Severity-Late Sub-Constructs

Ronis' and Harel's (1989) proposed Severity-early and Severity-late was confirmed as a useful endogenous latent variable before being utilized in the full causal model. Along with Benefits, Confidence, Barriers, and Susceptibility, it created a well-fitting endogenous latent construct model. However, Severity did not favorably augment the fit of the final causal model. One explanation is that in terms of alpha internal consistency, both constructs had only poor to fair reliability. Specifically, Severity-early had an alpha internal consistency of .52 and Severity-late had one of .75. Also, in that LISREL VII takes into account the entire model, inclusive of Severity-

early and Severity-late, Severity in general as a construct did not contribute to the full causal model.

Mammography Construct

One question that is puzzling is if one assumes alternative actions of nearly equal efficacy are available, and if BSE and mammography are of nearly equal efficacy in the eyes of women, then why did mammography Barriers and mammography not contribute to a full causal model which would have included both? Perhaps, in terms of mammography, and especially so in this population of fairly well-to-do women, there were few Barriers to mammography. Quite possibly, this would not have been so with more indigent women. In that case, there would have been a stronger relationship of mammography Barriers to mammography. This would be an interesting research question for future studies and certainly fits in with who obtains mammography at this time.

In terms of the UAB population of women, these women may be utilizing mammography at a greater rate than the general population. Research indicates that women ages 50-59 most commonly receive mammography (Massachusettes Medical Society, 1991). The mean age of the UAB women was 56, with 91% stating that they had received a mammogram, and 44% indicating that they had received a mammogram yearly over the past ten years. Thus, in this population of women, in that they greatly utilize mammography and thus appear to

value it as a breast cancer screening device, it can be hypothesized that there is an even greater difference in terms of a passive screening health behavior (BSE) and an active screening health behavior (mammography). The two endogenous constructs, BSE Frequency and Mammography, fitted poorly when together. Moreover, for the purposes of future research with younger, premenopausal women, who would have had little reason to receive mammography, the endogenous construct Mammography was dropped from the full causal model.

BSE Construct

BSE requires women to remember to perform an infrequent behavior, to learn to perform a specific skill and to maintain a behavior that, because of its private nature, may receive little external reinforcement (Meyerowitz & Chaiken, 1987). Moreover, in terms of evaluation, BSE continues to be difficult to assess whether the researcher wants to discover true frequency or true ability. Thus, researchers are placed in the position of evaluating the efficacy of BSE as a screening device that may or may not be performed (Holtzman & Celentano, 1983).

The assessment of BSE is problematic as regards this study just as it has been for every other study attempting to evaluate BSE frequency and BSE competence. This is considerably less so as regards mammography. The knowledge questionnaires, namely Knowledge BSE and Knowledge General,

were an indirect attempt to assess women's competence. These questionnaires will also be administered to the WHT subjects at 6 and 12 months and perhaps additional information is forthcoming. In terms of this study's causal model, however, knowledge measured in this manner was not discriminatory of BSE frequency. It is suggested that knowledge could most accurately be assessed if women were scored on performing BSE according to American Cancer Society standards on one of the rubber breast models before and after the experimental condition intervention. Also, the Knowledge questionairre(s) could be revised to include all the steps for performing an adequate BSE as prescribed by the American Cancer Society.

Mammography and BSE were incompatible exogenous constructs in the full causal model. Calnan (1985) suggested that different types of preventive health behaviors may be products of specific contexts which might include specific beliefs about the behavior. BSE and mammogaphy are hypothesized to be fundamentally different in that mammography is a passively mediated screening health behavior while BSE is an active screening health behavior.

Summary of Discussion

Jette, Cummings, Brock, Phelps, and Naessens (1981) cautioned researchers as to conclusions to be drawn from studies that might have used different questions intended to measure the presence and magnitude of the same health

beliefs. Specifically, these differences concerned questions that attempted to measure health beliefs generally versus questions that attempted to measure health beliefs specifically. LISREL is a superior methodology which addresses this issue in that it has an ability to suggest the best fitting model, inclusive of general or specific questions, in contrast to other statistical methodologies which cannot do so. In other words, this is not an issue for LISREL.

The final full causal model was the best fitting full causal model. In that it utilized Barriers and Confidence, in terms of the Champion-Hbm construct, it also had reliability. It should also be a useful questionnaire to use with younger, premenopausal women, and it is brief enough to easily be utilized in doctor's offices and as a research screening tool.

This model requires confirmation from other independent samples of postmenopausal women. Also, the general applicability of the model should be tested with women of other ages. This research is currently being conducted.

APPENDIX A

QUESTIONNAIRE

Questionnaire

(The following demographic data was collected for the purpose of this dissertation. The UAB WHT study collected much more inclusive demographic data for the larger purposes of its study)

I am very interested in understanding older women's beliefs and activities in regards to health behaviors and in particular, their beliefs concerning breast cancer, breast self-examination and breast x-rays or mammography. Please answer all these questions on the basis of what you really believe and not on the basis of what you think your doctor wants you to do. Your privacy will be protected.

SECTION I: Personal Data

Please fill in the blank or circle the ONE answer which best describes you.

1. What is your age? _____ (years)

2. What is your marital status? (Please circle)

Married Widowed Single(never married) Divorced Separated

3. How many years of education have you completed? (Please circle)

   1. 6th to 8th
   2. 9th to 12th
   3. high school graduate
   4. completed highschool plus some trade or technical school
   5. some college
   6. college graduate
   7. graduate work

4. What is your ethnic background? (Please circle)

   Caucasian (White not Hispanic)

   African-American (Black/ Non-Hispanic)

   Asian/Pacific Island

5. What is your income? (Please circle)

   $ 0-14999 per year $ 15000-49900 per year

   $ 500000 or more per year

6. What is your household population? _____

(The following data was collected in order assess women's breast health history, in part, and their possible risk factors, their frequency of BSE, CBE, and mammography.)

BREAST SCREENING INTERVENTION PROGRAM
(Breast Self-Examination and Mammography Questionnaire)

1. Have you ever had breast problems like fibrocystic or lumpy breasts? (Please circle)

   Yes No

2. Has an immediate blood relative of yours ever had breast cancer? (Please circle)

   Yes No

   If yes, what relation to you?_____

3. Have you ever examined your breasts for any changes, such as lumps or thickening? (Please circle)

   Yes No

4. How often have you examined your breasts in the last year? (Please check one)

   never

   Once every Month

   Once every 3 months

   Once every 6 months

5. How often have you examined your breasts in the last three months? (Please check one)

   never

   Once every month

   Once every two months

   Once every three months

6. How often have you examined your breasts in the last month? (Please check one)

   never

   Once

   More than once

7. Have you ever been given instructions by a physician or a nurse on how to perform breast self-exams? (Please circle)

   Yes No

8. Women practice brest self-exam for different reasons. What are your personal reasons for practicing, or not practicing, breast self-exam?

   _____
   _____
   _____

9. Have you ever had an x-ray or mammogram of your breasts? (Please circle)

Yes No

10. If "yes", when was the last time you had a mammogram?

Date: _____/_____/_____
mo. day year

11. During the past 10 years how often have you had breast x-ray or mammogram? (please circle)

Twice a year yearly every 2-4 years once every 5 years

only once in the last 10 years

12. Women obtain x-rays or mammograms of their breasts for different reasons. What are your personal reasons for getting, or not getting, a mammogram?

_____
_____
_____

13. Have you ever had a breast clinical exam by your physician? (Please circle)

yes no

14. If "yes", when was the last time you had a clinical breast exam?

Date: ____/____/____
mo. day year

(The following questionnaire includes Champion's HBM/BSE questionnaire (1991), Champion's HBM/Mammography questionnaire (1991), Ronis' and Harel's questions about Severity (1989), and two Cuing questions on BSE and Mammography.)

BREAST SCREENING INTERVENTION
(Health Beliefs Questionnaire)

I am very interested in understanding women's beliefs and activities in regard to health behaviors, and in particular, their beliefs concerning breast cancer, breast self-examination and breast x-rays or mammography. Please answer all these questions on the basis of what you really believe and not what you think your doctor wants you to do. Your privacy will be protected.

Section I

(The following section includes questions regarding Health Motivation, one of the constructs of Health Belief Model, as adapted by Champion.)

These are some questions about your health behaviors. After each question please circle the ONE answer that best describes what you really believe.

1. I want to discover health problems early. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

2. Maintaining good health is extremely important to me. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

3. I search for new information to improve my health. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

4. I feel it is important to carry out activities which will improve my health. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

5. I eat well balanced meals. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

6. I exercise at least three times a week. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

7. I have a regular health check-up even when I am not sick. (Health Motivation)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

Section II

(The following section includes questions related to Seriousness and Susceptibility, two of the constructs of the Health Belief Model, as adapted by Champion (1991) to reflect breast cancer concerns.)

These are some questions about breast cancer that relate directly to you. Please continue to circle the ONE answer that best describes what you really believe.

1. It is extremely likely I will get breast cancer in the future. (Susceptibility)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

2. The thought of breast cancer scares me. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

3. I feel I will get breast cancer in the future. (Susceptibility)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

4. When I think about breast cancer, my heart beats faster. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

5. There is a good possibility I will get breast cancer in the next 10 years. (Susceptibility)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

6. I am afraid to think about breast cancer. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

7. My chances of getting breast cancer are great. (Susceptibility)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

8. Problems I would experience with breast cancer would last a long time. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

9. I am more likely than the average woman my age to get breast cancer. (Susceptibility)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

10. Breast cancer could threaten a love relationship of mine. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

11. If I had breast cancer my whole life would change. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

12. If I develop breast cancer I would not live longer than 5 years. (Seriousness)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

Section III

(The following section includes questions regarding Severity, and were developed by Ronis and Harel. Questions 1-5 indicate Severity-late items and questions 6-10 indicate Severity-early items.)

These are some questions about breast cancer which relate to women in general. Please continue to circle the ONE best answer.

1. If a woman developed breast cancer, and it was not treated promptly, she would probably need very extensive surgery.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

2. If a woman developed breast cancer, and it was not treated promptly, she would probably need other therapies in addition to surgery, for example, chemotherapy or radiation therapy.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

3. If a woman developed breast cancer and it was not treated promptly, she would probably die within five years.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

4. If a woman developed breast cancer, and it was not treated promptly, it would probably have a very bad effect on her sex life.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

5. If a woman developed breast cancer, and it was not treated promptly, it would probably have a bad effect on her work, either in or outside of the home.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

6. If a woman developed breast cancer, even if it was treated promptly she would probably need very extensive surgery.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

7. If a woman developed breast cancer, and it was treated promptly, she would probably need other therapies in addition to surgery, for example, chemotherapy or radiation therapy.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

8. If a woman developed breast cancer and it was treated promptly, she would probably die within five years.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

9. If a woman developed breast cancer and it <u>was treated</u> promptly, it would probably have a very bad effect on her sex life.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

10. If a woman developed breast cancer, and it <u>was treated</u> promptly it would probably have a bad effect on her work either in or outside of the home.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

Section IV

(The following section includes questions assessing Benefits, Confidence, and Barriers, three of the constructs of the Health Belief Model, as adapted by Champion (1991) to reflect breast cancer concerns and confidence regarding breast self-examination. Additionally, this section includes a question assessing Cuing, one of the other constructs of the Health Belief Model, as regards breast self-examination.)

These are some questions about breast self-examination which relate directly to you. Again, please circle the ONE answer that most accurately describes what you really believe.

1. When I complete monthly breast self-examination, I don't worry as much about breast cancer. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

2. I feel funny doing breast self-examination. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

3. I know how to perform breast self-examination. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

4. Completing breast self-examination each month will allow me to find lumps early. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

5. Doing breast self-examination during the next year will make me worry about breast cancer. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

6. I am confident I can perform breast self-examination correctly. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

7. If I complete breast self-examination monthly during the next year I will decrease my chance of dying from breast cancer. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

8. Breast self-examination will be embarrassing to me. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

9. If I were to develop breast cancer I would be able to find a lump by performing breast self-examination. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

10. If I complete breast self-examination monthly I will decrease chances of requiring radical or disfiguring surgery if breast cancer occurs. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

11. Doing monthly breast self-examination will take too much time. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

12. I am able to find a breast lump if I practice breast self-examination alone. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

13. If I complete monthly breast self-examination it will help me to find a lump which might be cancer before being found by a doctor or nurse. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

14. Doing breast self-examination will be unpleasant. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

15. I am able to find a breast lump which is the size of a quarter. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

16. I am able to find a breast lump which is the size of a dime. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

17. I am able to find a breast lump which is the size of a pea. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

18. It is hard to remember to do breast self-examination. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

19. I am sure of the steps to follow for doing breast self-examination. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

20. I don't have enough privacy to do monthly breast self-examination. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

21. I am able to identify normal and abnormal breast tissue when I do breast self-examination. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

22. When looking in the mirror I can recognize abnormal changes in my breasts. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

23. I can use the correct part of my fingers when I examine my breasts. (Confidence)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

24. When examining my breasts, I am able to check for discharges from the nipples. (Confidence)

very often	often	occasionally	almost never	never

25. When examining my breasts, I am able to feel the areas between my armpit and my breasts. (Confidence)

very often	often	occasionaly	almost never	never

26. I am reminded by something or someone to do a breast self-exam. (Cuing)

very often	often	occasionally	almost never	never

SECTION V

(The following section assesses Benefits and Barriers, two of the constructs of the Health Belief Model, and adapted by Champion (1991) and pertain to mammography. This section also includes a question assessing Cuing, one of the constructs of the Health Belief Model, in relation to Mammography.)

The following are some questions which relate directly to you having an x-ray or mammogram of your breasts. Please continue to circle the ONE answer that best describes what you really believe.

1. When I get a recommended mammogram, I feel good about myself. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

2. When I get a mammogram, I don't worry as much about cancer. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

3. My doctor or nurse will praise me if I obtain the recommended mammogram. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

4. Having a mammogram or x-ray of the breasts will help me find lumps early. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

5. Having a mammogram or x-ray of the breasts will decrease my chances of dying from breast cancer. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

6. Having a mammogram or x-ray of my breasts will decrease my chances of requiring radical or disfiguring surgery if breast cancer occurs. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

7. Having a mammogram will help find a lump before it can be felt by myself or a nurse or doctor. (Benefits)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

8. Having a routine mammogram or x-ray of the breasts would make me worry about breast cancer. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

9. Having a mammogram or x-ray of the breasts would be embarrassing. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

10. Having a mammogram or x-ray of the breasts would take too much time. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

11. Having a mammogram or x-ray of the breasts would be painful. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

12. Having a mammogram or x-ray of the breasts would cost too much money. (Barriers)

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

13. I am reminded by someone or something to get an x-ray or mammogram of my breasts. (Cuing)

very often	often	occasionally	almost never	never

(This was a knowledge questionnaire created by the researchers at the UAB WHT study in an attempt to ascertain women's knowledge about breast cancer in general; for the purposes of this dissertation this questionnaire is denoted as Knowledge General.)

BREAST SCREENING INTERVENTION PROGRAM
(Knowledge Questionnaire)

You may be among the increasing number of people who are worried about breast cancer. Although there is cause for concern, the fact is, you have more control over this disease than you may realize. The key is to learn about breast cancer. The combination of Clinical Breast Examination (CBE), Mammogram, and Breast Self Examination (BSE) can result in earlier detection, less treatment and better survival. If a cancer is found at its earliest stage, the survival rate after treatment is nearly 100 percent.

Please answer the following statements by circling True or False:

1. About 5% of women in the USA will develop breast cancer. (Please circle)

   True False

2. Breast texture varies from week to week and from woman to woman. (Please circle)

   True False

3. Both breasts should be exactly similar in size. (Please circle)

   True False

4. All breast lumps that are felt during breast self examination are cancer. (Please circle)

   True False

5. Cancer lumps are much harder and more painful than benign breast lumps (Please circle)

   True False

6. If you have no relatives with breast cancer, you will never develop breast cancer. (Please circle)

   True False

7. Fondling during lovemaking may cause breast cancer. (Please circle)

   True False

8. Mammography causes breast cancer. (Please circle)

   True False

9. Fibrocystic breasts have an increased risk of developing breast cancer. (Please circle)

   True False

10. Large breasts are more likely to get cancer. (Please circle)

    True False

11. Chemical pollution increases breast cancer. (Please circle)

    True False

12. Most breast cancers are detected by women themselves. (Please circle)

    True False

13. Post menopausal hormone use causes breast cancer. (Please circle)

    True False

14. It is easier to perform Breast Self-Examination at the end of the menstrual period. (Please circle)

True False

15. If you do practice Breast Self Examination, and Clinical Breast Examination, you don't need to do mammography. (Please circle)

True False

16. If you have a highly suspicious lesion by mammogram, and your doctor referred you to the surgeon, you probably have cancer. (Please circle)

True False

17. If breast cancer is found at its early non-invasive stage, the survival rate after treatment is less than 50%. (Please circle)

True False

(The following questionnaire was developed by the researchers at the UAB WHT study for the purpose of assessing breast self-examination expertise; for the purposes of this dissertation this questionnaire is denoted as Knowledge BSE.)

Breast Screening Intervention Program
(Breast Self Examination Technique)

How do you do Breast Self Examination? Please answer the following statements by circling True or False.

1. You should do breast self examination once every 3 months. (Please circle)

   True False

2. You should do breast self examination immediately before your menstruation starts. (Please circle)

   True False

3. Women should start breast self-examination after their 1st childbirth. (Please circle)

   True False

4. Women older than 60 years old should not be concerned about Breast Self Examination. (Please circle)

   True False

5. If you do routine Breast Self Examination & Clinical Self Examination you don't need to do mammography. (Please circle)

   True False

6. During Brest Self Examination you should feel the right brest with your right hand and the left breast with your left hand. (Please circle)

   True False

7. During Breast Self Examination, you should feel your breasts with the palm of your hand. (Please circle)

   True False

8. You should use firm pressure during Breast Self Examination. (Please circle)

   True False

9. You should not compare one breast with the other during Breast Self Examination. (Please circle)

   True False

10. During Breast Self Examination, you need also to examine breast tissue that extends toward the shoulder. (Please circle)

    True False

APPENDIX B

TABLES

Table 1

Demographic Characteristics of UAB Sample

Variable	Percentages	n
Categorical Variables		
Race		
Caucasian	64.4%	143
Black	31.5%	70
Asian/Pacific Islands	.5%	1
Income		
$0-14999	14.9%	33
$15000-49900	51.8%	115
$50000 or more	23.0%	51
Continuous Variables		
Age (range: 46-73)	56	6.65
Education	4.61	1.73
Household Population	2.28	1.16

Note. (In terms of Education) 4 = Posthighschool, trade, or technical school; 5 = some college.

Table 2

Means and Standard Deviations for Psychosocial Measures

Construct	Number of Items	Mean	Standard Deviation
Susceptibility	5	17.31	3.75
Severity-Early	5	18.41	2.40
Severity-Late	5	11.34	2.98
Seriousness	7	20.57	4.52
Benefits	11	24.11	5.12
Barriers	12	45.66	5.61
Confidence	14	38.24	6.28
Cuing	2	6.57	1.97
Health Motivation	7	12.45	3.31
Knowledge BSE	10	16.96	1.64
Knowledge General	15	26.71	6.38

Note. n = 198.

Table 3

Alpha Internal Consistencies for Psychosocial Variables and Demographics

Subscale	Susc	Sev-E	Sev-L	Ser	Ben	Barr	Conf	Cuing	HeMot	KnoBSE	KnoGen
Susc	(.94)										
Sev-E	.09	(.52)									
Sev-L	.12	.28**	(.75)								
Ser	.46**	.29**	.33**	(.76)							
Ben	-.03	-.03	.20**	.03	(.81)						
Barr	-.09	.17*	.07	.14*	-.30 *	(.83)					
Conf	-.11	-.01	.02	-.18*	.39**	.29**	(.77)				
Cuing	.08	.02	.15*	.13	.22**	.02	.11	(.52)			
HeMot	.01	-.01	.13	-.05	.23**	-.23*	.24**	.15*	(.77)		
KnoBSE	.00	-.11	.01	.02	.01	.23**	-.18**	-.05	.05	(.45)	
KnoGen	.07	-.22**	-.04	.08	-.14*	-.16*	-.20**	-.08	.05	-.01	(.70)
HHIncome	-.03	-.04	.00	.03	.10	-.07	.04	-.00	-.12	-.06	.10
Educ	.01	.00	.22**	-.04	-.04	.01	-.07	.12	-.09	.09	.01

(table continues)

Table 3 (continued)

Subscale	Susc	Sev-E	Sev-L	Ser	Ben	Barr	Conf	Cuing	HeMot	KnoBSE	KnoGen
BldRel	.08	.04	.09	-.01	.00	-.07	-.05	-.09	.02	.02	-.01
CBE	.09	-.01	-.04	.07	.08	-.08	.14*	.01	.06	-.01	-.03
Fibrocys	.10	.02	.08	.01	.05	-.22	.05	.02	-.03	-.01	-.03
Mammo	.20**	-.10	.00	.02	.18**	-.27**	.17*	.01	.26**	-.09	.07
BSE	-.06	.01	-.02	-.06	.06	.01	.03	-.05	.18**	-.01-	.04

Note. N = 221; Values on main diagonal are alpha internal consistencies. Values off the diagonal are Peason's correlations. Susc=Susceptibility; Sev-E=Severity-Early; Sev-L=Severity-Late; Ser=Seriousness; Ben=Benefits for BSE & Mammography; Barr=Barriers for BSE & Mammography; Conf=Confidence; Cuing=Cuing for BSE & Mammography; HeMot=Health Motivation; KnoBSE=Knowledge BSE; KnoGen=Knowledge General; HHIncome=Household Income; Educ=Education; BldRel=Blood Relative Having Had Breast Cancer; Physicia=CBE; Fibrocys=History of Fibrocystic Breast Disease; Mammo=Mammography; BSE=BSE Rate for Last Year (most conservative rate).

* $p < .05$ **$p < .01$

Table 4

Frequency of BSE, Mammography, CBE, Fibrocystic Breast Disease and Blood Relatives with Breast Cancer

Variable	Percentage	n
BSE (Last Year)		
Never	21.6%	48
Once Every 6 Months	19.8%	44
Once Every 3 Months	23.0%	51
Once Every Month	32.9%	73
BSE (Last 3 Months)		
Never	34.7%	77
Once Every Three Months	20.7%	46
Once Every Two Months	4.1%	9
Once Every Month	38.3%	85
BSE (Last Month)		
Never	44.6%	99
More Than Once	9.0%	20
Once	44.1%	98

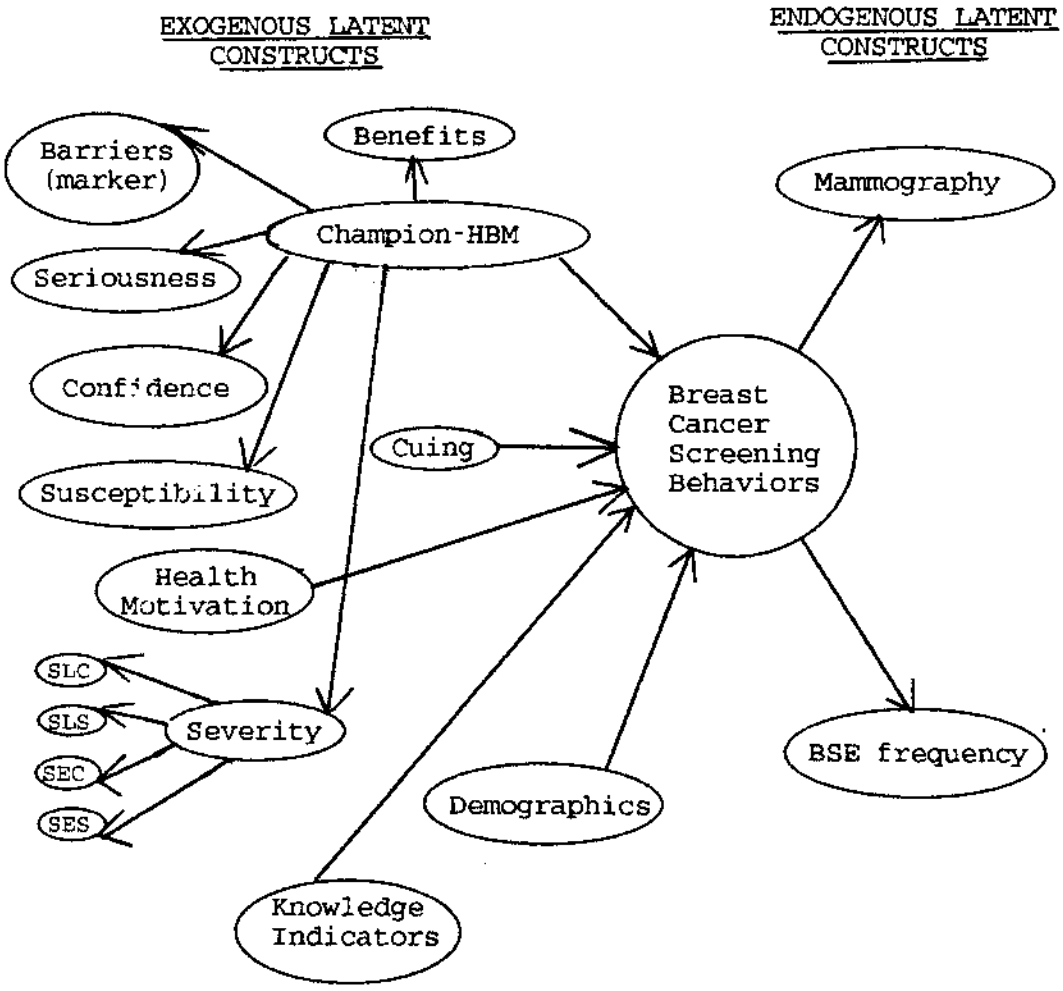
Table 4 (continued)

Mammography		
Twice a Year	1.4%	3
Yearly	43.7%	97
Every 2-4 Years	25.7%	57
Once Every 5 Years	5.0%	11
Once in Last 10 Yrs.	12.6%	28
Missing	10.4%	23
Ever had a Clinical Breast Examination (CBE)		
Yes	58.6%	130
No	39.2%	87
History of Fibrocystic Breast Disease		
Yes	43.2%	96
No	53.6%	119
Blood Relative with Breast Cancer		
Yes	22.1%	49
No	74.3%	165

APPENDIX C

FIGURES

Figure 1: Model relating Health Beliefs, Knowledge, and SES to Breast Cancer Screening Behavior.



Note: Intercorrelations are hypothesized among: all 6 factors of the Champion-Hbm, Cuing and Severity; demographics; and, Knowledge Indicators. Intercorrelations are also hypothesized among the 4 Severity constructs: (Severity-Late-Clinical=SLC; Severity-Late-Social=SLS; Severity-Early-Clinical=SEC; Severity-Early-Social=SES). Observed indicators for the exogenous constructs are not shown.

Figure 2: Full Causal Model #1

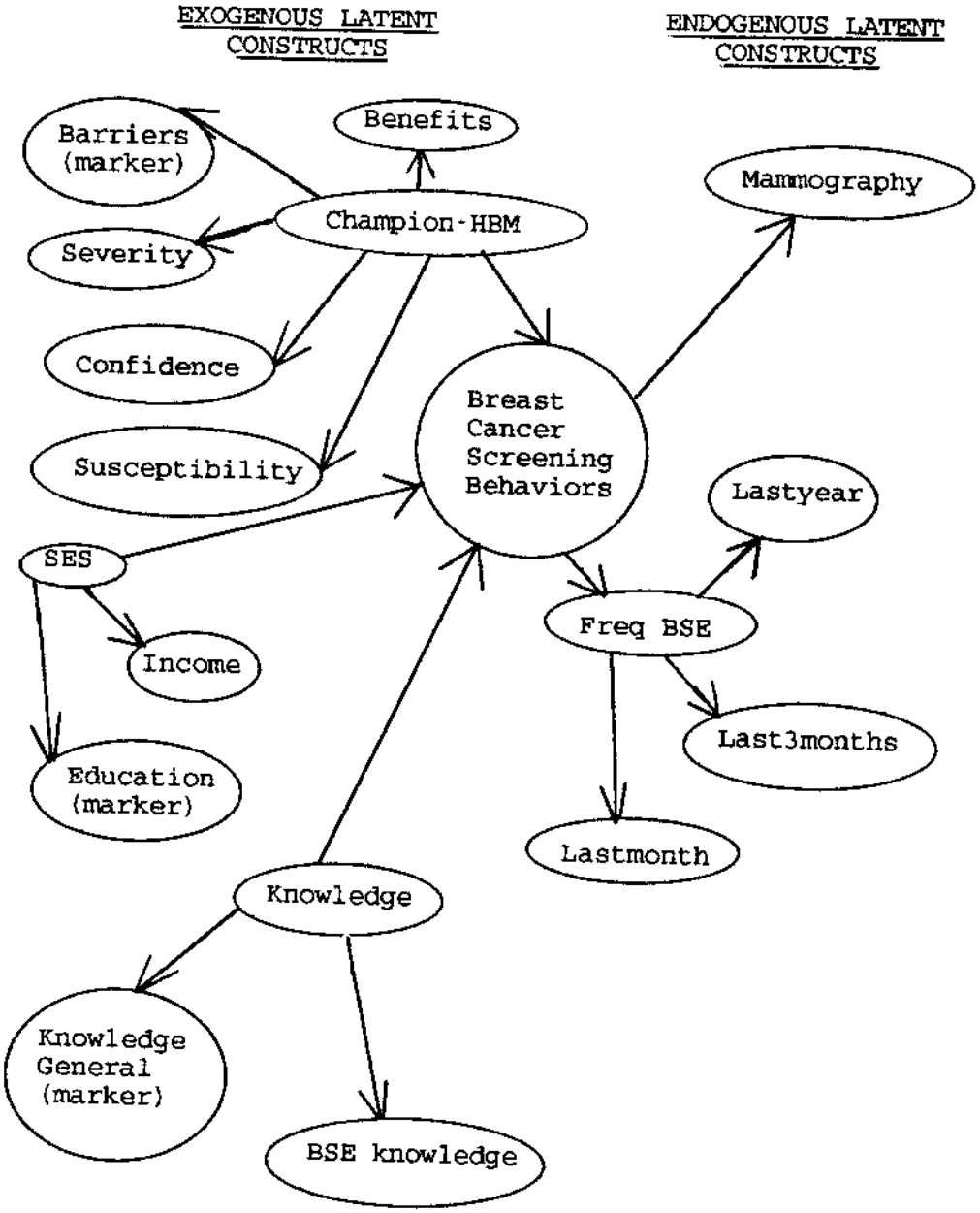
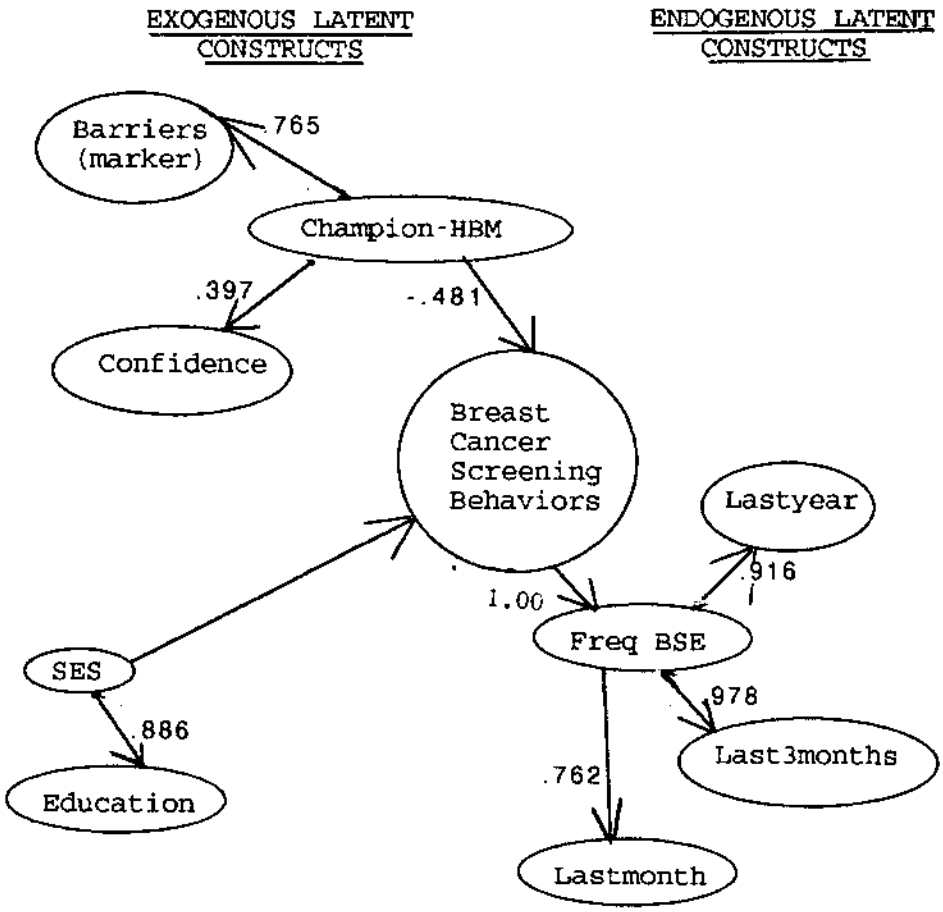


Figure 3: Final Full Causal Model



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