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## Living in the context of poverty and trajectories of breast cancer worry, knowledge and perceived risk after a breast cancer risk education session

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### Abstract

**Objectives**—The purpose of this paper was to demonstrate how living in neighborhoods with high levels of poverty (while controlling for personal income) impacts personal characteristics which in turn impacts retention of breast cancer risk knowledge and changes in worry and perceived risk.

**Methods**—The data from this project come from a larger NCI funded study that included a pre-test, a breast cancer risk education session, a post-test, the option of an individualized risk assessment via the Gail Model and three follow-up phone calls over the next nine months.

**Results**—The percent of individuals living below poverty in the community in which the participant resided was predictive of the personal characteristics assessed, and these characteristics were predictive of changes in breast cancer worry, and knowledge across time.

**Conclusions**—Differentiation of self and monitoring, two of the individual characteristics that appear to allow people to process and use information to make “rational” decisions about health care, appear to be impacted by the necessity for adaptation to a culture of poverty. Thus, as a health care community, we need to tailor our messages and our recommendations with an understanding of the complex intersection of poverty and health care decision making.

The purpose of the current project was to investigate how poverty creates more than just limitations in affordability, but a socio-cultural context that influences the processing and use of risk information about breast cancer over time. “Healthy People 2010” (U.S. Department of Health and Human Services, 2000) has as one of its major goals ending health disparities among ethnic minorities and people of lower socio-economic status. However, disparities in morbidities due to cancer continue. African Americans have 10–15% lower five year survival rates. Males and females in counties with 20% living below the poverty level have 13 and 3% higher cancer death rates respectively compared to counties with less than 10% living below the poverty level (Schwaderer & Itana, 2007). Some suggest that these disparities are directly or indirectly related to racism (Brondolo, Gallo & Myers, 2009). Perceptions of racism have been linked to less use of preventive screenings including mammography.

However, these disparities may also be a function of how information is provided and processed by individuals in varying contexts. Most health decision making models use a realist perspective to define risks in disease prevention initiatives such as breast cancer screening (Vahabi & Gastalbo, 2003). This realist perspective suggests that with adequate knowledge of

risks people will choose appropriate screening measures. One such model of health decision making is The Health Beliefs Model (Becker & Maiman, 1975; Janz & Becker, 1984), which suggests that perceived susceptibility, severity, barriers and benefits will lead a person to some action. Thus, health providers believe that providing the most accurate information about breast cancer and its risks, as well as the benefits of screening will lead to appropriate screening. This does not appear to be the case, however. Lerman, Croyles, Tercyak & Hamann (2002) suggest that decision making about risk assessment or screening appears to be based less on information and actual risk than it is on perceived risk and personality factors. These “personality factors” may be influenced by adaptations necessary for surviving within a culture of poverty.

### **The Intersection of Poverty and Health**

There is considerable complexity in the intersection of poverty and health disparities (Villaruel, 2007). The research literature provides a wide variety of methods of assessing this and interpretations about this intersection. Some have suggested that ethnic minorities and/or those living in poverty have different health valuation systems than Whites and/or those with higher incomes (Gaskin & Frick, 2008). That is, they suggest that ethnic minorities use different “weights” (i.e. consider some factors more important than others) when considering, for example, mobility versus the amount of pain experienced, when making treatment decisions. Gaskin & Frick (2008) found no evidence for racial/ethnic differences in self-rated valuations of health states, but there were differences based on poverty status, region of the country and educational attainment.

Adding further to these complexities is that people use various “models” to interpret risk, which may not be what health care providers use (Vahabi & Gastalbo, 2003). Vahabi & Gastalbo (2003) suggest that in the domain of health care, a realist perspective is used to define risks in disease prevention initiatives such as breast cancer screening. A major precursor in adopting this approach into clinical practice is that human beings are rational and have as a priority maximizing their health. So once women are provided with the knowledge of breast cancer risks and the benefits of early detection they would opt for screening at recommended intervals. If women are not following these recommended guidelines, we assume they must not have enough knowledge or be able to use the knowledge they have. However, Vahabi and Gastalbo (2003) and others (i.e. Davey et al. 2003), suggest that women may use other perspectives to define risk and want different sorts of information in order to make decisions. In a qualitative investigation, Vahabi and Gastalbo (2003) found that giving voice to women’s understandings of risk showed that there are many perspectives on risk that co-exist and compete. A behavior that is labeled as irrational under the realist framework can be quite rational and intelligible when other perspectives are used. In this way it becomes important to take into account other factors when considering people’s health-related decisions. These are not only based on their desire to maximize their health but also on multiple factors such as their socio-cultural context, power relations, and cognitive capacities (Vahabi & Gastalbo, 2003).

Levine et al. (2008) investigated the intersection of race/ethnicity and SES for disparities in breast cancer mortalities before and after Medicare provided a mammography benefit. The interpretations of their findings was that researchers need to look beyond poverty (as an annual income only) and suggest that there is a correlation between a reduced capability to use a mammography benefit (i.e. Medicare for elderly women) and poverty, which creates a confound in statistical analyses. That is, an individual’s or community’s ability to convert a “commodity,” like insurance coverage for mammography screening, into adherence to screening recommendations is influenced by many factors including social norms, and other environmental factors such as the availability of health centers that provide mammography screening convenient to the community. Levine et al. (2008) define capability with Penchansky and Thomas’s (1981) five A’s of access to care: Affordability, availability (i.e. provider

resources), accessibility (i.e. geographic location), accommodation (i.e. how well the provider meets the needs and preferences of the patient), and acceptability (i.e. comfort with the provider/patient relationship).

Our previous research (author citation, 2008) suggests that knowledge alone does not lead to opting for a personalized risk assessment for breast cancer, and that African American and Caucasian women use information differently to make decisions about getting more personalized information about risk. The research objective in this current project was to contribute information about the intersection of breast cancer knowledge retention, worry, and perceived risk and residing within a culture of poverty which influences individual characteristics through adaptation. The question to be addressed was how does the poverty status of the community within which the participant resides influence retention of breast cancer knowledge, maintenance of breast cancer worry, and maintenance of perceived risk after attending a breast cancer risk education session. Knowledge of breast cancer, appropriate worry about risks and perceived risk are believed from a realist perspective to motivate screening behavior. The major assumption here is that with knowledge, worry would decrease and perceived risk would be more accurate over time.

In order to investigate the research question for this project a model was created that can be seen in Figure 1. In this model, the percentage of individuals living below poverty in the participant's community, along with her personal income and her race/ethnicity in essence create a context to which she adapts. Within this context, the participant develops a particular emphasis on how to handle threatening health information (i.e. monitoring style) and a sense of herself in relation to others (i.e. differentiation). These adaptations are considered "functional" in that in order to survive within a broader context of poverty, these monitoring styles and levels of differentiation serve the person well. The participant's ability to accept and retain information about breast cancer risk and any change in breast cancer worry are then influenced by these adaptations to the broader context of relative levels of poverty.

### Definitions of Constructs

Miller and colleagues (Miller & Champion, 1997; Miller, 1995; Miller et al., 1999; Miller, Fang, Diefenbach & Bates, 2001) have developed a typology of information processing styles and demonstrated that people have different ways of processing threatening health information. High monitors tend to scan for, and amplify, threatening cues, while low monitors or blunders find ways to distract themselves from threatening cues. Studies using this model of monitoring styles show that perceived risk of developing a disease, along with personality factors, motivate an individual's interest in undergoing health behaviors such as mammography (Lerman et al., 1996; Shoda, et al., 1998; Fang, Miller, Daly, & Hurley, 2002).

Monitoring may be directly related to other individual characteristics including Bowen (1978) Family Systems Theory's construct of differentiation of self. Differentiation of self is about an organism's self-regulation (Friedman, 1991). At higher levels, individuals are able to maintain their integrity in the face of extreme emotion evoking situations. They can make rational decisions even when faced with life or death situations. They are also able to relate to others intimately, yet still maintain their sense of a unique identity. Those with lower levels of differentiation can be overwhelmed by their emotional response to situations, and react without thinking. They have difficulty relating intimately with others without losing their sense of a unique identity. Their decision making is often based on "all or nothing" thinking and their perspective taking is narrow to the point of self centeredness (Papero, 1990).

It could be that those who are more differentiated are better able to use available information to have more accurate perceptions of risk. Those who are less differentiated would fall into the high monitoring or low monitoring categories. People who are less differentiated have a more

difficult time processing information because of their anxiety and subsequent emotional reactivity (Paper, 1990) around threatening health information.

Therefore, it may be the case that living within a broader context of poverty (defined by the percentage of individuals living below the poverty line in the community) may impact individual characteristics through adaption to the environment, which then may impact how threatening health information is perceived and maintained. Understanding these relationships would then allow for interventions tailored to these particular adaptations that would lead to an increased “capability” (i.e. Levine et al., 2008).

## Methods

### Sample

The sample for this project comes from a larger NCI funded study to understand the impact of individualized risk assessment for breast cancer on decisions about screening behavior.. The data come from 181 women between the ages of 18 and 80 with an average age of 48.5. Sixty-two percent of the sample were African American, with 34.7% Caucasian. Twenty-one percent of the sample had a high school education or less, 31% reported having had some college, and 27% had a bachelor’s degree. The average income was between \$20,000 and \$30,000 annually, with 40% making less than \$20,000, and about 26% of the sample making more than \$50,000 annually.

Participants had the opportunity to participate in follow-up phone calls if they elected to do so. In order to participate in this phase of the project the participants gave their name, address and phone number along with the phone numbers of two other people who would always know their whereabouts on a “locator” form. Using the addresses provided, the percent of those living below the poverty level in the community in which the participant resided could be obtained. For those who agreed to participate in the follow-up phone calls (n=123), the average percentage of individuals in their communities living below the poverty level was 18.89, with a range from 4 to 36.5 (sd = 10.65).

### Procedures

Breast cancer education sessions were advertised in churches that elected to participate in the program, in community agencies (i.e. an urban league, YWCA for formerly homeless women, a housing project for formerly homeless women, and a homeless family shelter) and at a university wellness program. African American and Caucasian women entered the project from any of the venues. Participants were informed about the voluntary nature of the research component of the project. If they elected to participate in the research (nearly 100% did so), they completed a pretest before the education session, a post test following the education session, and then could elect to have an individualized risk assessment via the Gail model, and could also participate in follow-up telephone calls every three months over the following nine months. Participants received \$5 for completing the pretest and post-test and an additional \$30 for completing the follow-up phone calls.

### Instruments

Differentiation of Self Inventory (DSI; Skowron & Schmitt, 2003), a 46 item instrument was used to assess four characteristics of differentiation of self or the lack thereof based on Bowen’s (1978) definition of differentiation of self: Fusion with Others, Emotional Reactivity, Emotional Cutoff, and “I” Position. Sample items include, “I tend to distance myself when people get too close to me,” (cut-off), “At times my feelings get the best of me and I have trouble thinking clearly,” (emotional reactivity), and “I usually do not change my behavior simply to please another person” (I position). Internal consistency reliabilities ranged from .

81 to .89 for the subscales and .92 for the full scale. Skowron and Schmitt (2003) report significant correlations between the DSI subscales and the Personal Authority in the Family System Questionnaire (Bray, Williamson & Malone, 1984). The DSI was elected because it is shorter and more closely aligns with Bowen's (1978) definition of differentiation of self than other assessments available. The fusion subscale had poor reliability in this sample and was not used. The subscales are scored so that higher scores indicate higher differentiation. The converse being that lower scores indicate that the respondent is more likely to endorse the behaviors (cutoff or emotional reactivity) that indicate a lack of differentiation. The entire DSI was included in the pretest and the emotional reactivity subscale was included in one of the follow-up phone calls.

The Miller Behavioral Style Scale (MBSS; Miller, 1987) was used to assess monitoring styles (information seekers or blunders). The short form of the MBSS presents 2 scenarios and asks the respondent to endorse the behavioral response that they would most likely choose if they were in the same situation. The two scenarios include going to the dentist, and learning that someone will be fired at one's place of employment. The MBSS was included in the pretest and two of the follow-up phone calls.

Breast Cancer and Hereditary Knowledge Scale (Ondrusek, Warner, & Goel, 1999) was used to assess knowledge of breast cancer and heredity specifically for women with low to moderate risk for hereditary breast cancer. It assesses knowledge in four areas: incidence and etiology, screening, disease presentation, and genetics. Ondrusek et al. (1999) report a test-retest reliability of .76. Breast cancer knowledge was assessed at pretest, posttest, and all three follow-up phone calls.

Breast Cancer Worry was measured with the 3 items from McCaul, Shroeder, and Reid (1996): 1) How often do you worry about getting breast cancer? Answered on a scale from never (1) to always (5); 2) On a scale from 1–5, how would you rate how worried you are about getting breast cancer? Answered on a scale from not at all (1) to extremely (5); and 3) Thinking about breast cancer makes me feel upset and frightened. Answered on a scale from strongly disagree (1) to strongly agree (5). Breast cancer worry was assessed at pretest, posttest, and all three follow-up phone calls.

Perceived Risk was assessed with the item "what do you think your chances are for getting breast cancer in your lifetime?" This was answered on a scale from 0 to 100%. Perceived risk was assessed at pretest, posttest and all three follow-up phone calls.

Actual risk was calculated using the Gail formula with questions included in the pre-test questionnaire.

Data on participants' age, gender, SES, ethnicity, and religious background, mammography and other breast cancer screening history and insurance coverage were also collected from the participants themselves.

We used the addresses in the American Fact Finder program on the US Census Bureau's website to determine the Public Use Microdata Sample which provided information on the percentage of people living below the poverty level in that area.

## Results

### Preliminary Analysis

The total number of participants in the project was 181. Of those 181, 123 agreed to the follow-up phone call portion of the project (67.9% of the original). At the first follow-up phone call,



there were 87 participants with complete data (70.7% of the 123), and the second phone call, there were 77 participants with complete data (62%) and at the third phone call there were 83 participants (67.4%). In a series of comparison procedures, those who completed some or all of the follow-up phone calls differed by the setting of the education session (church, community agency, wellness program, homeless housing program, elderly housing;  $\chi^2(8) = 20.41$ ;  $p < .01$ ). Those participants from a homeless housing program were the least likely to have participated in all three follow-up phone calls, while those in the wellness program were the most likely to participate in all three follow-up phone calls.

A MANOVA comparing those who completed some or all of the follow-up phone calls on community percent living below poverty, age, personal annual income, breast cancer worry, knowledge, the ratio of perceived to actual risk, monitoring and the differentiation of self subscales was significant (Wilk's Lambda = .61;  $F(20, 122) = 1.70$ ;  $p < .05$ ). In the univariate comparisons percent living below poverty in community, personal annual income, monitoring and cut-off were all statistically different among the groups who completed some or all of the follow-up phone calls. Those living in communities with higher percentages of poverty were more likely to complete only 1 follow-up phone call. Those having lower personal incomes, having higher monitoring scores and having lower cut-off scores were also less likely to complete all the follow-up phone calls. There were no differences in the race/ethnicity of those who did or did not complete the three follow-up phone calls, nor were there differences among those who did or did not complete follow-up phone calls and whether or not they had had a clinical breast exam in the past year or if over the age of 38 had had a mammogram in the last year.

The majority (76.3%) of women who came to the education sessions over the age of 38 had had a mammogram within the last year. This differed by setting of education session, however ( $\chi^2(4) = 20.57$ ;  $p < .001$ ). For those women who came to a session through their church 76.3% had had a mammogram in the last year, for those who came through an agency 81.8% had had a mammogram, for those who came through a homeless housing program only 41.2% had had a mammogram, for those who came through an elderly housing facility, only 63.6% had had a mammogram and for those who came through a wellness program, 97% had had a mammogram in the last year.

The same was true of those women who had had a clinical breast exam within the last year. The majority of women reported having had a clinical breast exam within the last year (69.4%). This differed by setting of education session ( $\chi^2(4) = 27.18$ ;  $p < .001$ ). Again, only 44.2% of those who came to the education session via a homeless housing program had had a clinical breast exam within the last year. The next smallest percentage was for those women who came through an elderly housing facility (63.6%). This was followed by those who came through a church (70%), through an agency (66.7%) and those who came through a wellness program (95.5%).

From these preliminary analyses, there were differences in those women who completed all the follow-up phone calls versus those who did not, and the setting of the education session seemed to matter. It should be noted that the setting in which the education session took place and the percent of individuals in the community living in poverty in the neighborhood are related in this data set. The homeless housing programs were in high poverty areas (36.5%), as was the elderly housing facility (18.3%). The African American churches were also in high poverty areas as well (13.7 to 36.5%). The lowest percent of individuals living below the poverty level were those who attended the education session via a university wellness program. Thus, accounting for percent of those in the community living below the poverty level in the analyses also accounted for setting of educational session.

## Correlations

Table 1 provides the correlations among the variables in the model (see Figure 1) that was tested in this project along with means and standard deviations. The percent of individuals living below the poverty level in the community was significantly related to the participants' income level, their emotional reactivity score, their I-position score and their cut-off score on the DSI. These relationships were all negative suggesting that with higher percentages of individuals living below the poverty level in the communities in which the participant resided, the participant also had lower income, and had a lower level of differentiation as assessed with the DSI. Age was positively related to income, so that the older the participant the higher the income. Income was positively related to higher differentiation in the form of cut-off (i.e. a lower tendency to cut-off in the face of intense emotion). Monitoring was related negatively to I-position, such that higher monitoring scores were associated with lower I-position scores. Finally, the three subscales of the DSI were significantly intercorrelated. These correlations provide an indication of the associations among the variables of interest in the model.

## Model Test

The model was tested for three separate outcomes: breast cancer worry, breast cancer knowledge and perception of breast cancer risk in proportion to actual risk via the Gail Model (Gail, Brinton, Byar, Corle, Green, Schairer, & Mulvihill, 1989). The model was tested with structural equation modeling using LISREL 8.8 software (Joreskog & Sorbom, 2006). In order to include as much data as possible full information maximum likelihood estimation was used with the Expectation Maximization Algorithm. In this process, cases with all data are "weighted" differently than cases that do not have all the data. Thus, missing data is not replaced, but those cases with missing data make a proportional contribution to the total. The only latent variable in the model was the differentiation variable. This latent variable was created with the three subscales as indicators. All three indicators loaded positively and significantly on the latent variable. The latent variable explained about 29% of the variance in the emotional reactivity indicator, 13% of the I-Position indicator, and 74% of the cut-off indicator. Although the I-Position indicator was not explained well by the latent variable, it was kept in the model for model identification purposes.

Table 2 provides the standardized estimates of the three outcome models. In the first column, in the model with breast cancer worry as the outcome, the percent of individuals in the community living below the poverty level, age, personal income and race/ethnicity were all significantly predictive of differentiation. Percent of individuals in the community living below poverty was predictive of lower levels of differentiation, age was also predictive of lower levels of differentiation, and so was race/ethnicity (coded 0 for Caucasian and 1 for African American). Income was positively predictive of differentiation, so that higher income levels predicted higher differentiation after controlling for percent of those in the community living in poverty, age and race/ethnicity. Race/ethnicity was negatively predictive of monitoring as well. So, Caucasian women had higher monitoring scores than African American women.

Differentiation and monitoring were then free to "cause" worry over time while also accounting for stability in worry over time. Differentiation was negatively related to worry at the third follow up, after controlling for the stability of worry over all time periods. Thus, more change in worry was predicted by lower levels of differentiation. Monitoring predicted change in worry at the post-test. Higher monitoring predicted more change in worry after the education session. Monitoring was also predictive of change in worry at the third follow-up. Higher monitoring was predictive of more change in worry. Breast cancer worry at pretest was predictive of worry at post-test, and the second and third follow-up worry scores. After accounting for pretest worry, there was no relationship between worry at post-test and worry at the first follow-up, or between the worry at the first and second follow-up or between the second and third follow-

up. This suggests there was some change in worry over the 9 months, and any variation that did occur was in part predicted by differentiation and monitoring. The model explained 48% of worry at post education session, and 15, 17, and 44% of worry at the first, second and third follow-up respectively. The model fit the data fairly well ( $\chi^2 (44) = 68.48$ ;  $p = .01$ ; RMSEA=.056; 90% CI (.027;.080). The chi-square and RMSEA are the only fit indices available in LISREL when using full information maximum likelihood. A Root Mean Square Error of Approximation (RMSEA) of .05 or lower indicates a close fit to the data. A non-significant chi-square is an indicator of a “perfect” fit. Given a fairly small chi-square and the confidence interval for the RMSEA, again the model provided a fairly close fit to the data.

The model using breast cancer knowledge as the outcome did not fit the data as well ( $\chi^2 (44) = 105.19$ ;  $p < .001$ ; RMSEA=.088; 90% CI (.066;.11). The relationships between the exogenous variables (percent living below poverty, income, age, and race/ethnicity) and differentiation and monitoring were the same as they were for the model with breast cancer worry as the outcome. All four exogenous variables were predictive of differentiation, and race/ethnicity was predictive of monitoring. Differentiation was predictive of knowledge at pretest, post education session, and at the second follow-up. So differentiation was predictive of the initial levels of knowledge (higher differentiation predicted more knowledge) and was also predictive of change in knowledge after accounting for stability in knowledge over the nine month period. Monitoring was not predictive of initial levels of knowledge or any change in knowledge. There was stability in knowledge from pretest to post session and the first follow-up, and stability between the first and second follow-up and the second and third follow-up. Knowledge at post-test was not predictive of knowledge at the first follow-up, thus knowledge after the education session did not appear to be retained. The model explained about 10% of initial knowledge, 28% of knowledge post education session, and 18, 37 and 35% of the variance in breast cancer knowledge at the first, second and third follow-up phone calls respectively.

The model using perception of breast cancer risk in proportion to actual risk as the outcome fit the data only slightly better than the model with knowledge as the outcome ( $\chi^2 (44) = 83.38$ ;  $p < .001$ ; RMSEA=.071; 90% CI (.047;.093). The relationships among the exogenous variables and differentiation and monitoring were the same. Neither differentiation nor monitoring were predictive of perceived risk. There was stability in perceived risk between pre-session and post-session, and pre-session and the first follow-up phone call. Post-session perceived risk was not predictive of perceived risk at the first follow-up. Perceived risk at the first follow-up was predictive of perceived risk at the second follow-up and perceived risk at the second follow-up was predictive of risk at the third follow-up. Again it would appear that any change in perceived risk at post education session was not retained. The model explained about 1% of initial levels of perceived risk, 12% of post education session perceived risk, and 19, 21 and 17% of the variance in perceived risk at the first, second and third follow-up phone calls respectively.

## Discussion

The objective of this project was to understand how changes in breast cancer worry, knowledge, and perceived risk would be retained after a breast cancer risk education session in the context of relative levels of poverty in the community in which the participant resided. It was hoped that these results would provide information about the intersection of poverty and the processing of risk information via adaptation to a culture poverty. It was hypothesized that levels of differentiation and monitoring would vary within the context of varying levels of poverty in the community and that these adaptations to the context of the culture of poverty would then impact the retention of any change in worry, knowledge, or perceived risk of breast cancer after a breast cancer risk education session. The hypothesized relationships were supported in some respects but not others.



The percent of individuals living below poverty in the community was predictive of level of differentiation after controlling for the individual's age, personal income and race/ethnicity. Age, personal income, and race/ethnicity were also predictive of differentiation levels, after controlling for all the other variables in the model. Rather than viewing the culture of poverty from a deficit model, it is suggested that the levels of differentiation within this context of poverty are adaptive. The assessment of differentiation used was created and tested on middle to upper-middle class individuals (Skowron & Friedlander, 1998). The items that best indicated their level of differentiation may not be suitable or speak to situations that those living in a culture poverty may face. For example, "I'm concerned about losing my independence in intimate relationships" is an item in the cut-off subscale of the DSI that is reversed scored. Thus, if the person answers that it is very true of them, they get the lowest score for that item. Being a person of the middle class, I'm not really sure how a formerly homeless woman would answer this question. As a matter of survival, maintaining autonomy and not being dependent on any one would seem important within the context of poverty. Thus, the women living in higher levels of poverty appeared to answer the questions around cut-off as if they were not well differentiated. From Bowen Theory, it is not "healthy" to be "fiercely" independent. Within the context of the culture of poverty it may be more adaptive or functional to be fiercely independent.

However, one's level of differentiation was predictive of initial levels of breast cancer knowledge, change in knowledge and worry. The higher the level of differentiation was, the more knowledge at the outset of the project, and the less change in worry, and more change in knowledge. Thus, although a "lower" level of differentiation may be adaptive in the context of the culture of poverty it does not prove to be functional in the face of retaining knowledge of breast cancer risk or relieving breast cancer worry at least after a breast cancer risk education session which was not tailored to those living in a culture of poverty.

Monitoring levels were related to race/ethnicity such that Caucasian women regardless of income, age, or level of poverty in the community in which they lived had higher monitoring scores. That is, they paid more attention to potentially health threatening information. The women's level of monitoring was then related to their level of breast cancer worry after the education session (controlling for their worry at pre session) and related to their change in worry by the third follow-up phone call. So, those women who had higher monitoring scores, were more likely to change their level of worry post session and their worry changed more over the nine month follow-up period. Figure 2 provides graphs of worry over time by monitoring scores for the Caucasian women in the sample and for the African American women in the sample.

The American Cancer Society suggests that women under the age of 39, should be getting annual clinical breast exams, while women over the age of 39 should be getting annual clinical breast exams and mammography as screening measures to monitor for changes in breast tissue that could lead to cancer. The data from this project suggest that women living in neighborhoods with a higher percentage of individuals living below poverty are not getting annual clinical breast exams nor are they getting mammography at the same rate as women who do not live in neighborhoods of poverty even after controlling for their personal incomes. Unfortunately, women living in neighborhoods with a high percentage of individuals living below the poverty line were the least likely to participate in some or all of the follow-up phone calls in this project. Participants were asked when they had last had a clinical breast exam and when they had last had mammography at pre-session and at each follow-up. Of the 55 women who said they had not had a clinical breast exam within the last year at pre session, 15 reported getting a clinical breast exam over the follow-up period, 13 of whom came to the education session via organizations that were established in neighborhoods with higher percentages of poverty. Understanding what is different about these 13 women in comparison to the other women living

in poverty is important for the next steps in understanding the intersection of poverty and health decision making. What motivated them to obtain screening? With the small numbers in this project it is difficult to answer this question statistically.

The numbers became even smaller for those women who reported having not had a mammogram in the last year if they were 39 and older. There were 31 women who were in this category. Only 13 of those women participated in some or all of the follow-up phone calls. From the dates of mammography reported, 8 of these women appeared to have gotten screening over the nine month follow-up, and all of these women came to the education session via an organization established in communities with high levels of poverty.

Again, understanding the motivation of these 8 women to obtain mammography after the education session would be important for future research. If Levine et al.'s (2008) ideas about capability are accurate, and we assume that the information they received at the education session was at least in part the impetus for obtaining the screening, whether or not the "five A's" were also met would need to be explored. In other words, it appears from the results of this project that living in the context of the culture of poverty impacts individual characteristics such as monitoring and differentiation (as the individual adapts to the environment) that, in turn, influence how people process and maintain potentially threatening health information, the affordability, availability, accessibility, level of accommodation, and acceptability of health services within the surrounding community are still essential components of increasing breast cancer risk screening for all women.

### Limitations to the Project

Providing the information in and of itself is not enough. The women who came to these education sessions for this project were for the most part already adhering to screening recommendations with the exception of those participants who came to the session via a homeless housing program. Thus, there was little variation in screening behavior that could be analyzed. The sample was also small and not randomly selected. Understanding the "audience" and how they will interpret and use the information provided seems to be the most important lesson to be learned from this project.

### Conclusions

Thus, reaching those women who are not obtaining recommended screening takes more than offering education sessions about breast cancer risk. If by chance, a participant of an education session is not getting recommended screening, how they process and use the information received depends, in part, on the level of poverty of the community in which they reside given the necessity to adapt to this environment. Differentiation of self and monitoring, two of the individual characteristics that appear to allow people to process and use information to make decisions about health care, appear to be impacted by this necessity for adaptation. Thus, as a health care community, we need to tailor our messages and our recommendations so that the information and resources we provide can be used by the very people who need them the most. Levine et al. (2008) suggest that the intersection of race/ethnicity and/or poverty and health care decisions is confounded (statistically speaking). That is, an individual's or community's ability to convert a "commodity," like insurance coverage for mammography screening and/or information about risks, into adherence to screening recommendations is influenced by many factors including social norms, and other environmental factors such as the availability of health centers that provide mammography screening convenient to the community. Thus, as a health care community we also need to increase our capacity or capability to reach this community by developing methods that are effective given this complex intersection of poverty and health care.

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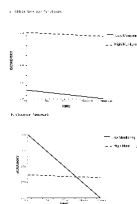
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**Figure 1.**  
Model to test the impact of the context of poverty on individual characteristics that influence outcomes of a breast cancer risk education session.





**Figure 2.**  
Differences in the relationship between monitoring and worry overtime for African American (a) and Caucasian (b) participants.

Table 1

Correlations among the variables used in the model to be tested along with their means and standard deviations.

	1	2	3	4	5	6	7	8	9	10	M	SD
1. Percent in poverty	--										18.90	10.65
2. Age	-.16	--									45.17	14.29
3. Income	-.55 <sup>*</sup>	.21 <sup>*</sup>	--								30–39 <sup>a</sup>	3.40 <sup>b</sup>
4. Pre-session Worry	-.07	.08	-.05	--							8.08	1.95
5. Pre-session Knowledge	.00	-.06	.02	-.15	--						6.64	1.90
6. Monitoring	.15	-.06	-.08	-.04	.08	--					3.06	1.97
7. Perceived to actual risk	-.08	-.01	-.04	.19	.06	-.06	--				2.61	2.64
8. Emotional reactivity	-.26 <sup>*</sup>	-.09	.09	.06	.14	.16	-.04	--			39.41	11.32
9. I-Position	-.29 <sup>*</sup>	.07	.15	-.16	.13	-.23 <sup>*</sup>	.00	.34 <sup>*</sup>	--		33.53	5.87
10. Cut-off	-.38 <sup>*</sup>	-.11	.41 <sup>*</sup>	-.16	.06	.01	-.07	.32 <sup>*</sup>	.35 <sup>*</sup>	--	42.18	16.02

\*  
p< .05

<sup>a</sup>\$1,000

<sup>b</sup>\$10,000 units

**Table 2**

Standardized path estimates for each of the three outcome models.

	Outcome		
	Worry	Knowledge	Perceived to actual risk
Paths to differentiation			
Percent Poverty	-.19*	-.27*	-.20*
Age	-.31*	-.34*	-.31*
Income	.35*	.39*	.34*
Race/ethnicity	-.22*	-.28*	-.22*
Paths to monitoring			
Percent Poverty	.17	.17	.17
Age	-.11	-.11	-.11
Income	-.07	-.07	-.07
Race/ethnicity	-.17*	-.17*	-.17*
Paths to pre-session			
Differentiation	.03	.30*	-.10
Monitoring	-.02	.11	.02
Paths to post-session			
Differentiation	-.02	.31*	.07
Monitoring	.15*	.12	.04
Pre-session	.68*	.32*	.34*
Paths to Follow-up 1			
Differentiation	.05	.22	.06
Monitoring	-.03	.02	.06
Pre-session	.22	.28*	.45*
Post-session	.20	.03	-.10
Paths to Follow-up 2			
Differentiation	-.05	.40*	-.09
Monitoring	-.08	.04	.08
Pre-session	.28*	.11	-.18
Follow-up 1	.20	.28*	.48*
Paths to Follow-up 3			
Differentiation	-.22*	.25	.10
Monitoring	.24*	-.10	-.10
Pre-session	.49*	.19	.20
Follow-up 2	.21	.31*	.35*

\*  
t value  $\geq 1.96$ ;  $p < .05$