ADOPTION OF BREAST SELF-EXAMINATION IN SOCIO-ECONOMICALLY DISADVANTAGED WOMEN: THE EFFECT OF PROMPTING, SELF-MANAGEMENT, FEEDBACK, AND SUPPLEMENTARY TRAINING

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Increased breast cancer mortality among socio-economically disadvantaged women is well documented. Also well documented is the utility of BSE as an economical means of early detection and, therefore, decreased breast cancer mortality. This study assessed health beliefs and breast cancer screening practices among a sample of women recruited from local public health clinics as well as a sample of women recruited from a federally-subsidized housing development in Roanoke, Virginia. In addition, this study concomitantly examined the efficacy of an intervention promoting BSE through standard face-to-face training, written prompts, self-management, and personalized feedback within the housing development sample. The feasibility of recruiting and intervening with predominately minority, low SES, women living in public housing is also addressed. The clinic sample consisted of 42 women who ranged in age from 20 to 44 (X=24.9 years), 88.1% had earned their high school diploma or equivalency, and the sample was predominantly (83.3%) Caucasian. The housing sample (n=30) was

largely African-American (87%), ranged in age from 20 to 57 (X=35 years), and had a mean educational attainment of 11th grade. Both samples reported relatively low levels of BSE frequency, quality, and knowledge; however, the clinic sample was significantly more likely to have tried a BSE than women in the housing sample
($p < .05$) and reported a significantly higher perception of benefits of BSE ($p < .001$). Analyses of variance revealed a significant effect of the intervention on BSE frequency ($p < .05$), although not on BSE quality or knowledge. Results of stepwise multiple regressions varied depending on the dependent measure used for BSE frequency; however, number of project-initiated contacts uniformly appeared as a significant predictor of BSE frequency whereas knowledge was the largest significant predictor of BSE quality. The study demonstrated the potential utility of the intervention to promote the adoption of BSE; however, BSE proficiency must also be addressed for the intervention to succeed in achieving health benefits.

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Adoption of Breast Self-Examination in Socio-economically Disadvantaged Women: The Effect of Prompting, Self-Management, Feedback, and Supplementary Training

The aggregate cost of breast cancer to our society, in terms of both morbidity and mortality, is enormous. Every year, among women in the United States, more new cases of breast cancer are diagnosed than any other cancer. In fact, an estimated 183,000 new cases of breast cancer were diagnosed in 1994 alone, and one in every nine women will develop breast cancer by age 85 (American Cancer Society, 1994). Moreover, breast cancer is the second major cause of cancer death among women in the United States, with an estimated 46,000 deaths in 1994 (American Cancer Society, 1994). A significant reduction in the toll of breast cancer, with respect to either morbidity or mortality, would constitute a major contribution to women's health (Pennypacker, Bloom, Criswell, Neelakantan, Goldstein, & Stein, 1982). Because incidence rates are rising, particularly among relatively young black women (Kelsey & Gammon, 1991), and primary prevention is not yet a reality, the best available method to decrease mortality rates is early detection.

Early detection of breast cancer (i.e. before the cancer has metastasized regionally or distantly) leads to more successful, less invasive, and less expensive treatments (American Cancer Society, 1994). In addition, the 5-year survival rate for localized breast cancer is 93%, and approaches 100% if the cancer is in situ (American Cancer Society, 1994). In contrast, the survival rate for regionally spread cancer is 71%, and only 18% for persons with distant metastasis (American Cancer Society, 1994).

In efforts to promote early detection, The American Cancer Society

(1994) recommends that women have a screening mammogram by age 40, regular mammograms (every 1-2 years) for women age 40 to 49, and annual mammograms for asymptomatic women age 50 and older. Annual clinical physical examination of the breast is also recommended for women over 40, whereas women between 20 and 40 should be clinically examined every three years. Finally, monthly breast self-examinations (BSE) for all women 20 years or older is recommended by the American Cancer Society.

Unfortunately, for many women, particularly women with low incomes, mammography and clinical exams are less of an option due to cost and limited access. However, breast self-exams, defined as the regular, systematic inspection and palpation of one's own breasts for the purpose of detecting an abnormality (Roche & Gosnell, 1989), are relatively simple to perform, involve no medical cost, transportation, or special equipment, are non-invasive, and require very little time. In addition, BSE has been found to be associated with earlier detection of breast cancer, less advanced stage of breast cancer at time of diagnosis, and fewer axillary-lymph-node metastasis (Baines, 1992; Foster, Lang, Costanza, Worden, Haines, & Yates, 1978; Foster & Costanza, 1984; Greenwald, Nasca, Lawrence, Horton, McGarrah, Gabriele, & Carlton, 1978; Huguley & Brown, 1981; Mant, Vessey, Neil, McPherson, & Jones, 1987). In fact, some data suggest that regularly practiced and properly taught BSE can lead to a 20 - 30% reduction in the number of women presenting with positive lymph nodes at the time of diagnosis (Mant et al., 1987). Other researchers (Greenwald et al., 1978) have conservatively estimated, based on pathological staging of disease, that BSE could lead to a 9.2% reduction of patients who die within five years of diagnosis. Because prognosis of breast cancer is primarily dependent upon stage of disease at

diagnosis, earlier detection through BSE may lead to a decrease in cost and extent of treatment and potentially increase survival rates.

Although some research (Newcomb, Weiss, Stror, Scholes, Young, & Voight, 1991) has contributed to a debate in regards to the efficacy of BSE as a screening modality for breast cancer, most retrospective studies examining the relationship between BSE frequency and stage of breast cancer at the time of diagnosis seem to support its utility (Mayer & Solomon, 1992). In fact, a meta-analysis of studies examining this relationship found an association between BSE practice and negative lymph node as well as smaller tumor diameter at diagnosis (Hill, White, Jolley, Mapperson, 1988). However, given the descriptive nature of the research and the lack of a controlled and prospective clinical trial evaluating the impact of BSE on mortality to date (O'Malley & Fletcher, 1987), the beneficial impact of BSE in relation to mortality is impossible to assess (Mayer & Solomon, 1992). Nonetheless, the potential benefit of lead time gained must not be ignored when assessing the utility of BSE (Mant et al., 1987), particularly in a population of women who do not access mammography screening or clinical exams.

Breast self-exams, if performed regularly and proficiently, have the potential to be the best available method for early detection of breast cancer on a national scale if a high level of compliance among women can be established (Pennypacker et al., 1982). It is therefore possible, to the extent acceptance of the BSE technique by women can be achieved, that breast cancer survival will also be directly improved. Unfortunately, it is clear that this necessary level of high compliance has not yet been established, despite the relative ease with which one can perform a BSE (Fox, Klos, Tsou, & Baum, 1987; Grady, 1988). Studies in numerous settings reveal that while nearly all

women (90% - 99%) are aware of breast self-exams, far fewer (15% - 40%) actually practice monthly BSE (O'Malley & Fletcher, 1987) and up to 20% report never having done a BSE (Gallup Organization, 1984).

Despite the intuitive appeal of achieving a high level of compliance with BSE among women, both Grady (1984) and Mayer and Solomon (1992) describe some difficulties, inherent in this behavior, which contribute to the difficulty of doing so. First, BSE is recommended as a monthly behavior, making it difficult to become an habitual self-care behavior, such as dental flossing. Second, effective naturally occurring cues for BSE do not exist. Third, the short-term consequences of BSE would not be considered rewarding by most women and no feedback is provided to women for performing the exam. Fourth, unlike some health behaviors, BSE does not have any additional rewards other than health protection. Finally, because BSE is such a private behavior, it is difficult to establish social norms surrounding it.

Several researchers have shown women that who do engage in breast self-exams tend to be Caucasian (Huguley & Brown, 1981), of higher income (Celentano & Holtzman, 1983), relatively well-educated (Howe, 1981; Huguley & Brown, 1981; Senie, Rosen, Lesser, & Kinne, 1980; Sheley, 1983; Smith, Francis, & Polissar, 1980), younger (Celentano & Holtzman, 1983; Foster et al., 1978; Huguley & Brown, 1981; Senie et al., 1980; Smith et al., 1980), and married (Senie et al., 1980; Smith et al., 1980). Therefore, it is the women who are more likely to have access and financial resources to receive more sophisticated diagnostic procedures who concomitantly engage in regular BSE.

Yet, thousands of economically-disadvantaged and minority women

are diagnosed with breast cancer each year. In addition, because of delayed diagnosis, minority women tend to be diagnosed with more advanced forms of breast cancer, more frequent distant metastasis, and survival rates among black women at all stages of breast cancer fall below survival rates of white women (Nemoto, Vana, Bedwani, Baker, McGregor, & Murphy, 1980).

The racial difference in survival rates of breast cancer is apparently unaffected when controlling for age and stage of the disease (Ansell, Whitman, Lipton, & Cooper, 1993). However, several studies have found controlling for socioeconomic status indicators does significantly reduce or eliminate the influence of race on breast cancer survival (Ansell et al., 1993; Bassett & Krieger, 1986; Dayal, Power, & Chiu, 1982; Eley et al., 1994; Wells & Horm, 1992). Moreover, income alone has been found to be a significant predictor of breast cancer survival with low income women having significantly decreased survival rates (Ansell et al., 1993; Farley & Flannery, 1989) and increased incidence of later stage breast cancer (Wells & Horm, 1992).

It is likely that these race, and particularly the income, patterns are due in part to decreased preventive health practices. Disadvantaged women have less access, typically do not have the financial resources to tap professional screening sources, and are not engaging in self-screening behaviors (Howe, 1981; Satariano et. al., 1986; Wells & Horm, 1992). There is a relative dearth of intervention research among lower income and minority women regarding breast cancer screening. Therefore, further research efforts to understand why these women are not engaging in such behavior and efforts to increase the occurrence of these behaviors is indicated and necessary.

Theoretical Framework

Health Belief Model. Current theoretical approaches offer different explanations as to which causal mechanism accounts for the adoption and maintenance of health behaviors. One such theoretical explanation is the Health Belief Model (HBM). Several researchers have employed the health belief model to understand and account for the lack of compliance in regards to BSE. The Health Belief Model was originally developed in an attempt to conceptualize the widespread failure of individuals to comply with disease prevention strategies or early detection tests for asymptomatic diseases (Janz & Becker, 1984). More specifically, the Health Belief Model (Appendix A) states that the likelihood that any individual will practice a particular health related behavior, such as BSE, depends on the following dimensions:

Perceived Susceptibility: Individuals vary in their feelings of personal vulnerability to a condition and this dimension taps one's subjective perception of the risk of contracting an illness.

Perceived Severity: Individuals vary in their perception of the seriousness of a particular illness and this dimension assesses feelings of concern about the medical and social consequences of contracting an illness.

Perceived Benefits: Individuals may take different courses of action depending on their beliefs about the effectiveness of the various actions available in reducing the disease threat.

Perceived Barriers: This dimension taps individuals' beliefs about the potential negative aspects of a particular health action such as expense, time, or dangerous side-effects.

Cues to Action: This dimension refers to the stimulus which appears necessary to trigger the decision-making process, including the presence of

internal or external stimuli.

Demographic, Sociopsychological, and Structural variables: These variables may affect one's perception and, therefore, indirectly influence health-related behaviors (Janz & Becker, 1984).

The utility of the Health Belief Model in regards to BSE has been demonstrated by several researchers. However, the perceived barriers dimension repeatedly appears, across different populations of women, as the most relevant predictor BSE frequency (Champion, 1992; Clarke, Hill, Rassaby, White, & Hirst; Nemcek, 1990; Hailey & Bradford, 1991; Sheppard, Solomon, Atkins, Foster, & Frankowski, 1990; Strauss, Solomon, Costanza, Worden & Foster, 1987).

Health Locus of Control. Another theoretical concept which has demonstrated some utility in the area of breast self-exams is Health Locus of Control. The locus of control construct emerged from Social Learning Theory and refers to the degree to which an individual perceives a particular reinforcement is due to his/her own behavior or due to outside forces. The relationship between locus of control and health can be understood in two ways. First, people with a strong sense of personal control may be more likely to prevent illness or extend effort to maintain their health as compared to those with a lesser sense of personal control. Second, once people have become ill, those with a stronger sense of personal control may be able to adjust to their illness and promote rehabilitation more quickly (Sarafino, 1994). Clearly, examining the relationship between breast self-exams and locus of control focuses on the former type of relationship.

Health Locus of Control is typically conceptualized as consisting of three different dimensions, including:

Internal Health Locus of Control: This refers to the extent one perceives health as contingent upon one's own behaviors.

Powerful Others' Health Locus of Control: This refers to the extent to which one believes health is controlled by other people, such as physicians or other health care workers.

Chance Locus of Control: This taps the belief that health is beyond one's own control and is controlled by such factors as luck or fate.

The latter two dimensions collectively assess the degree to which one believes health is controlled by important external sources. Normative data suggests that persons who engage in preventive health behaviors show high health internality and low chance beliefs (Wallston & Wallston, 1981). Therefore, one would expect women who do practice regular BSE to score high as "internals" and relatively low on the external dimensions. In fact, a few researchers have found the Powerful Others' health locus of control dimension to be inversely related to BSE frequency (Alagna & Reddy, 1984; Nemcek, 1990; Sheppard et al., 1990; Strauss et al., 1987), implying an overreliance on medical personnel to detect any potential breast abnormalities.

Self-Efficacy. A third potential theoretical contributor to understanding BSE noncompliance is self-efficacy. Self-efficacy expectancy refers to one's judgment of personal ability to successfully execute a particular behavior in a given situation (Bandura, 1977). Women are more likely to adopt a new health behavior, such as BSE, to the extent that they feel competent and confident in their ability to perform the behavior adequately. Self-Efficacy Theory also considers outcome expectancies, or perceived consequences/reinforcers of the behavior, as important determinants of

behavior adaptation. However, self-efficacy expectancies are considered more crucial in action control, whereas outcome expectancies are typically limited to intention formation (Schwarzer, 1992). In addition, self-efficacy is believed to impact the amount of effort one is willing to put forth and length of perseverance in the presence of barriers (Bandura, 1977).

The role of self-efficacy in various health behaviors has been examined to a considerable extent and a substantial amount of evidence exists which notes its utility as a cognitive factor affecting health (O'Leary, 1985). In fact, several researcher have found self-efficacy to be a significant predictor of BSE frequency (Alagna & Reddy, 1984; Baker, 1988; Clarke et al., 1991). For some researchers, self-efficacy overlaps the confidence component of the perceived barriers variable in the Health Belief Model, which is also supported as a significant predictor of BSE frequency (Sheppard et al., 1990; Strauss et al., 1987).

BSE Maintenance

Working within the context of one or a combination of the above discussed theoretical frameworks, numerous researchers have explored breast self-exams. Research has focused both on the factors which predict BSE adherence as well as intervention strategies designed to promote BSE adoption and maintenance. Unfortunately, in this somewhat vast literature, minimal research has been targeted at disadvantaged women.

Sheppard, Solomon, Atkins, Foster, and Frankowski (1990), using a questionnaire based on the Health Belief Model, did examine predictors of BSE frequency and quality in lower income and lower education women of childbearing age. Results indicated that perceived barriers (including:

forgetting; exclusive reliance on medical personnel; and low confidence in ability to do BSE), to be the single best predictor of BSE frequency, whereas knowledge of correct BSE technique was the best predictor of BSE quality. Unfortunately, these data also revealed the majority of low income, low education women do not perform regular BSE and the reported quality of BSE was quite poor. In this study, the authors compared these results to results obtained on the same questionnaire by higher education, higher income women, also of childbearing age. In this sample of women , perceived barriers were also the most powerful predictor of BSE frequency, accounting for the same amount of variance (67%) as in the former sample of women. Not surprisingly, however, more low income, low education women reported never having performed a breast self-exam (Sheppard et al., 1990).

Prompting. Several studies evaluating the efficacy of various short-term strategies to increase BSE frequency have been conducted, although not with the same population of women of interest in this proposal. These strategies have included general principles of behavior modification, such as prompting, self-management, and rewards. Prompts are events that serve to initiate a desired response. A few prompting modalities have been examined, including both biweekly and monthly mailed prompts, biweekly telephone prompts, and biweekly personalized prompts. Mayer and Frederiksen (1986), compared a control condition, mail prompts condition, and phone prompts condition. They found the three conditions did not differ with respect to the number of "high" compliers per condition. However, the prompting conditions were more likely to have subjects perform BSE at least one time during the experimental period, with those receiving phone prompts even more likely to do so (Mayer & Frederiksen, 1986). Grady (1984) examined the

use of appropriately timed (i.e. scheduled to arrive 5 - 10 days after the onset of the participant's menstrual cycle) monthly postcard prompts and found a positive effect on BSE adherence. Mayer, Dubbert, Scott, Dawson, Ekstrand,and Fondren (1987) compared the efficacy of biweekly mailed prompts to a condition receiving both biweekly mailed prompts and biweekly personal contact prompts. Results indicated a significant number of "high" compliers in the personal contact group as compared to the mailed prompts only condition. Finally, Craun and Deffenbacher (1987) found an increase in adherence among women who received monthly mailed prompts as compared to a no prompt control condition.

Despite these seemingly promising results in regards to prompting strategies, the increases in adherence seen in the various types of prompting conditions were not maintained over time. In fact, Grady (1984) reported a dramatic decrease in BSE frequency after discontinuing prompting postcards in a prompt-only condition, but reported a less rapid decrease in the conditions receiving self-management and both prompts and self-management. Therefore, it is necessary for future research to identify the prompting schedule and modality that will best serve to maintain motivation, reduce habituation (Mayer & Solomon, 1992), and possibly allow for a gradual removal of the prompts. Perhaps more research on self-management techniques or less labor intensive prompting will be more effective in long-term BSE adherence. The present study attempted to shed light on this empirical question with a population which has received relatively little attention in the literature.

Self-Management. Another behavioral modification technique applied to BSE is self-management. Several researchers have attempted to assess the

efficacy of self-management in increasing BSE frequency. In a community-wide BSE education study, Worden, Solomon, Flynn, Costanza, Foster, Dorwaldt, Weaver (1990), used a calendar logo, clips to be placed on menstrual supplies, and message note pads as reminder materials for BSE maintenance. In addition, women received a packet of 12 self-reward cards suggesting different ways women could reward themselves for doing their monthly exams. Outcome data obtained through random-digit dialing of women in two communities revealed no significant difference in BSE frequency between the maintenance and no maintenance communities, however, women in the maintenance community did show a significantly greater increase in reported BSE quality as compared to the non-maintenance community. No differences between the two communities were noted on observed BSE quality by home interviews; however, the maintenance community women detected significantly more lumps in silicone breast models at follow-up, compared to non-maintenance community women.

Baines, Krasowski, and Wall (1988) used calendars in an attempt to promote BSE adherence; however no significant difference between calendar recipients and nonrecepients was revealed. Grady (1984) also used calendars and reminder stickers as self-management techniques and found a positive effect of self-management with cyclic women, but not with non-cyclic women. In addition, Grady (1984) noted a significant additive effect of self-management plus appropriately timed postcard prompts. This study examined whether the combination of prompting and self-management would increase BSE frequency and BSE maintenance in the absence of timing, as this process is so labor intensive and therefore, an unrealistic public health intervention.

Supplementary Training. Maintenance of BSE quality remains a research concern since observed BSE quality may diminish as soon as three months following one-session training (Mayer & Solomon, 1992). Home practice and review have been shown to enhance maintenance of self-reported BSE proficiency, however, if the public health benefits of BSE are to be realized, further research is needed to identify optimal retraining intervals to maintain observed BSE proficiency (Pinto & Fuqua, 1991). Retraining may also serve as an opportunity for women to reacquaint themselves with the BSE technique as well as discuss and devise solutions for the barriers to BSE they have personally experienced since the first training session, thereby increasing BSE adherence.

Feedback. Feedback is not inherent in the practice of BSE and has not been extensively examined as a potential predictor of BSE adoption. However, reinforcing factors, such as the receipt of feedback following the adoption of a behavior, appear to contribute to the adoption of certain health behaviors. In fact, Green & Kreuter (1991) developed the Precede/Proceed Model for health promotion which incorporates reinforcing factors and suggests the necessity of such factors for behavior change. Moreover, because BSE is a difficult behavior to adapt, in part, due to the lack of rewarding consequences or feedback (Grady, 1984; Mayer & Solomon, 1992), providing women with feedback appears to be a reasonable intervention strategy.

Feedback can take several forms and be provided through a variety of mediums. Skinner, Stretcher, and Hospers (1994) revealed the significant impact of written tailored messages for mammogram screening recommendations, particularly among women of lower socioeconomic status. In this study, tailored messages were designed to include specific information

pertaining to the woman's personal risk status and previous screening practices. This intervention did not provide feedback on the behavior of interest, rather it provided an antecedent to the behavior. However, the antecedent message did contain feedback based on questionnaire data and provided a statement of risk and recommendations based on reported information. Thus, feedback was provided in the context of a behavioral antecedent. The positive impact of tailored messages on increasing mammography screening, a behavior which involves negotiating the medical system, obtaining access, and paying for services, lends support to the possibility that such information may increase BSEs as well.

BSE Quality. Another component of breast self-exams, which has only been eluded to thus far, involves performing BSE proficiently. Assessing the quality of a breast self-exam is an important consideration as it carries implications for a woman's ability to detect breast lumps, particularly small lumps. There are two common approaches to measuring BSE quality (Mayer & Solomon, 1992). First, women may describe how they do a self-exam and this self-report is compared to a list of components which should be involved in an ideal BSE. The index of quality is arrived at by determining the number of congruent components between the reported exam and the ideal exam. The second approach involves observation of a woman performing a BSE, on herself or a breast model, and again recording and comparing the number of components done in the exam which comply with the ideal exam, as determined by the particular researcher. Unfortunately, consensus is lacking on which components constitute an ideal exam (Mayer & Solomon, 1992).

A few studies have explored the relationship between the two approaches of measuring quality, indicating a significant correlation between

self-reported quality and observed BSE quality (Mamon & Zapka, 1985; Stefanek & Wilcox, 1992). Therefore, self-reported BSE quality may serve as a sufficient indicator of actual BSE proficiency.

Numerous studies, incorporating both measurement approaches to BSE quality and varying criterion, have been conducted and sadly converge on one common theme: BSE quality among American women is extremely poor (Mayer & Solomon, 1992)

In efforts to decipher what variables are involved in establishing BSE quality, four primary predictor variables have been examined (Mayer & Solomon, 1992). First, demographic variables, including age, race, income level, and education, do not appear to be related to BSE quality in any consistent manner (Celentano & Holtzman, 1983; Sheppard, et al., 1990). In contrast, knowledge of correct BSE technique appears related to self-reported and observed BSE quality (Alagna & Reddy, 1984; Sheppard et al., 1990). Confidence in one's ability to perform BSE appears related to reported BSE quality; however, its relationship to observed BSE quality is equivocal (Mayer & Solomon, 1992). Finally, although three studies examining the relationship between BSE frequency and BSE quality reported positive correlations among the two variables (Alagna & Reddy, 1984; Baines, Wall, Risch, Kuin, & Fan, 1985; Celentano & Holtzman, 1983), three additional examinations of these variables concluded no significant correlation among them (Howe, 1980; Howe, 1987; Mamon & Zapka, 1985). Of the predictors examined thus far, BSE frequency appears the most confusing and perhaps this relationship may vary among different populations of women. This relationship will be examined in the proposed study of socio-economically disadvantaged women.

Access and Implementation

Lower-income, and particularly lower-income, minority women, are in need of effective interventions targeted towards early detection of breast cancer. Despite the challenge of developing culturally sensitive interventions, an even greater challenge involves recruiting this population of women and implementing the intervention in a feasible and accessible manner.

Women of lower income face numerous barriers which often preclude them from participating in research and interventions targeted towards health promotion. Several recommendations have been offered to assist in the recruitment of minority and lower income populations, including: straightforward, written consent form; initial contact made by project coordinator; individual recruitment; use of appropriate language; willingness to answer questions; employing leaders in the community as recruiters/endorsers of the project; and offering incentives for participation (Haywood, deGuzman, Jackson, Venegas, & Blumfield, 1992; Rand et al., 1992). These recommendations appear reasonable and useful; however, the efficacy of these recruitment recommendations needs to be explored further.

For example, Sung and his colleagues (1992) developed an intervention intended to increase the rate of participation of black women in screening programs for breast and cervical cancer. This project initially recruited from health clinics, but was unable to sufficiently recruit from this setting and expanded recruitment to public housing projects in the area. The most effective recruitment strategy was door-to-door canvassing within the housing developments; however this approach was not cost or time efficient

(Sung et al., 1992). However, these researchers suggested the potential utility of this recruitment strategy if its efficiency could be increased and if it resulted in a decreased rate of participant attrition during longer intervention trials. Therefore, individual recruitment within housing developments appears to warrant further investigation and will be examined in this project.

Another breast and cervical cancer screening intervention project targeted towards low-income African-American women (Whitman et al., 1994) recruited participants from both local health clinics as well as within the community, including churches, beauty shops, laundromats, libraries, and grocery stores. However, participation in this intervention did not require these women to reconvene at a different location for a structured meeting, thereby decreasing the barriers to participation.

There appears to be a consensus that barriers to participation must be reduced and access to programs must be improved when targeting lower SES populations; however, the exact means of achieving these goals appears to warrant further investigation and refinement of recommendations are necessary.

Goals of the Present Research

The purpose of this study was twofold. First, the comparative portion of this project examined the relationship between demographic characteristics and health belief variables, as well as predictors of BSE frequency and quality. Second, the experimental portion of the project was designed to: (1) determine whether slight modifications of maintenance strategies, shown to have some utility with non-disadvantaged women, will also be successful with socio-economically disadvantaged women; and (2) whether public

housing developments provide a reasonable delivery site for similar interventions. The efficacy of the intervention was tested in a randomized pretest-posttest experimental design, involving a minimal treatment control condition. In addition, by assessing health beliefs, self-efficacy, and health locus of control, this research provided an opportunity to examine the factors relevant to determining BSE frequency and quality in this population of women, and expand upon currently ambiguous findings.

Method

Comparative Sample

Recruitment

Local Public Health Clinics were initially considered as a recruitment and intervention site for the experimental portion of this project and, therefore, some preliminary data was gathered in order to characterize the women who are treated at these clinics.

Women were recruited from area Public Health Clinics, including Radford, Christiansburg, and Roanoke. These clinics offer services to a slightly different clientele each day of the week. In efforts to maximize the possibility of recruiting eligible participants, the Family Planning, WIC, and Well Child clinic days were used for recruitment.

Participants

Responses on the Health Beliefs Questionnaire (see Measures) were obtained from 42 women, 18 (43%) from Radford's clinic, 16 (38%) from Christiansburg, and 8 (19%) from Roanoke. A total of 62 women were approached at the clinics, 57 (92%) agreed to participate, 15 (24%) of these

women were ineligible to participate, and 5 (8%) refused to participate.

Women of all races were eligible to participate unless: (1) they were pregnant or breast feeding, since breast tissue undergoes extensive changes during these times which makes BSE both difficult to perform and inaccurate or (2) they reported a prior history of breast cancer, since their treatment may have included partial or total mastectomies and they are more likely to receive routine mammograms and clinical exams. Of the 15 women who did not meet eligibility criteria, nine (60%) were pregnant, four (27%) were currently breast-feeding, and one (7%) reported a prior history of breast cancer.

The total sample consisted of 42 women who ranged in age from 20 to 44 ($X = 24.93$ years). The majority of the sample had graduated high school or earned their high school diploma equivalency ($n = 37$; 88.1%) and several women reported some education beyond high school ($n = 11$; 26.2%). The sample was predominantly Caucasian ($n = 35$; 83.3%) and slightly less than half of the sample ($n = 20$; 47.6%) received Medicaid benefits.

Only three participants (7.2%) reported breast cancer in a first-degree relative (sister or mother), 17 (40.5%) reported a family history of breast cancer among second degree relatives, 12 (28.6%) reported no family history of breast cancer, and the remaining 10 (23.8%) participants were uncertain as to whether there was a family history of breast cancer.

The majority of women (n=32; 76%) reported no personal history of breast problems; however, as many as ten women (24%) reported breast problems ranging from lumpy breasts (n=4) to harmless, untreated lumps (n=5) to fluid-filled, benign lumps removed by surgery (n=1).

Procedure

Women were approached in the waiting room by the researcher, asked to complete an anonymous survey pertaining to breast cancer and personal screening practices, and were screened for eligibility. Written informed consent was obtained for every participant. After completing the survey, women received $3.00 as compensation for participating and were also provided two informational pamphlets from the American Cancer Society. These brochures described the BSE technique in detail, as well as information regarding mammography and breast cancer facts. Even women who were ineligible to participate were offered the educational pamphlets and were given a rationale as to why they were ineligible for participation. Finally, all participants were asked to provide the researcher with their name, address, and phone number if they were interested in further participation with the project. Further participation was described as attending a brief group meeting to discuss the project and provide feedback on the planned intervention (i.e., a focus group).

While the clinics provided a reasonable location to obtain survey data as women waited for their appointments, the clinics were not a viable site for recruiting participants for a project which required returning to the clinic on non-appointment days. Four different focus groups were arranged with participants who had completed the Health Beliefs Questionnaire and indicated interest in further involvement with the research project. Two focus groups were arranged at the Radford clinic and two at the clinic in Christiansburg. On all four occasions, no participants attended the focus groups, despite monetary incentives and verbal consent to attend.

These women reportedly faced several barriers which prevented them from coming to the Health Clinic for a research project, particularly lack of

child care and transportation. Such barriers are common among women of lower income and have led many researchers to consider alternative delivery sites and methods which increase the feasibility of participating in research projects. Therefore, the experimental portion of this project was subsequently implemented within a public housing development, where a meeting facility was within walking distance to all participants. The proximity of the meeting place eliminated transportation barriers and likely reduced child care barriers since the women remained within their housing development.

Measures

Health Belief Questionnaire. This questionnaire (Appendix B), developed by Strauss, Solomon, Costanza, Worden, and Foster (1987), is designed to assess the following: baseline frequency of BSE; baseline quality of BSE; knowledge of correct BSE technique; perceived benefits of BSE; perceived barriers to BSE; perceived severity of BSE; perceived susceptibility to breast cancer; anxiety about breast cancer and performing BSE; sources of BSE information; and demographic information. This questionnaire has been employed by these researchers on several occasions and has been used with a lower education population of women.

Statistical Analyses

Descriptive analyses were conducted to characterize the sample of women recruited from Public Health Clinics on such variables as: demographics, BSE frequency, quality, and knowledge, and personal and family histories of breast problems. Stepwise multiple regressions were conducted on the clinic sample to determine predictors of reported baseline

BSE frequency and quality. Alpha levels were conservatively set at .05 for entry of a variable into the predictive equation and .10 for removal of a variable.

Comparative analyses, including analyses of variance and Pearson's Chi-Square tests for categorical variables, were performed on the clinic sample (N=42) and the Housing Development sample (N=30), with reference to: demographic variables, previous BSE screening practices (both frequency and quality), health belief variables, and knowledge of BSE. Endorsement of specific item components for BSE knowledge and quality were also examined across the clinic and housing development samples. An alpha level of .05 was used for all statistical analyses.

Experimental Study

Recruitment

In order to ascertain a sample of predominantly minority, socio-economically disadvantaged women, recruitment of participants occurred through a federally-subsidized housing development (Landsdowne Development) in Roanoke City. Restricting recruitment to this particular site provided assurance of accessibility to a nearby meeting facility. Moreover, this location provided a reasonable pool of women for recruitment who could be considered lower socioeconomic status. Landsdowne development contains 299 housing units with approximately 246 female heads of household, more than 50% of whom are non-Caucasian.

Participant recruitment was modeled after a successful strategy used in

a demographically similar, although much smaller, development, which was the site of an HIV prevention trial. Recruitment involved door-to-door contact using flyers and face-to-face communication with potential participants, either at their door or inside their homes. A slight modification to the recruitment strategy used in the HIV trial included the employment of a management-recommended internal liaison and recruiter. The African-American woman who was hired as the development contact person and recruiter was in her mid-thirties, had resided in the development for nearly 10 years, and demonstrated significant involvement in both the resident council and development-wide activities (e.g., she is the elected treasurer of resident council and has been selected as a development representative for numerous activities).

The initial phase of recruitment occurred through a two-stage process. First, throughout the entire development, an introductory flyer which briefly described the study was delivered by the resident contact to all women. The flyer highlighted the potential benefits of participating, specifically the monetary incentives (described later) and the necessary time commitment. Women were also informed that the woman coordinating the project would be back within the week to discuss the project more extensively and elicit participation. Second, women were recruited in person, door-to-door, and assessed for interest and eligibility. Informational flyers, which encouraged woman to call a toll free phone number if they were interested in participating, were left at the homes of woman who were not home during recruitment. Women who were both interested and eligible for the project first read and signed the consent form, then completed the first set of questionnaires, and were immediately compensated $5.00 cash for completing

the surveys. This procedure was specifically chosen because women were able to complete the questionnaires in the privacy of their own homes and because it was believed that compensating the women at the time of recruitment would both establish a degree of trust in the researcher as well as a sense of obligation to the project. During the recruitment process, all of the participants were explicitly informed of the complete requirements for participation in the study and were additionally provided these requirements in writing.

Although the potential pool of participants was nearly 250, many residents refused to open their doors or were not home during recruitment. However, during the recruitment process, every housing unit received a flyer and nearly every unit in the development was approached. Of the 33 women who were both home and receptive to discuss the project, 23 both met criteria and were interested in participating. Four women (12%) were ineligible to participate and six (18%) were not interested in participating. Using the door-to-door recruitment strategy within the development required, on average, approximately 45 minutes per participant.

Although not time efficient, the recruitment strategy proved somewhat effective in ascertaining a pool of participants. However, the risks associated with walking around the development and carrying cash significantly increased throughout the recruitment process as the researcher's presence became known and predictable. Therefore, an alternative recruitment strategy was developed to ascertain the remaining participants. This procedure involved the resident contact hand delivering flyers to every unit within the development and inviting woman within the development to a recruitment meeting. Existing participants were also sent a personal

letter encouraging them to recruit neighbors. The resident contact and existing participants received a monetary compensation ($5.00) per woman recruited. This recruitment process resulted in seven additional participants.

Participants

The total sample of participants for the experimental study was 30 (n=15, experimental condition; n=15, control condition). Eligibility criteria were identical to those previously stated for the comparative study, specifically: (1) no prior history of breast cancer and (2) not currently pregnant or breast-feeding.

All of the participants resided in Landsdowne development, and therefore, were within a short walking distance to the community room, which is where all project related activities were conducted.

Women were randomly assigned at the time of recruitment to either the experimental (group BSE training, prompting, self-management, and tailored, performance-contingent feedback) or control condition (written instructional materials and non-tailored performance-contingent feedback). On three distinct occasions two related or friendly women were simultaneously recruited. Therefore, these women were randomized to either the control or experimental group as a pair to avoid contamination between conditions.

Participants were predominantly African-American (n = 26; 86.7%) and ranged in age from 19 to 57 (X=35.10 years). The majority of the sample had not earned a high school diploma (n=18; 60%) and the modal educational level reported was between 10th and 11th grade. However, several participants reported receiving their high school diplomas and taking some

college courses (n=5; 16.7%). The majority of women also received Medicaid (n = 21; 70%).

Similar to the clinic sample, only three participants (10%) reported breast cancer in a first-degree relative (all mothers) and another five women (16.7%) reported a family history of breast cancer among second-degree relatives. Twelve women (40%) indicated no family history of breast cancer and the remaining ten women (33.3%) reported being uncertain as to whether breast cancer was present in their family history.

The majority of women (n=25; 83.3%) reported no personal history of breast problems; however, five women (16.7%) reported breast problems ranging from lumpy breasts (n=1) to harmless lumps that were either removed by surgery (n=2) or left untreated (n=2).

Although 30 women were recruited and assessed at baseline, two women, both of whom were randomized to the experimental condition, failed to attend any of the training sessions and, therefore, did not receive any of the instruction or necessary materials to proceed with the intervention. Thus, these participants were considered drop-outs and eliminated from all data analyses regarding outcomes; however, they were retained in baseline analyses and for the comparative analyses with the clinic sample regarding baseline data.

Procedure

After informed written consent was obtained from women who were both interested in participating and met eligibility requirements, they were instructed to complete, at home, the initial set of questionnaires, including the Health Beliefs Questionnaire, the BSE Self-Efficacy Questionnaire, and the

Multidimensional Health Locus of Control measure. The measures required approximately 15-20 minutes to complete and were self-administered, except in cases where the participant indicated she was unable to read. In such cases, the researcher orally administered all questionnaires to the women within the privacy of their homes. Each woman was immediately compensated $5.00 for completing these measures.

Following random assignment to condition, women in the control condition were mailed a packet of information regarding how to complete and return BSE records, a personal BSE calendar, a pamphlet explaining the BSE technique in detail, as well as BSE records to complete and return on a monthly basis (discussed in Measures section). Women in the experimental group were notified about an upcoming training meeting in the development's community room which was often scheduled within a week of recruitment.

The first training meeting for women in the experimental condition adhered to the standard American Cancer Society format, including:

1. an informational component which involved providing women with written information about breast cancer and breast self-exams as well as a discussion of this information, especially in regards to barriers to BSE.

2. an instructional video provided by the American Cancer Society entitled "A Special Touch." Although all three BSE search patterns (concentric circles, radial spokes, and vertical strip) were described during training, the vertical strip pattern was advocated as it has been associated with maximum coverage of the breast and axillae (Atkins, Solomon, Worden, & Foster, 1991).

3. practice of the BSE technique on a synthetic breast model, as well as

personalized feedback on performance, in an effort to increase confidence in women's ability to do BSE proficiently (Pinto & Fuqua, 1991).

4. a brief review of the essential BSE components and encouragement to contact a clinic if they felt they discovered a questionable lump or symptom of breast cancer

5. an open question and answer period to address problems/concerns discovered during BSE practice on the models.

The training meetings were conducted by the researcher who received her training and certification from the American Cancer Society.

Every woman was provided a personal calendar which included a detailed description of the BSE technique as well as supplementary information about breast cancer. In addition, women in the experimental condition received biweekly reminder prompts which encouraged BSE and focused on previously cited barriers to BSE. Every prompt had a unique message and included a peel-off BSE sticker to place on their calendars on the appropriate day of the month to perform their BSE (See Appendix C for a sample prompt).

Participants in the experimental condition were given the following instructions: "When you get your period, mark an X on that day, then count 4 - 5 days from the X (depending on the typical length of your period) and, on that day, either place the BSE sticker on your personal calendar or, if using the sticker on menstrual supplies, write in "BSE" on your calendar." The peel-off sticker on the prompt itself as well as the changing message was used to: (1) reduce the possibility of women habituating to the postcard prompt and (2) encourage self-management with their personal BSE calendars.

For both the initial training group and the booster group, women

received an initial, personalized letter from the researcher explaining the purpose of the meeting and an explanation of the benefits of attending the meeting, including the monetary incentive ($5.00). Women also received a flyer in the mail detailing the date and time of the meeting. The resident contact subsequently hand delivered a reminder flyer to each invited participant on the day prior to or the morning of the scheduled meeting. Finally, all participants with working telephones were called the day prior to the meeting, by the researcher, as a reminder to attend the meeting.

Every woman was compensated $5.00 for each meeting attended and was also eligible for a door prize given at each meeting (See Table 1 for an overview of monetary incentives).

Attendance rates for the meetings ranged from 0% attendance to 80% attendance, but averaged 31%. Occasionally, women missed meetings for valid reasons, including work or prior obligations; however, frequently women reported either forgetting about the meeting or not feeling like coming on a particular day. Therefore, women in the experimental condition were typically invited to several trainings meetings before attending. A total of seven initial training groups were held for 13 women to attend.

Six weeks following the initial training session, women in the experimental condition attended a second "booster" meeting in which the BSE technique was reviewed in detail and every woman demonstrated their preferred search pattern on the breast models. For the woman who had not yet done a BSE since the initial training meeting, barriers to BSE were discussed and strategies to reduce the barriers were provided.

Women, in both conditions, who returned their BSE records received written feedback regarding their performance. Women received feedback

even when they returned a BSE record stating that they had not performed a BSE that month; however, this only occurred once throughout the project. For woman in the control condition, the feedback was generic, non-personalized, and identical every month. However, for women in the experimental condition, the feedback following the receipt of each BSE record was both unique and personalized, taking into account their personal and familial risk factors for breast cancer as well as their previous screening habits (See Appendix D for sample feedback messages). Woman only received feedback if they returned a BSE record, and therefore, differential amounts of feedback were received among participants.

Women were instructed to return the BSE records in the self-addressed stamped envelope provided, regardless of whether they actually performed a BSE. Additionally, they were compensated for returning the records, not for performing a BSE. Thus, every participant had an equivalent opportunity to receive feedback messages as well as monetary compensation. Participants received $2.00 per BSE record returned, for a maximum of $6.00.

Three months following recruitment, for the control condition, and three months following the training session, for the experimental condition, women were invited to attend a brief meeting for post-assessment. Women were offered $5.00 compensation for attending the meeting as well as any additional money earned throughout the previous three months by returning BSE records.

Every participant was sent a personalized letter detailing the amount of money they would earn by attending the meeting and completing a brief questionnaire. Monetary incentives ranged from $5.00, for those woman who failed to return any BSE records throughout the previous three months, to

$11.00, for woman who had returned three BSE records throughout the project.

Prior to each meeting, the resident contact hand delivered a reminder flyer to each participant the day prior to or morning of the scheduled meeting and attempted to identify which women were not able to attend and the reasons preventing attendance. In addition, participants with working telephones were contacted by the researcher on the morning of the scheduled meeting as a reminder to attend. The post-measure questionnaire required approximately five minutes to complete and was self-administered except in cases where the participant was unable to read.

Attendance at the first post-assessment meeting was minimal and, therefore, a second meeting was offered. Again, attendance was sparse, despite offering the group on a Saturday to accommodate the participants working outside their homes. Alternative procedures were then developed in an attempt to obtain participant outcome data (See Table 2 for a detailed and numeric account of this process). One such procedure involved mailing the questionnaire, with a self-addressed stamped envelope to return the questionnaire, and a personalized and detailed letter explaining the monetary incentive for completing and returning the questionnaire. Another technique involved going door-to-door to each participant's home to obtain outcome data. Each of these techniques was attempted on two separate occasions, as was another group meeting. Because outcome data for six participants was still unavailable, one final attempt to obtain this data involved the Roanoke Housing Activities Coordinator going door-to-door to each of the remaining participant's homes. He personally encouraged them to complete the questionnaire, resulting in four additional post-assessments

competed.

Measures

Baseline Assessment Measures

Health Beliefs Questionnaire. This questionnaire, described above, (Appendix B) was also administered to women in the experimental study. On this scale, the perceived barriers index is comprised of three components, including: forgetting; low confidence in ability to do BSE; and exclusive reliance on medical personnel. Two of these components, specifically low confidence and reliance on medical personnel, partially overlap self-efficacy and one dimension (Powerful Others') of the locus of control construct, respectively. For this sample of women, the correlation between confidence and self-efficacy was .5242 and .2045 between reliance on medical personal and Powerful Others' Health Locus of Control. The former correlation is represents a fair degree of overlap among these constructs, while the later correlation reflects a somewhat weak association between reliance on medical personnel and Powerful Others' locus of control.

Multidimensional Health Locus of Control. In 1978, Wallston, Wallston, and DeVellis developed the Multidimensional Health Locus of Control (MHLC) scale to assess three dimensions of locus of control, including Chance, Powerful Others, and Internal. This scale is widely used and Wallston and Wallston (1981) have reported both adequate internal consistency and test-retest reliability of the MHLC scale. In addition, preliminary evidence for construct validity was reported.

The Multidimensional Health Locus of Control scale consists of 18 items self-rated on a six-point Likert scale ranging from "Strongly Disagree" to

"Strongly Agree" (See Appendix E). Each of the eighteen items loads on one of the three dimensions (six items per dimension) and responses on those items are summed to yield a total score for each dimension. Scores range from 6 to 36, with a higher number representing a stronger belief in that particular dimension.

BSE Self-Efficacy Questionnaire. Breast self-examination self-efficacy measures a women's confidence in her own ability to perform BSE correctly. A common measure of self-efficacy for BSE does not exist, however, a measure adopted from Baker (1988) was used in this study (Appendix F). This scale consisted of a list of seven items pertaining to BSE proficiency and frequency. For each item, a woman was asked to rate the strength of her expectation to perform that component on a 100-point probability scale ranging in ten point intervals from high uncertainty to complete certainty. For each item women report an inability to perform, they scored zero on that item. The items were summed and divided by seven for a total BSE self-efficacy score ranging from 0 to 100.

Post-Assessment Measures

BSE Self-Efficacy Questionnaire. The same measure described above was re-administered to women in the experimental condition following BSE training to assess the potential impact of educational training coupled with individual practice of BSE with feedback on self-efficacy.

BSE Frequency and Self-Reported Quality. Self-reported BSE frequency was measured using the following questions:

(1) Did you do a BSE this past month? Can you remember the date?

(2) If you did a BSE, how many days following your period did you do the

exam?

(3) How many times in the past three months have you done a BSE? Can you remember the dates of any of these BSEs?

Self-reported BSE quality was assessed by defining an adequate breast self-exam as consisting of the following components: (1) adequate coverage of the breast tissue and axillae, (2) consistent search pattern, (3) use of the flats of the middle three fingers, and (4) use of adequate pressure (Mayer & Solomon, 1992). These four items, along with the above questions pertaining to BSE frequency were included on a questionnaire designed for post-training data collection. Items pertaining to quality of exams were scored (one point for a correct response and zero points for an incorrect response) and summed, for a total quality index score ranging from zero to four.

BSE Records: Ongoing Measure of BSE Performance. Because retrospective self-reports of BSE frequency precludes any analysis on temporal patterns of adherence, BSE records were used in conjunction with self-reports as an ongoing indirect-behavioral measure of BSE adherence. BSE records were developed by Grady (1984) and can be described as carbonless "snap-aparts" containing a schematic drawing of the breasts (See Appendix G for a sample BSE record). Although this measure is positively correlated with verbal report, it has been shown to suggest lower rates of BSE than verbal report (Grady, Goodenow, & Borkin, 1988).

Three BSE records, with addressed, stamped envelopes, and explicit written instructions were given to women in both conditions. Women were instructed to note any suspicious findings or changes in their breasts on the BSE record, as well as the date of the exam. Participants were instructed to complete the BSE record soon after their BSE, retain one copy of the record,

and mail the other copy to the researcher. Throughout the study, only one participant indicated a suspicious finding during a BSE; however, this was reportedly examined by a health professional.

Reliability

Although the reliability of self-reports at baseline was not assessed, the reliability of self-reported BSE frequency at post-assessment was compared to the number of BSE records returned throughout the study. Among those participants responding to the post-assessment (N=23, 82%), a Pearson correlation of .405 between self-reported BSE frequency and BSE records was achieved. Because this correlation reflects insufficient congruency among these measures, all analyses were performed using both variables as a dependent measure.

Missing Data

Despite numerous and varied methods to ascertain post-assessment data on all participants, several participants remained unavailable for post-assessment (N= 5). Two women moved from the development without any indication of forwarding addresses (one experimental condition, one control condition), another woman refused to participate in post-assessment (control condition), and data on two additional women (one experimental condition, one control condition) remained unattainable despite eight separate and varied attempts to reach these women and obtain outcome data.

Interestingly, neither woman in the final category returned a single BSE record throughout the course of the study. Although this is most likely suggests that these participants failed to perform any BSEs over the duration

of the study, such a conclusion was not assumed in any of the analyses. All analyses using self-reported BSE frequency were conducted with only the available data (n=23). However, analyses for which the dependent variable was number of BSE records returned, data on all 28 participants was available.

Statistical Analyses

Independent sample t-tests were used to assess for any differences among the experimental and control conditions on demographics, health beliefs, health locus of control, and self-efficacy. Descriptive statistics are also reported for baseline BSE frequency, quality, and knowledge for both conditions. Stepwise multiple regressions were used to determine the utility of the Heath Belief Model and other potential predictors, including knowledge and education, in explaining baseline BSE frequency and quality for this population of women.

One-way and two-way analyses of variance (ANOVAs) were used to test the efficacy of the intervention (i.e. prompting, self-management, booster sessions, and tailored, performance-contingent feedback) on BSE frequency. Post-hoc comparisons were used to compare means across conditions for analyses which further delineated the experimental condition. Analyses of covariance (ANCOVA) were also used to assess treatment effects while controlling for variables highly correlated with BSE frequency, such as number of contacts.

One-way analyses of variance were also used to assess the effects of the intervention on BSE quality and knowledge. Pearson's Chi-Square analyses were used to assess for differences among the experimental and control conditions regarding the percentage of women per condition meeting criteria

for regular BSEs.

Moreover, using both self-reported BSE frequency and BSE records returned as continuous dependent measures, stepwise multiple regression was used to determine to what extent health belief variables, self-efficacy, health locus of control, demographic characteristics, and number of contacts contributed to the prediction of BSE frequency. Predictors of BSE quality and the adoption of regular BSEs at post-assessment were also examined through stepwise multiple regressions.

For all stepwise multiple regression, an alpha level of .05 was used for entering a variable and .10 was used for removing a variable from the predictive equation.

Estimated effect sizes and associated power are computed from experimental findings for the main outcome variables, including reported BSE frequency and number of BSE records returned.

Results

Clinic Sample

BSE Frequency, Quality, Knowledge

Many of the 42 women assessed (n = 35; 83.3%) reported having done a BSE at some point in their lives; however, only 31% (n = 13) of the sample can be considered performing regular BSEs, as defined by performing four or more BSEs within a six month period (See Table 3). A large percentage of the sample (40.4%) reported practicing intermittent BSEs, the health benefit of which is rather questionable.

Moreover, the quality of BSEs was rather poor with only four

participants (9.5%) reporting adequate coverage, use of the correct part of her hand, and correct pressure when doing BSE. Many women in the sample (45.7%) reported compliance with two of the three essential components for a proficient BSE (see Table 4).

Consistent with the finding indicating poor quality BSEs, general knowledge of correct BSE technique was extremely poor, with only one participant knowing all five key elements of a complete and correct BSE (See Table 5). Although most women were aware of when to begin regular BSEs and how often BSEs should be done, less than half the sample was knowledgeable on which part of the hand should be used for BSE, how much pressure to apply, or what area of the breast should be examined. Moreover, while 19% of the sample reported never having been taught how to do a BSE, 57% indicated that a physician or nurse had taught them the BSE technique. This information about BSE was either incomplete or not retained by the majority of women in this sample. Lack of knowledge into these important criteria for proficient BSE suggests the decreased health benefit of doing BSE in this population of women.

Predictors of BSE Frequency and Quality

Stepwise multiple regression analyses were performed using BSE frequency as the continuous dependent measure and perceived anxiety, perceived benefits, and BSE knowledge entered as possible predictor variables. For this sample of 42 women, the results indicated that knowledge and perceived anxiety were significant predictors, accounting for 37% of the variance in BSE frequency [$F(1,41) = 11.56$; $p = < .01$].

Knowledge entered the stepwise regression equation first, and was

positively correlated with BSE frequency implying greater knowledge of BSE technique is related to more frequent BSE. The correlation between BSE frequency and perceived anxiety was negative, indicating greater perceived anxiety with performing BSE is associated with less frequent BSE.

Regression analyses were also performed using self-reported BSE quality as the continuous dependent measure. For this analysis, only women who had reported ever doing a BSE were included (n=35). Knowledge of BSE was the only significant predictor of BSE quality, accounting for only 16% of the variance [$F(1,33) = 6.3$; $p < .05$). Although statistically significant, knowledge of BSE is clearly not sufficient, in and of itself, to achieve BSE proficiency.

Comparative Analyses

The sample of women ascertained from area Public Health Clinics is demographically dissimilar to the women recruited from the housing development (See Table 8). Specifically, the clinic sample is significantly younger than the sample of women recruited from the housing development; is largely Caucasian as opposed to African-American; has received significantly more formal education; and, using receipt of Medicaid as a collateral for income, has a significantly higher income level. Although no significant difference existed between the two groups regarding personal history of breast problems, the clinic sample reported a marginally significant greater degree of family history of breast cancer.

The clinic and housing development samples did not significantly differ on reported BSE frequency ($X_{clinic}=2.62$; $X_{housing}=2.17$; $p>.05$), quality

(X_{clinic}=1.57; $X_{housing}$=1.37; p>.05), or knowledge (X_{clinic}=2.88; $X_{housing}$=2.43; p>.05); they do significantly differ on the percent of women in each condition that has never performed a BSE (See Table 9). A Pearson's Chi-Square test revealed that significantly more women in the housing development sample had never done a BSE in the past (X^2=3.73; df=1; p <.05) as compared to the clinic sample. Moreover, using Lambda as a measure of association (p<.01) demonstrates that knowing whether a woman has ever done a BSE helps predict of which sample she is a member.

Despite the demographic differences among these two samples of women, they reported remarkably similar levels of endorsement on most Health Belief Variables (See Table 10). The two samples only significantly diverged on their perception of the benefit of BSE, with the clinic sample reporting much higher beliefs of benefit (t=6.45; df=68; p <.001) as compared to the housing development sample.

Experimental Study

Baseline Analyses

Participants

Participants in the experimental (n=15) and control conditions (n=15) did not significantly differ on any demographic variables (p >.05), including: age; race; education; or percent of women receiving Medicaid (See Table 11).

BSE Frequency

Although 19 women (63.3%) in the total sample reported having done

at least one BSE at some point in their lives, only eight women (26.7%) can be characterized as performing regular BSEs (defined as four or more BSEs in a six month period). Of the women who reported regular BSEs, 37.5% (n=3) were in the control condition and 62.5% (n=5) were in the experimental condition.

In contrast to the women within the experimental condition who reported performing regular BSEs, nearly half, 46.7%, of the experimental condition reported never having done a BSE, compared to only 27.7% of women in the control condition. Neither this difference, nor the difference between mean number of BSEs performed within the previous six months per condition (X_c=2.133; X_e=2.200), were statistically significant ($p > .05$). However, based on the frequency distributions of baseline BSE per condition (See Table 12), it appears as though there are essentially two subsets of women within the experimental condition: (1) those who perform regular BSEs and (2) those who have never done a BSE. In contrast, there appears to be more variability among BSE frequency within the control condition, such that there the same two subsets described above as well as an additional subset of women who perform BSEs intermittently.

BSE Quality

Baseline BSE quality was examined among those participants who reported doing a BSE at least once (n=19). Within the total sample, baseline BSE Quality was relatively poor (X=1.37), with only four women (21.1%) reporting use of all three quality components during BSE. Moreover, four women (21.1%) reported using none of the quality components during BSE

which raises concerns about the utility of their exams. Perhaps most importantly, only seven women (36.84%) reported adequate coverage of breast tissue during BSE which, again, significantly decreases the utility of the exam. Table 13 details the percent of women in the sample who correctly endorsed each of the essential quality components.

No significant difference was observed on baseline quality ratings between the control (X_c=1.18) and experimental (X_e=1.63) conditions (See Table 14).

BSE Knowledge

Baseline BSE knowledge was assessed for the entire sample of women, regardless of whether they had performed a BSE before. BSE knowledge at baseline was consistently poor among both the control (X_c=2.40) and experimental (X_e=2.47) conditions ($p > .05$). In addition, only 13.3% of the total sample responded correctly to all five BSE knowledge components. Table 15 details the percent of women in the sample who correctly endorsed each of the essential BSE knowledge components.

Consistent with the poor quality reported on amount of breast area covered during an exam, this was also the component on which women were least knowledgeable. Only 30% of the total sample responded correctly to this item, with the most frequent response reflecting an omission of coverage in the area where 50% of breast cancers occur, the upper axillary region.

Although three women (10%) reported never having been taught the BSE technique, many women (n=17; 56.7%) reported being taught BSE by a physician or a nurse. Consistent with the clinic sample, either the instruction

these women received was inadequate or they have forgotten certain components of BSE.

Health Belief Variables

Independent samples t-tests revealed no significant differences ($p>.05$) at baseline between the experimental and control conditions on the following variables: perceived barriers; perceived benefits; perceived severity; perceived susceptibility; or perceived anxiety (See Table 16). Women in both conditions responded similarly, endorsing a fairly high degree of perceived severity of breast cancer and perceived susceptibility for the illness. Moreover, while women in both conditions reported fairly high levels of perceived benefit of BSE, they concomitantly endorsed a significant degree of barriers to performing BSE as well as a significant amount of anxiety associated with doing BSE.

Health Locus of Control

Independent samples t-tests revealed no significant difference among the experimental and control conditions on any of the Health Locus of Control domains ($p>.05$ for all domains). Internal locus of control represented the most heavily endorsed domain for both the control ($X=25.47$) and experimental ($X=26.20$) conditions. Means, by condition, for the remaining two domains can be seen in Table 17.

Self-Efficacy

Independent samples t-test revealed a significant difference between the control and experimental conditions on reported BSE self-efficacy at

baseline (t=2.70; df=28; $p < .05$), with the control condition endorsing greater BSE self-efficacy than the experimental condition (See Table 17).

Paired samples t-tests indicated a significant improvement on BSE self-efficacy among women in the experimental condition following training (t=-5.47; df=12; $p = .000$).

Therefore, a subsequent analysis of BSE self-efficacy among the control condition at baseline (X_C=74.95) and the experimental condition post-training (X_{e2}=77.24) was performed and revealed no significant difference in self-efficacy among the two conditions ($p > .05$). A new self-efficacy variable was therefore created for use in the multiple regression analyses which consisted of baseline BSE self-efficacy for the control condition and post-training BSE self-efficacy for the experimental condition.

Predictors of BSE Frequency at Baseline

Stepwise multiple regression analyses were conducted using reported BSE frequency during the previous six months as the continuous dependent measure. Self-efficacy, BSE knowledge, education, and perceived barriers were entered into the equation as possible predictors. Education was the only significant predictor, accounting for 57.5% of the variance in BSE baseline frequency (See Table 18). The positive correlation is indicative of an association among increased education level and greater BSE reported frequency.

Predictors of BSE Quality at Baseline

Stepwise multiple regression was performed to assess predictors of

baseline BSE quality, the continuous dependent measure. Self-efficacy, education, and knowledge were entered into the equation as possible predictors. Similar to the clinic sample, knowledge emerged as the sole predictor of BSE baseline quality, accounting for 73.7% of the variance in this measure (See Table 19). Increased knowledge about the BSE technique is, therefore, highly predictive of proficient BSEs in this sample of women.

Post-Intervention Analyses

Reported BSE Frequency

Analysis of variance revealed a significant difference between the control and experimental conditions on self-reported BSE frequency (See Table 20). The experimental condition (X_e=2.82) reported significantly more BSEs as compared to the control condition (X_c=1.58). This analysis was conducted only among those participants on who outcome data was received (n=23; n=12 control, n=11 experimental).

A one-way Analysis of Variance (See Table 21) was performed to evaluate the potential effects of BSE frequency variation within the experimental group. Specifically, whether attendance at the booster session was an essential component in BSE adoption. Results of this analysis demonstrated a significant difference ($F(2,20) = 4.26$; $p < .05$) between the control and experimental groups; however, post-hoc comparisons revealed no significant difference between number of BSE reported for those participants within the experimental condition who attended the booster session versus those who did not. Table 22 reports the mean number of BSEs per condition.

A two-way Analysis of Variance (See Table 23) was performed to assess the unique and potentially interactional effects of condition and feedback. The main effect of feedback was statistically significant; however, the interaction between feedback and treatment condition was not. This finding provides evidence of the contribution of feedback, independent of treatment condition, in promoting the maintenance of BSE once it was initially tried. The mean number of reported BSEs performed by those participants receiving feedback was 2.64 (n=14), as compared to 1.44 for those participants not receiving feedback (n=9).

BSE Records Returned

Data on the number of BSE records returned per participant was available for all 28 participants who completed the study. Using this variable as a continuous dependent measure, a one way analysis of variance (See Table 24) revealed no statistically significant difference between the mean number of BSE records returned by participants in the control condition (X_c=1.07) and participants in the experimental condition (X_e=2.31); however, the trend (p=.086) was in the predicted direction with a greater mean number of records returned in the experimental group.

An Analysis of Covariance was also performed to examine the effects of treatment condition on number of BSE records returned while controlling for the effects of number of project-initiated contacts. Number of contacts was highly correlated (.7146) with number of BSE records returned. Using number of contacts as a covariate, a significant difference was found between the mean number of records returned in the control versus experimental

condition (See Table 25).

Another one-way Analysis of Variance (See Table 26) was conducted to determine whether attendance at the booster session, for those participants within the experimental condition, was an important component in BSE adoption, using number of BSE records returned as the continuous dependent measure. The ANOVA revealed a significant difference among conditions ($p < .05$). Post-hoc comparisons clarified this finding by demonstrating that the experimental group plus booster session differed from both the control condition as well as the experimental group without a booster session, although the latter two groups did not significantly differ from each other (See Table 22). Although this significant effect of the booster session was not observed when self-reported BSE frequency was used as the dependent measure, this analysis reflects the importance of attending the booster session on BSE adoption as measured by return of BSE records.

BSE Quality

BSE quality was measured at post-assessment as a self-reported index of quality, measured on a five point scale (see Measures). Only those participants who completed outcome assessments (n=23) AND reported doing a BSE at least once during the previous three months (n=18) were included in this analysis (n=7 control; n=11 experimental). An analysis of variance (See Table 27) revealed no significant difference between the experimental (X_e=3.36) and control condition (X_c=3.71) on reported BSE quality. In fact, the trend was not in the hypothesized direction, with the control condition reporting a slightly higher level of BSE quality.

Although the experimental group did not report more proficient BSEs than the control condition at post-assessment, the overall quality of BSEs for the total sample significantly increased from baseline ($t=-9.73$; $p < .01$).

BSE quality was not correlated with self-reported BSE frequency in this sample of women (.0659); however, BSE quality was more highly correlated with number of BSE records returned (.4427). This latter correlation suggests some marginal relationship among BSE quality and BSE frequency, as measured by number of BSE records returned.

BSE Knowledge

Within the total sample, mean BSE knowledge increased slightly, although not statistically significantly, from baseline ($X=2.43$) to post-assessment ($X=2.73$). In addition, there was a 17% increase in women who were knowledgeable regarding all of the essential components for a proficient BSE. Interestingly, knowledge in the control group both increased more and was greater than the experimental condition at post-assessment ($X_C=2.91$ vs. $X_e=2.55$), although not statistically significant (See Table 28). Moreover, this unexpected difference in knowledge may partially account for the slight increase on post-assessment BSE quality for the control condition, since knowledge is the primary predictor of BSE quality.

Regular BSEs

For both dependent measures, a greater percentage of women within the experimental condition performed regular BSEs. For BSE records returned, 53.8% of the experimental group compared to only 20% of the

control group were performing regular BSEs, although this difference was only marginally significant using a Chi-Square analysis (p =.06), most likely because of the small sample sizes. A similar difference, also marginally significant (p =.06) existed between the control (26.7%) and experimental conditions (61.5%) using reported BSEs as the dependent measure. Although the percentage of women meeting criteria for regular BSEs increased in both conditions using reported BSEs, the percentage increase was similar across conditions indicating similar biases in reporting across conditions.

Predictors of BSE Frequency and Quality

Stepwise multiple regressions were performed separately to examine BSE frequency using (1) self-reported BSE frequency and (2) number of BSE records returned as continuous dependent measures. Predictors of self-reported BSE quality were also examined using stepwise multiple regressions.

Self-Reported BSE Frequency. For the 23 women included in this analysis, number of project-initiated contacts and baseline BSE frequency were the largest significant predictors of reported BSE frequency at post-assessment. These two variables accounted for 46.2% of the variance in reported BSE frequency (See Table 29).

Although treatment condition is independently predictive of BSE frequency, it is also highly correlated with number of project-initiated contacts. Therefore, when both variables are entered into the predictive regression equation,treatment condition does not contribute a significant amount of unique variance in explaining BSE frequency, beyond that already accounted for by its association with number of contacts.

Both correlations were positive, indicating the greater number of

contacts and the greater number of BSEs reported at baseline are associated with greater BSE frequency.

Although self-efficacy was not a significant predictor of reported BSE frequency for the total sample, a simple regression was conducted to examine its influence within the experimental condition only. Self-efficacy, following training, constituted a significant predictor of reported BSE frequency within the experimental condition, accounting for 42.9% of the variance (See Table 30).

Number of BSE Records Returned. Data on 28 participants was available for these analyses. Number of BSE records returned was the continuous dependent measure and perceived barriers, knowledge, education, and number of contacts served as potential predictors. All variables, except education, appeared as significant predictors, accounting for 66.6% of the variance in number of BSE records returned (See Table 31). Number of contacts entered the equation first, followed by knowledge and perceived barriers. Increased number of contacts and increased knowledge are related to increased number of records returned, whereas increased perceived barriers is associated with fewer BSE records returned.

Reported BSE Quality. Only those participants who completed outcome assessments (n=23) AND reported doing a BSE at least once during the previous three months (n=18) were included in this analysis (n=7 control; n=11 experimental). Among this sample, knowledge, Chance health locus of control, and perceived benefits appear significantly predictive of BSE quality at post-assessment, accounting for 77.9% of the variance (See Table 32).

Knowledge enters the predictive equation first and, as expected, increased knowledge is related to increased quality of exam. Perceived

benefits is the second predictor entered into the equation and represents a curious relationship with BSE quality. Based on the negative correlation, it appears as though increased perceptions of the benefit of BSE is associated with poorer quality of BSE exam. Chance health locus of control is the final predictor to enter the regression equation and is also inversely related to BSE quality. An increased belief in the chance or luck aspect of health is associated with decreased quality of BSE.

Although perceived barriers is highly, negatively correlated with reported BSE quality, it did not enter the predictive equation. It appears as though this variable fails to contribute a significant amount of unique variance to the prediction of BSE quality once perceived benefits enters the predictive equation as these two independent variables are highly correlated.

Predictors of Regular BSE

Logistic regressions were performed to determine relevant predictors of regular BSEs, defined as three or more BSEs during the three month intervention. Both reported BSE frequency and number of BSE records retuned were converted to dichotomous variables based on whether the participant had or had not met criteria for regular BSEs.

Self-reported BSE Frequency. The number of project-initiated contacts was the only significant predictor of reported regular BSEs, where increased number of contacts predicted a greater likelihood of performing regular BSEs ($p < .05$).

Number of BSE Records Returned. In addition to number of project initiated contacts, experimental condition and knowledge were also found to be significant predictors of regular BSEs, using number of BSE records

returned as the dichotomous dependent variable ($p < .001$).

Estimation of Effect Sizes

Effect sizes, and corresponding power, were calculated on the major dependent variables in order to assess treatment effectiveness. The effect size for number of BSE records returned was calculated to be .507, a medium treatment effect according to Lipsey (1990). Using number of contacts as a covariate, the effect size for number of records returned was increased to .949, representing a large treatment effect. The effect size for number of BSEs reported was calculated to be 1.25, also representing a large treatment effect.

Based on these estimated effect sizes, the corresponding power for statistical analyses was adequate for reported number of BSEs (.94) and BSE records with number of contacts as a covariate (.80). However, for number of BSE records returned, power was less than desired (.40), which may account for the failure to find a significant difference among the experimental and control conditions on this dependent measure.

Discussion

Comparative Study

Consistent with previous findings reported on similar populations of women, BSE frequency, quality, and knowledge were all relatively low among this sample. Interestingly, knowledge and perceived anxiety were most predictive of BSE frequency in this sample of women. Knowledge has been found to be related to BSE frequency by several researchers (Alagna & Reddy, 1984; Champion, 1990; Howe 1981), and perceived anxiety has also been associated with BSE frequency (Hailey, Lalor, Byrne, & Starling, 1992).

Moreover, if increased anxiety associated with BSE is construed as a barrier to BSE, this finding is less equivocal and is consistent with previous findings that perceived barriers are highly predictive of BSE frequency.

In addition to its association with BSE frequency, knowledge was found to be significantly predictive of BSE quality in this sample of women, a finding which is quite robust among women of varying demographics (Alagna & Reddy, 1984; Champion, 1992; Hirst, 1986; Shepperd et al., 1990).

The comparative analyses between the clinic and housing development samples revealed some expected findings, as well as some unanticipated findings. The two samples were demographically different, particularly regarding race, age, and education. In addition, although the two samples significantly differed on percent of women receiving Medicaid, the samples did not extensively differ on income levels. In fact, it is likely that the two samples of women are of similar income, considering that women recruited from the health clinics do not have private physicians or private insurance and many of the women qualified for federally-funded assistance programs for their children. The results of the comparative analyses are perhaps more interpretable given this assumption of similar incomes among the two samples.

The two samples did not significantly differ on BSE frequency, knowledge, BSE quality, or most of the health belief variables. The only differences found among the two samples was in percent of women who had never done a BSE and perceived benefit of BSE. The housing development sample reported a larger percentage of women never doing BSE coupled with less perceived benefit of BSE. Although perceived benefit did not significantly predict BSE frequency, perhaps the perception of benefit is related

to whether women ever attempt BSE.

The lack of significant differences on the majority of health belief variables implies a strong similarity in health beliefs among lower income women of different ages, education levels and race. Shepperd et al. (1990) found women of lower education and lower income to hold significantly different beliefs than women of higher education and higher income.

Because the same measure employed by Shepperd et al. (1990) was used in this study, Table 33 reports the means on each of the health belief variables for their lower income, lower education sample; higher income, higher education sample; as well as the clinic and housing samples from this study. Based on the reported means, the three lower income samples appear more similar across all of the health belief dimensions as compared to the higher income sample, despite the racial, educational, and age differences. All three lower income samples endorsed fairly high levels of perceived severity, susceptibility, benefits, barriers, and anxiety. The higher income sample was particularly discrepant on the perceived barriers and anxiety dimensions, endorsing considerably lower levels of both.

Education is typically viewed as the primary risk variable for health behaviors. However, perhaps educational level is less significant than income level as the primary factor related to health beliefs for this particular health behavior. Women with limited incomes have decreased access to health care and health education which may account for the importance of income for the practice of BSE. This finding may have implications for interventions targeting health beliefs. Specifically, different interventions may not be necessary for women of varying ages, education, and races, if they are of similar income levels.

Experimental Study

Results of the baseline analyses confirmed previously well-documented findings that BSE frequency, quality, and knowledge are extremely poor among American women, and particularly poor among socio-economically disadvantaged women. These findings, again, speak to the necessity of breast screening interventions for lower SES women.

This intervention was a small scale efficacy trial regarding: (1) the intervention components and (2) the delivery site and modality. Therefore, definitive conclusions regarding effectiveness and generality can not be offered from the results of this study; however, some promising findings warranting further investigation were observed. Specifically, BSE frequency appeared to substantially increase among the experimental condition. The combined influence of BSE training, prompting, self-management, personalized feedback, and supplementary training had a significant positive influence on the adoption of BSE.

Although the individual components of the intervention can not be fully examined, the receipt of feedback was observed to have a significant, independent effect on BSE frequency. While Skinner, Strecher, and Hospers (1994) found tailored messages to be more effective than generic messages, in the present study, both tailored and generic feedback messages appeared to have a significant effect on BSE frequency. Perhaps the feedback messages in this intervention were not individually tailored to the greatest possible extent. For example, the feedback messages provided to participants did not integrate previous screening practices with reported risk factors and generate specific suggestions. This was not done because it was anticipated that

women would return several BSE records throughout the study and, therefore, require several feedback messages. Therefore, it was not possible to provide all of the information regarding risk factors and screening behaviors within a single message without being repetitive. Rather, in order to have enough information to uniquely personalize each feedback message, women received pieces of information on each feedback message. This may have diluted the effect of any single feedback message.

Attendance at the booster session was also found to have a positive effect on BSE frequency, as measured by number of BSE records returned. Although retraining intervals were not varied in this study, supplementary training with the booster appeared to be an important component in BSE adoption, when coupled with the other facets of the intervention.

The effects of prompting and self-management cannot be independently assessed within the project's design. However, all of the women in the experimental sample reported reading every prompt and most of the women reported finding these helpful. Nearly all of the women within the experimental condition also reported using their personal BSE calendar and reportedly found that to be the most helpful cue to action, when coupled with the peel-off sticker on the prompt.

In contrast to these encouraging results, BSE proficiency remained less than ideal and must be taken into account when considering the health benefits of this intervention. Frequency without proficiency may not reduce risk any more than not doing BSEs, particularly if one of the areas a women is non-proficient is in reference to the area of breast tissue covered. In addition, women performing frequent but non-proficient BSEs may develop a false sense of security by doing incorrect exams which may fail to detect potential

breast abnormalities.

Although quality was increased from baseline, BSEs must contain all of the essential components in order to be considered proficient and, therefore, related to the health benefits of early detection of breast cancer and increased survival. This intervention did not place a significant emphasis on BSE quality; however, several researchers have offered suggestions regarding the necessary components of interventions to achieve increased levels of proficiency. Such suggestions include having women practice the BSE technique on themselves, in addition to the breast model, one-on-one BSE training with a health professional, and significant follow-up meetings to re-assess proficiency and re-train when necessary (Jacob et al., 1992; Pinto, 1993). Other researchers have examined the effectiveness of instructional audiotapes provided to participants following BSE training and reported significantly better proficiency among tape listeners at six month post-assessment, as compared to women who were trained in BSE but received no additional follow-up (Jones et al., 1993). Despite these encouraging findings, other empirical evidence sheds some doubt on the suggestions offered above. For example, Alcoe, Gibley, and McDermot (1994) found women assigned to a training condition which required BSE practice on their own breasts were less likely to complete training as compared to women trained on the breast models only. Thus, these strategies should be independently addressed with women of varying demographics because these strategies may be differentially accepted among different populations of women. In sum, the findings from this project provide evidence that quality must be addressed independently and extensively in any BSE intervention because, although frequency is necessary, it is not sufficient to achieve the potential health benefits associated

with the adoption of BSE.

Stepwise regression analyses on predictors of BSE frequency revealed some unexpected findings. Specifically, perceived barriers, which has often been reported to be the most predictive variable of BSE frequency, did not enter the predictive equation for self-reported BSE frequency. The small size of the sample and demographic differences from samples in other studies may explain these results.

The number of project-initiated contacts, or cues to action as labeled by the Health Belief Model, entered the predictive equation for reported BSE frequency first, followed by baseline BSE frequency. In several prospective studies, baseline BSE has been documented as a significant predictor of BSE frequency (Calnan, 1985; Calnan & Moss, 1984; Champion, 1990; Champion & Miller, 1992). In contrast, using number of BSE records returned as the dependent measure of BSE frequency, perceived barriers entered the predictive equation third, behind number of contacts and knowledge. Thus, in this sample of women, cues to action appeared most significantly and consistently related to BSE frequency. This variable has not been included as a possible predictor in many studies published to date, and therefore, has not been reported to be highly related to BSE frequency. However, the few intervention studies which have incorporated a cues to action component have consistently found increased frequency among these conditions (Craun & Deffenbacher, 1987; Grady, 1984; Mayer & Frederiksen, 1986; Mayer et al., 1987).

As expected, and consistent with numerous reported findings, knowledge represented the strongest predictor of BSE quality. However, several additional variables were significantly predictive of BSE quality as

well, including: perceived benefits and chance health locus of control. These later findings are somewhat inconsistent with reported findings as these variables appear to be related to BSE frequency, more so than quality. However, Alagna and Reddy (1994) also reported chance health locus of control to be a significant predictor of BSE proficiency. While the inverse relationship between quality and chance health locus of control is understandable, the inverse relationship noted between perceived benefits and BSE quality is unexpected. The slight negative correlation between perceived benefits and BSE knowledge, which is highly predictive of BSE quality, may partially account for this observed inverse relationship.

The marginally significant correlation among BSE quality and number of BSE records returned is consistent with findings from several researchers (Alagna & Reddy, 1984; Baines, Wall, Risch, Kuin, & Fan, 1985; Celentano & Holtzman, 1983). This finding demonstrates the relationship among practicing BSE and maintaining a reasonable level of quality in BSE.

If the potential health benefits of BSE are to be realized, BSE must be adopted both regularly and proficiently. Although proficiency was not greatly affected by this intervention, a subsample of participants did achieve regular BSEs. Based on the logistic regressions conducted, the number of project-initiated contacts appeared to be a significant predictor of regular BSEs. Thus, in order to maintain BSE once the behavior has been initiated, continuous contacts appear to be necessary. Sheley and Lessan (1986) also concluded that intense training, persistent reinstruction, and continual contacts with women were necessary to promote BSE in a Latin American population. The duration, frequency, and content of contacts necessary to achieve a regular BSEs should be experimentally examined in future studies.

The necessity for continued contacts highlights some of the unique factors of this health behavior. Specifically, BSE is a very private and personal behavior, virtually no reward is obtained from performing this health behavior, and it is performed so intermittently that it can not be incorporated into a daily or even a weekly routine. Thus, this health behavior may, in fact, require a different theoretical framework or perhaps the integration of several theoretical models for appropriate conceptualization, as suggested by Curry (1994). Moreover, interventions targeting BSE may be best if derived from an amalgamation of theoretical models coupled with a functional analysis of the behavior. Although numerous determinant studies have been conducted to examine predictors of BSE, perhaps smaller or single subject studies with women who routinely practice BSE are necessary to identify specific motivators for BSE. These could then be incorporated into and experimentally examined in future interventions with women who don't practice BSE. In addition, assessing women prior to training may provide information regarding specific, individual beliefs or barriers to BSE which could be targeted in training, particularly if training was, in part, one-on-one with a health professional, as suggested by Jacob et al. (1992). Champion and Scott (1993) highlighted the necessity of targeting beliefs during instructional training to achieve increased levels of BSE adoption. Specifically, future research efforts should be directed toward developing a partially theoretically based and largely practically based intervention, with the necessary components to achieve regular, proficient BSEs in a multitude of populations.

Process/Implementation Comments

The recruitment process, and particularly maintaining participation during the study, was extremely labor and time-intensive, suggesting alternative strategies for future implementation. Landsdowne development was chosen for several reasons unrelated to implementation feasibility; however, such factors are essential to consider when delivering an intervention, According to the housing development management, a general state of apathy regarding program offerings exists within the development. Reportedly, low levels of participation in all development-offered activities, such as job-training and GED courses, is a continual source of frustration among the housing development managers.

Implementing interventions within housing developments does eliminate a substantial number of barriers (e.g., logistical problems) which prevent many lower income women from participating in such projects. However, developments must be pre-screened for implementation feasibility in order to avoid pitfalls. Landsdowne development proved to be a less than ideal setting for implementing this intervention. For example, the size of the development precluded the recruitment process, which was highly effective in the HIV prevention project, from achieving the same degree of success. Moreover, the safety and social climate of Landsdowne differed substantially from other subsidized housing development in Roanoke which have been the setting for successful HIV prevention interventions. Thus, certain factors appear essential to consider when examining a development as a potential intervention delivery site. These characteristics may reasonably include, size, safety, meeting facilities, social climate (e.g., attendance at various scheduled activities currently offered within the development), and resident turn-over rates (i.e., typical length of residence).

There were several participants who were highly motivated to participate and required very little prompting or contacts to attend meetings. These women varied in age; however, all appeared to be uniquely motivated by some factor. For example, for one woman, the company of other women from the development appeared to motivate her to attend meetings, whereas the monetary incentive was a primary motivator for another woman. A rather extensive family history of breast cancer and a strong belief in the benefit of BSE appeared to be a motivator for another participant. Perhaps future studies, with larger sample sizes and distinct subsets of women, can characterize the type of participant who is most likely to remain in the project, attend all required meetings, and require little follow-up to do so.

Moreover, additional information is necessary so that interventions can be increasingly tailored and marketed towards different subsets of women based on different motivating factors and other relevant variables. For example, Jacob, Penn, Kulik, and Spieth (1992) randomized African-American women based on their cognitive style (blunters vs. monitors) and assessed the differential effectiveness of a BSE maintenance intervention on women with different cognitive styles. Results indicated that women with different cognitive styles responded significantly differently to the intervention components, suggesting the utility of tailoring BSE maintenance strategies to women. Another potentailly important variable to consider in tailoring interventions to women is stage of change. For example, women at different stages of adopting this behavior may require different interventions or different dosages of similar interventions to achieve a reasonable dgree of BSE frequency and proficiency.

Study Limitations

A clear limitation of this project was the small sample size. Attrition of participants throughout the project further decreased the total sample from 30 women to 23 women at post-assessment. The loss of seven (23%) participants was significant considering the initial sample size. Power was limited on several analyses, as was the possible number of predictor variables entered into the reported regression equations. Fortunately, the large effect sizes found on a few of the outcome variables allowed for sufficient power on some analyses.

Another limitation of this study was the integrity with which each intervention component was implemented. Although the prompts and feedback were implemented in a consistent and timely manner, other aspects of the intervention were not implemented with 100% integrity. For example, only slightly more than 50% of women assigned to the experimental condition attended a booster session, despite numerous meeting offerings. Moreover, the outcome data were not collected in a uniform manner, as some women completed the assessment in a group and others completed the questionnaire within their own homes. The extent to which variation in procedures confounded self-reports is unclear.

Perhaps one of the largest limitations of this study was that the validity and reliability of self-reported BSE frequency and quality was not verifiable, as was the reliability of BSE quality at post-assessment. Moreover, the lack of congruency between number of BSE records returned and reported BSE frequency causes some concern regarding the reliability of the remaining self-report data. There is no reason to suspect that biases related to self-report would differ across conditions, unless increased contact with the

experimental condition produced a greater demand characteristic. However, the possibility of this occurring was minimal considering the incentive was related to obtaining data, not adopting the behavior. In addition, although the number of reported BSEs was greater than the number of BSE records returned in both conditions, a similar degree of increase occurred within both conditions suggesting that no differential bias was operating within the experimental condition.

Future Directions

Because this was an efficacy trial, this intervention must be tested on a larger sample of women and with greater integrity to fully explore the potential benefits of the intervention on BSE frequency and quality. Moreover, the specific components of the intervention may be further analyzed. Specifically, the booster session and tailored feedback may both be essential intervention components. However, in an attempt to determine the most cost-effective intervention for this population of women, it is necessary to explore whether one or the other is sufficient to achieve an acceptable level of BSE adoption and proficiency.

Furthermore, BSE quality should be assessed with an observation-based measure whereby women perform a BSE on a breast model and are evaluated based on the number of essential quality components included in their exam. This would allow for a reliability check on women's self-reported BSE quality as well as a more objective assessment of BSE proficiency.

Further research is also necessary to determine components of an intervention necessary to achieve a high level of proficiency in BSE. Although knowledge is consistently found to be predictive of BSE quality, as

it was in this population of socio-economically disadvantaged women, knowledge alone appears insufficient to achieve the necessary level of BSE proficiency required for health benefits. Jacob et al., (1992) suggest that women practice BSE on their own breasts during training as well as have a health professional perform a clinical breast exam. Although this is a costly and time consuming procedure, Jacob et al. (1992) obtained a reasonable level of BSE proficiency among young, African-American, upper SES women using this process. Thus, this procedure warrants further investigation with different populations of women.

Despite documented evidence that regular, proficient BSE can lead to early detection and, therefore, increased survival from breast cancer, future interventions must also promote mammography and clinical exams in this population of women. Incidence rates for breast cancer among women under 40 are highest for African-American women. The most precise method of early detection is mammography. Unfortunately, this technique is not considered cost-effective for decreasing breast cancer mortality among women under 50 years of age due to the decreased base rate of breast cancer in younger women and increased percentage of false positives (Kerlikowske, Grady, Rubin, Sandrock, & Ernster, 1995). Therefore, among population of women for whom mammography is not available or applicable, clinical exams should receive greater research attention (Foster, Worden, Costanza, & Solomon, 1992).

Implementation of interventions within housing developments represents another fertile area of research. Extensive needs assessment and elicitation research must first be addressed in any potential intervention site so that the intervention can be properly tailored and marketed. For example,

the format and content of the optimal training program acceptable for a particular clientele must be explored.

In addition, determination of the necessary characteristics for developments to possess in order for recruitment and implementation to have a reasonable chance for success is imperative. Elucidation of these characteristics may allow for numerous interventions to be implemented and evaluated on a population that is often underserved in the research community and undeniably in need of a variety of health promotion interventions.

Overall, the results of this study highlighted three critical issues which need to be considered for future research. First, access issues appear central to the success of even the best conceptualized intervention. Focus groups and elicitation research may be beneficial before entering a site to determine an acceptable and efficient recruitment procedure as well as to elicit opinions on how to specifically tailor and market the planned intervention to the targeted population. Underserved women must also have access to a nearby meeting facility. Second, training issues, including both frequency and proficiency training must be explicitly considered. It appears that different intervention techniques may be required to concomitantly achieve both frequent and proficient BSEs. Future intervention should include components necessary to achieve both. Finally, continuity of contact repeatedly appeared as a significant variable in this study. Project-initiated follow-up contact with participants after training appears essential for the behavior and to prevent attrition. Continued contact with participants could potentially occur through a variety of means, depending on the targeted population. These three elements must each be considered and achieved in future interventions

in order for the health benefits of BSE to be realized.

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Table 1

Monetary Incentives

	EXPERIMENTAL GROUP	CONTROL GROUP
1. Initial Questionnaires at Recruitment	1. $5.00	1. $5.00
2. Group Meeting (Exp. only)	2. $5.00 Chance for door prize	2. ------
3. 1 Month BSE Record	3. $2.00	3. $2.00
4. Booster Group (Exp. only)	4. $5.00 Chance for door prize	4. ------
5. 2 Month BSE Record	5. $2.00	5. $2.00
6. 3 Month BSE Record	6. $2.00	6. $2.00
7. 3 month Data Collection	7. $5.00	7. $5.00
	TOTAL: $26.00	TOTAL: $16.00

Table 2

Process of Obtaining Outcome Data

Activity	Number Targeted	Number of Questionnaires Obtained	Percent
Meeting	11	2	18%
First Mail-Out	9	2	22%
Meeting	11	0	0%
Meeting	24	7	29%
First Door-to-Door	17	5	29%
Second Mail-Out	12	2	17%
Second Door-to-Door	10	1	10%
Resident Manager	6	4	66%

Note. Because the intervention was conducted in waves, not all 28 participants were eligible for three month post-assessment at the same time

Table 3

Baseline BSE Frequency in Previous Six Months among Clinic Sample (n=42)

Frequency	n	Percent
Four or more BSEs	13	31%
One, Two, or Three BSEs	17	40.4%
No BSEs	5	11.9%
Never BSE	7	16.7%

Table 4

Baseline BSE Quality for Women reporting Ever Doing BSE among Clinic Sample (n=35)

Quality Item	n	Percent
Correct Area Coverage	13	37.1%
Correct Pressure	21	60.0%
Correct Part of Hand	21	60.0%
One Quality Component	11	31.4%
Two Quality Components	16	45.7%
All Three Quality Components	4	11.4%
No Quality Components	4	11.4%

Table 5

Baseline BSE Knowledge among Clinic Sample (n-42)
Number and Percents Endorsing Items Correctly

Knowledge Item	n	Percent
Recommended Age to Begin BSE	38	90.5
Recommended Part of Hand to Use	18	42.9
Recommended Frequency of BSE	28	66.7
Recommended Pressure During BSE	18	42.9
Recommended Area to Cover in BSE	19	45.2
All Five Components of Proficient BSE	1	2.4

Table 6

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Frequency in Clinic Sample (n=42)

Variable	B	SE B	*B*
Step 1			
Knowledge***	1.205	.3206	.5109
Step 2			
Perceived Anxiety*	- .6374	.2426	- .3623

Note. R^2 = .2610 for Step 1. ΔR^2 =.1111 for Step 2.

* $p < .05$

*** $p < .01$

Table 7

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Quality in Clinic Sample (n=35)

Variable	B	SE B	*B*
Step 1			
Knowledge	.3633	.1446	.4007 *

Note. $R^2 = .16$ for Step 1

* $p < .05$

Table 8

Means (Standard Deviations) for Demographic Characterisitcs

Characteristic	Clinic Sample (n=42)	Housing Sample (n=30)
Age ***	24.93 (6.395)	35.10 (11.2)
Education *** (% High School Grad)	64.3%	40.0%
Race *** (% Caucasian)	83.3%	13.3%
Medicaid * [a]	.48	.70
Personal History of Breast Problems [a]	.238	.167
Family History of Breast Cancer * [a]	.476	.267

[a] Scored 0=no, 1=yes; percentages indicate percent reporting yes to item

* $p < .10$

** $p < .05$

*** $p < .01$

Table 9

Means (Standard Deviations) of BSE Frequency, Quality, Knowledge for Clinic and Housing Development Samples

Characteristic	Clinic Sample (n=42)	Housing Sample (n=30)
Ever BSE * [a]	.83	.63
BSE Frequency	2.62 (2.4)	2.17 (2.8)
BSE Quality	1.57 (.850)	1.37 (1.07)
BSE Knowledge	2.88 (1.01)	2.43 (1.50)

* $p = .05$

[a] Scored 0=no, 1=yes; percentages indicate percent reporting yes to item

Table 10

Means (Standard Deviations) of Health Belief Variables for Clinic and Housing Development Samples

Characteristic	Clinic Sample (n=42)	Housing Sample (n=30)
Perceived Anxiety	2.77 (.813)	2.85 (.852)
Perceived Severity	2.61 (.579)	2.61 (.638)
Perceived Susceptibility	2.94 (.579)	2.97 (.645)
Perceived Benefits ***	3.50 (.437)	2.84 (.368)
Perceived Barriers	2.83 (.535)	2.81 (.895)

*** $p < .01$

Note. Higher number equal greater endorsement of items on that domain.

Table 11

Demographic Variables for Housing Development Sample

Characteristic	Total Sample (n=30)	Control (n=15)	Experimental (n=15)
Age (Mean)	35.10	33.29	36.80
Race (% Africain-American)	86.7%	80.0%	93.3%
Education (% High School Grad)	40.0%	46.7%	33.3%
Medicaid (% receiving)	70.0%	66.7%	73.3%

No significant differences at $p < .05$

Table 12

Baseline BSE Frequency in Previous Six Months among Housing Development Sample

BSE Frequency	Housing Sample (n=30)		Control Group (n=15)		Experimental Group (n=15)	
	n	%	n	%	n	%
Four or more BSEs	8	(26.7%)	3	(20.0%)	5	(33.3%)
One, Two, or Three BSEs	8	(26.7%)	6	(40.0%)	2	(13.3%)
No BSEs	3	(10%)	2	(13.3%)	1	(6.67%)
Never BSE	11	(36.7%)	4	(27.7%)	7	(46.7%)

Table 13

Baseline BSE Quality for Women reporting Ever Doing BSE among Housing Development Sample (n=19)

Quality Item	n	Percent
Correct Area Coverage	7	36.8%
Correct Pressure	9	47.4%
Correct Part of Hand	10	52.6%
One Quality Component	8	42.1%
Two Quality Components	3	15.8%
All Three Quality Components	4	21.1%
No Quality Components	4	21.1%

Table 14

Means (Standard Deviations) of Baseline Knowledge, Frequency and Quality for Experimental and Control Conditions

Characteristic	Control (n=15)	Experimental (n=15)
Knowledge	2.40 (1.59)	2.47 (1.46)
Baseline BSE Frequency	2.13 (2.59)	2.20 (3.03)
Baseline BSE Quality	1.18 (1.08)	1.63 (1.06)

$p > .05$

Table 15

Baseline BSE Knowledge among Housing Development Sample (n=30)
Number and Percents Endorsing Items Correctly

Knowledge Item	n	Percent
Recommended Age to Begin BSE	24	80.0
Recommended Part of Hand to Use	13	43.3
Recommended Frequency of BSE	13	43.3
Recommended Pressure During BSE	14	46.7
Recommended Area to Cover in BSE	9	30.0
All Five Components of Proficient BSE	4	13.3

Table 16

Means (Standard Deviations) of Health Belief Variables for Experimental and Control Conditions

Characteristic	Control (n=15)	Experimental (n=15)
Perceived Anxiety	2.73 (.863)	2.97 (.855)
Perceived Severity	2.69 (.729)	2.53 (.546)
Perceived Susceptibility	3.07 (.594)	2.87 (.669)
Perceived Benefits	2.79 (.374)	2.89 (.371)
Perceived Barriers	2.64 (.882)	2.98 (.910)

$p > .05$

Table 17

Means (Standard Deviations) of Self-Efficacy and Health Locus of Control Variables for Experimental and Control Conditions at Baseline

Characteristic	Control (n=15)	Experimental (n=15)
Self-Efficacy *	74.95 (22.27)	49.80 (28.34)
Powerful Others'	21.47 (4.99)	22.07 (7.62)
Internal	25.47 (5.39)	26.20 (6.21)
Chance	20.53 (5.51)	21.53 (6.37)

* $p < .05$

Table 18

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Frequency in Housing Development Sample at Baseline (n=30)

Variable	B	SE B	*B*
Step 1			
Education*	1.595	.4336	.7584

Note. $R^2 = .575$ for Step 1

* $p < .05$

Table 19

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Quality in Housing Development Sample at Baseline (n=30)

Variable	B	SE B	*B*
Step 1			
Knowledge*	.6383	.1707	.8582

Note. R^2 = .7365 for Step 1

* $p < .05$

Table 20

Analysis of Variance for Housing Sample: Number of BSE Reported by Condition

Source	df	MS	F
Between Groups	1	8.75	8.94***
Within Groups	21	.98	
Total	22		

*** $p < .01$

Table 21

Analysis of Variance for Housing Sample: Number of BSE Reported by Condition

Source	df	MS	F
Between Groups	2	4.38	4.26*
Within Groups	20	1.03	
Total	22		

* $p < .05$

Table 22

Mean BSEs (Standard Deviation) at Three Month Follow-Up

Dependent Variable	Control Group n=12	Experimental Attended Booster n=6	Experimental Did Not Attend Booster n=5
BSEs Reported	1.58[a] (1.24)	2.83[b] (.408)	2.80[b] (.837)
BSE Records Returned	1.07[c] (1.67)	3.50[d] (1.87)	1.29[c] (1.60)

Note. Different superscripts denotes significant differences ($p < .05$) among mean values.

Table 23

Two-Way Analysis of Variance for Housing Sample: Number of BSEs Reported by Condition and Feedback

Source	df	MS	F
Main Effects			
Feedback	1	3.69	5.11*
Condition	1	7.13	9.88***
Interaction Effects			
Feedback x Condition	1	2.11	2.92
Residual (Within)	19	.721	
Total	22	1.33	

* $p < .05$

*** $p < .01$

Table 24

Analysis of Variance for Housing Sample: Number of BSE Records Returned by Condition

Source	df	MS	F
Between Groups	1	10.73	3.18
Within Groups	26	3.37	
Total	27		

$p > .05$

Table 25

Analysis of Covariance for Housing Sample: Number of BSE Records Received with Number of Contacts as Covariate

Source	df	MS	F
Main Effects			
Condition	1	45.96	520.8***
Covariate			
Contacts	1	85.50	968.9***
Residual (Within)	25	.088	
Total	27	3.65	

*** $p < .01$

Table 26

Analysis of Variance for Housing Sample: Number of BSE Records Returned by Condition

Source	df	MS	F
Between Groups	2	13.28	4.62*
Within Groups	25	2.87	
Total	27		

* $p < .05$

Table 27

Analysis of Variance for Housing Sample: Quality of BSE by Condition

Source	df	MS	F
Between Groups	1	.526	.468
Within Groups	16	1.123	
Total	17		

$p > .05$

Table 28

Analysis of Variance on BSE Knowledge at Post-Assessment per Condition

Source	df	MS	F
Between Groups	1	.7273	.4598
Within Groups	20	1.5818	
Total	21		

$p > .05$

Table 29

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Frequency in Housing Sample (n=23)

Variable	B	SE B	*B*
Step 1			
Number of Contacts***	.1509	.0455	.5858
Step 2			
Baseline BSE*	.1368	.0650	.3490

Note. $R^2 = .343$ for Step 1. $\Delta R^2 = .119$

* $p < .05$

*** $p < .01$

Table 30

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Frequency in Experiemntal Condition of Housing Sample (n=13)

Variable	B	SE B	*B*
Step 1			
Self-Efficacy*	.0137	.0052	.6553

Note. $R^2 = .429$

* $p < .05$

Table 31

Summary of Stepwise Regression Analysis for Variables Predicting Number of BSE Records Returned in Housing Sample (n=28)

Variable	B	SE B	*B*
Step 1			
Number of Contacts***	.3041	.0062	.6842
Step 2			
Knowledge***	.4658	.1731	.3752
Step 3			
Perceived Barriers*	- .5809	.2684	- .2745

Note. $R^2 = .4681$ for Step 1. $\Delta R^2 = .1257$ for step 2. $\Delta R^2 = .0710$ for step 3.

* $p < .05$

*** $p < .01$

Table 32

Summary of Stepwise Regression Analysis for Variables Predicting Reported BSE Quality in Housing Sample (n=23)

Variable	B	SE B	*B*
Step 1			
Perceived Barriers***	- .6637	.2029	- .6582
Step 2			
Knowledge*	.2979	.1372	.4219
Step 3			
Perceived Benefit*	- .9836	.4387	- .4141
Step 4			
Perceived Barriers Removed			
Step 5			
Chance Health Locus of Control*	- .0506	.0205	- .3457

Note. $R^2 = .4332$ for Step 1. $\Delta R^2 = .1509$ for step 2. $\Delta R^2 = .1228$ for step 3. $\Delta R^2 = -.0393$ for step 4. $\Delta R^2 = .1117$ for step 5.

* $p < .05$

*** $p < .01$

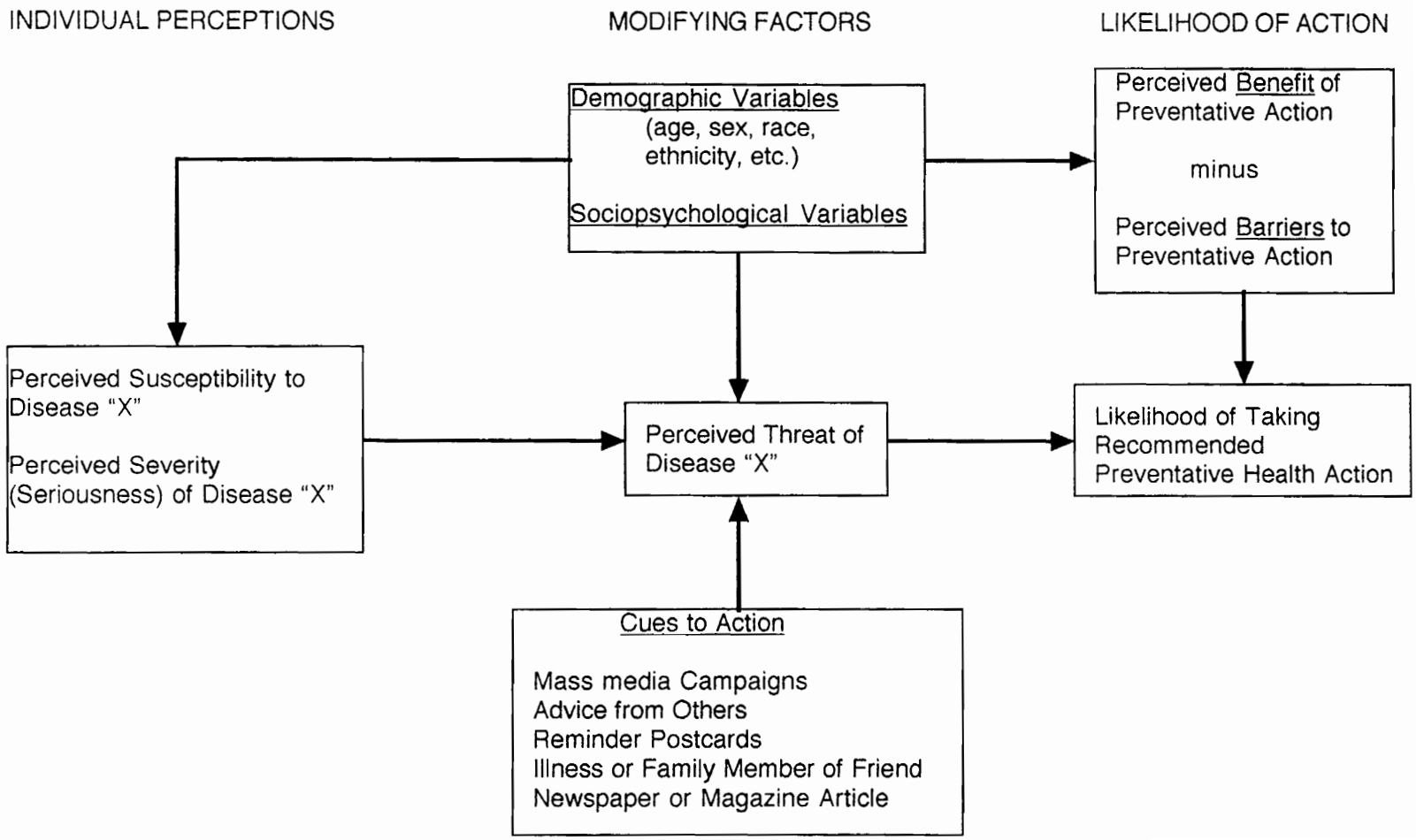
Table 33

Means Comparisons of Shepperd et al. (1990) Samples and the Clinic and Housing Samples on Health Belief Variables

Variable	Shepperd et al. (1990)		Russ (1995)	
	Low Income Low Education	High Income High Education	Clinic Sample	Housing Sample
Age	26.9	32.8	24.9	35.1
Severity	2.63	2.22	2.61	2.61
Susceptibility	2.87	2.82	2.94	2.97
Benefits	3.67	3.68	3.50	2.84
Barriers	2.74	2.22	2.83	2.81
Anxiety	2.94	2.48	2.77	2.85

Note. Higher number reflects a higher degree of endorsement on that variable

Appendix A
Health Belief Model


INDIVIDUAL PERCEPTIONS
MODIFYING FACTORS
LIKELIHOOD OF ACTION
Demographic Variables
(age, sex, race, ethnicity, etc.)
Sociopsychological Variables
Perceived Benefit of Preventative Action
minus
Perceived Barriers to Preventative Action
Perceived Susceptibility to Disease "X"
Perceived Severity (Seriousness) of Disease "X"
Perceived Threat of Disease "X"
Likelihood of Taking Recommended Preventative Health Action
Cues to Action
Mass media Campaigns
Advice from Others
Reminder Postcards
Illness or Family Member of Friend
Newspaper or Magazine Article

Appendix B
Components of the Health Belief Model Questionnaire

Questionnaire assessing dimensions of the Health Belief Model, developed by Strauss, Solomon, Costanza, Worden, and Foster (1987).

FREQUENCY OF BSE: Assessed by the number of times women have performed BSE in the past 6 months; women reporting four or more BSEs in past six months are considered regular performers

QUALITY OF BSE: Answered by women who report having ever done a BSE; quality is addressed by three questions pertaining to breast coverage, part of the hand used, and pressure during palpation; each correct answer receives one point and scores are summed to form a quality index ranging from 0 to 3.

KNOWLEDGE OF CORRECT BSE TECHNIQUE: Questions assessing knowledge are similar to quality questions and are scored similarly, resulting in a knowledge index ranging from 0 to 5.

ATTITUDES: Perceived severity of breast cancer, perceived susceptibility of breast cancer, and perceived benefits of BSE are each assessed by three statements; participants indicate their agreement with each statement on a 4-point Likert scale, ranging from 1 to 4; a mean score is obtained for each attitudinal variable, with a lager score indicating greater endorsement of the belief.

BARRIERS TO BSE: Three barriers, including low confidence, exclusive reliance on medical personnel, and forgetting are included; each statement is rated on a 4-point Likert scale, ranging from 1 to 4, with higher scores indicating greater endorsement of that particular barrier; a mean scored is also obtained across all three barriers as a collective barriers index.

ANXIETY: Two statements, each rated on a 4-point Likert scale, assess anxiety about BSE; a mean score, ranging from 1 to 4, is obtained with a higher score indicating a greater degree of anxiety.

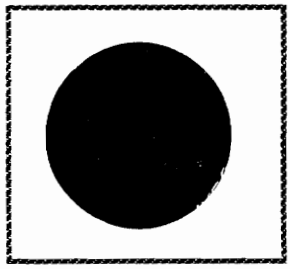
DEMOGRAPHICS: Age, education, personal history of breast cancer, history of harmless breast problems, and history of fibrocystic breasts are included.

Appendix C
Sample Prompt

For Women Only ...

*If you've already done your BSE this month, congratulations and keep it up! If not, remember that doing regular BSEs is an excellent way to find lumps early, **before** they have spread to other areas of the body - And, its **free** and takes **5 minutes** once a month. **Every woman** needs to find the time to protect herself from breast cancer!*

As a reminder, place this sticker on your calender the day your exam should be done. Also remember to fill out and send me a copy of the BSE record in the stamped envelope provided to you, even if you don't do a BSE this month.



Appendix D
Sample Feedback Messages

CONTROL CONDITION

For Women Only...

Dear Participant,

Thank you for returning the BSE record. It is important that you continue to do a BSE once a month. And remember to keep returning your BSE records ... you earn money each month you return one.

EXPERIMENTAL CONDITION

For Women Only...

Dear Cynthia,

Congratulations on doing a BSE in March. Because there is a history of breast cancer in your family, it is so important that you continue to do BSE every month ... and you're off to a great start - Keep up the good work!!!!

And keep returning your BSE records, you earn money each month you return one.

Appendix E
Multidimensional Health Locus of Control Measure

CODE # _____

MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL

DIRECTIONS: This questionnaire has to do with beliefs that people have about their health. In the questionnaire are series of statements followed by a six-point rating scale. Next to each statement, circle the number that most closely agrees with your beliefs. The higher the number, the more you agree with the statement. Please answer every item and do not spend too much time thinking about any one. Since this is a measure of your beliefs about health, there are no right or wrong answers.

	Strongly Disagree					**Strongly Agree**
1. If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3. Having regular contact with my physician. is the best way for me to avoid illness.	1	2	3	4	5	6
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5. Whenever I don't feel well, I should contact a medically trained professional.	1	2	3	4	5	6
6. I am in control of my own health.	1	2	3	4	5	6
7. My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8. When I get sick I am to blame.	1	2	3	4	5	6
9. Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10. Health professional control my health.	1	2	3	4	5	6

CODE # _____

	Strongly Disagree					Strongly Agree
11. My good health is largely a matter of good fortune.	1	2	3	4	5	6
12. The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6
15. No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16. If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17. If I take the right actions, I stay healthy.	1	2	3	4	5	6
18. Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

Appendix F
Self-Efficacy Measure

CODE # _____

BSE SELF-EFFICACY

USING THE SCALE BELOW, PLEASE RATE HOW SURE YOU ARE THAT YOU CAN PERFORM EACH OF THE FOLLOWING PROCEDURES RELATING TO BREAST SELF-EXAMINATION.

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all				Moderately certain I can do					Certain I can do	

	0 - 100
1. Looking for breast changes in the mirror	_____
2. Feeling for lumps in each breast and underarm while standing up	_____
3. Feeling for lumps while lying down	_____
4. Being able to find an unusual walnut-sized lump in my breast if one were there	_____
5. Being able to find an unusual pea-sized lump in my breast if one were there	_____
6. Remembering to examine my breast for changes each month	_____
7. Being able to perform a correct and complete breast self-examination each month	_____

Appendix G
Sample BSE Record

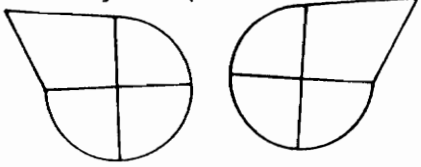
MONTH: (circle)

JAN FEB MAR APR
MAY JUN JUL AUG
SEP OCT NOV DEC

NAME:_____

DATE DID BSE:_____

Mark Any Lumps Found:



Right Left

Has this lump been checked by a doctor or nurse?

Yes No

Please keep this copy for your records. Mail second copy in envelope provided.

Curriculum Vitae
Christine Runyan Russ

2720 Newton Court
Blacksburg, Virginia 24060
(540) 951 - 2319

Personal Information

Date of Birth:	February 15, 1971
Place of Birth:	Baltimore, Maryland
Marital Status:	Married

Education

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Location:	Blacksburg, Virginia
Degree:	Master of Science (1995)
Program:	Clinical Psychology
Master's Thesis Title:	Adoption of Breast Self-Examination in Socio-economically Disadvantaged Women: The Effect of Prompting, Self-Management, Feedback, and Supplementary Training

UNIVERSITY OF MARYLAND BALTIMORE COUNTY

Location:	Baltimore, Maryland
Degree:	Bachelor of Arts (1992), Magna Cum Laude
Program:	Bio-psychology

Clinical Experience

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

January 1994 - Present	Graduate Clinician Primary therapy and assessment clinician for a variety of adult, child, and family cases; Cognitive and behavioral assessments for adults and children; Group therapy facilitator.

JOHNS HOPKINS HOSPITAL: SCHOOL OF PUBLIC HEALTH

May, 1995 - August 1995	Clinical Psychology Extern Family asessments; Clinical interviews; Program evaluation development and assessment training.

JOHNS HOPKINS HOSPITAL: DEPARTMENT OF PSYCHIATRY

February, 1992 - July, 1993	Interviewer Structured family history interviews.

Teaching Experience

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Spring, 1994	Introductory Psychology Lab Instructor Primary instructor for two labs; Facilitated discussions; Prepared lectures; Wrote quizzes; Proctored exams.
Fall 1994 - Spring, 1995	Introductory Psychology Lecture Assistant Assisted primary professors with lectures; Developed exam questions; Proctored exams; Introductory Psychology office assistant.

Research Experience

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

September 1993 - Present	Master's Thesis Research Small group behavioral intervention promoting breast self-exams among minority women living in subsidized housing in Roanoke, Virginia. HIV Prevention: Roanoke City Housing Projects Group Facilitator for small group intervention emphasizing empowerment and social diffusion; Conducted assessments. Skin Cancer Prevention: American Cancer Society Conducted assessments and community behavioral intervention promoting sun protection.

Exercise Promotion in the Elderly
Recruitment; Assessments; Group facilitator for small group intervention emphasizing personal planning and goal setting.

JOHNS HOPKINS HOSPITAL: DEPARTMENT OF PSYCHIATRY

February 1992 - July 1993
Research Assistant: Etiological Contribution of Genetics in Manic Depression
Ascertained and assessed families for suitability; Organized and facilitated data collection.

UNIVERSITY OF MARYLAND BALTIMORE COUNTY

September 1991 - June, 1992
Research Assistant: Linguistic and social contexts of laughter in conversation
Data collection and analysis.

Grant Experience

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

July, 1994
Assisted in Grant Development Activities and Conceptualization: Cancer Prevention in Rural Communities.

Graduate Coursework

Core Psychology Courses:
- Research Methods
- Statistics for Social Sciences I
- Statistics for Social Sciences II
- Developmental Psychology
- Personality Processes
- Biological Bases of Behavior

Clinical Psychology Courses:
- Intellectual Assessment
- Behavioral Assessment and Treatment
- Community Psychology
- Adult Psychopathology
- Advanced Psychotherapy
- Personality Assessment

Honors/Awards

Phi Kappa Phi Honor Society - Virginia Tech Chapter

Other Professional Activities

Virginia Tech, Dept. of Psychology - Honor Board Representative
Virginia Tech, Dept. of Psychology - Clinical Student Representative
American Cancer Society Breast Self-Exam Training Facilitator
Journal of Applied Behavior Analysis - Guest Reviewer
American Psychological Association - Student Member
Society of Behavioral Medicine - Student Member
Association for Advancement of Behavior Therapy - Student Member
American Public Health Association - Student member

Presentations

Poster presentation at Society of Neuroscience, 1992: R.R. Provine, L.A. Greisman, & C. N. Runyan. (1992). Laughter Punctuates Speech: Linguistic and Social Contexts of Laughter in Conversation.