

**Social Support and Family Status as Influences on  
Perceptions of Health Risks and Information-Seeking Behavior:  
A Case of New York State Teachers**

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## **ABSTRACT**

Numerous studies have indicated the importance of social support to health; those who are less socially integrated are psychologically and physically less healthy, and have higher mortality rates. A primary social support system is the family, which may be further characterized by the marital relationship and the parental relationship. This study examines one mechanism by which the influence family status, social networks and social integration may alter the perception of risks and information-seeking behaviors. If individuals are more sensitive to possible health risks as a result of social linkages, they may follow that increased concern with information seeking, and eventually risk protective behaviors.

In recent years, a number of national and international research projects have documented the increased incidence of breast cancer among teachers (1.5 times higher). In response, Cornell University and the National Education Association conducted a regional study of New York State teachers and educational support professionals to investigate their knowledge and perceptions of breast cancer risk factors (N=1114).

The study found mixed support for the hypothesis that family status, social networks and social integration influence risk perceptions and information-seeking behaviors. Most prominently, however, is that communication about health issues among members within a social network, community participation and general participation activities are significant predictors of increased risk perception, health concerns in the school and the community, and health information-seeking behaviors. These findings

suggest that there is a need to build into breast cancer risk communication efforts in understanding an individual's perceptions and information-seeking behaviors.

## INTRODUCTION

According to the American Cancer Society, breast cancer is the most common cancer among women, as well as the second leading cause of cancer death in women. Interestingly, a more comprehensive investigation into the demographics of individuals inflicted with breast cancer, both on a national and international level, documents an increased incidence of breast cancer (1.5 times higher) among teachers (Bernstein *et al.* 2002, Carpenter and Roman 1999, Pollán and Gustavsson 1999, Reynolds *et al.* 1999, Robinson and Walker 1999, Rubin *et al.* 1993, Zheng *et al.* 2002).

In response, California's Department of Health Services began a study of 133,000 teachers to better understand their increased (1.5 times higher) rate of invasive breast cancer. Similarly, the Department of Communications and the Program on Breast Cancer and Environmental Risk Factors (BCERF) at Cornell University along with the National Education Association (NEA) conducted a regional study of New York State teachers and education support professionals (ESPs) to investigate their knowledge and perceptions of breast cancer risk factors. Since the contribution of environmental factors to breast cancer risk remains scientifically ambiguous, the study is particularly interested in examining the target group's knowledge and beliefs about their surroundings and other socio-demographic variables associated with their attribution of breast cancer risk to environmental factors.

This thesis reports on one particular aspect of the New York teachers study: the role of social integration, social network dynamics and familial demographic attributes in the perceptions of health risks and information-seeking behavior using the data drawn

from the breast cancer questionnaire. Unraveling the foundation or at least portions of it, of how risk perceptions emerge can help in the development of communication projects. The general public is constantly exposed to mixed findings and uncertain results from the scientific field. How do individuals decide what information to accept as true? By understanding how these decisions are made, health communication models can be designed to directly inform these target groups. For example, if community organizations are a primary source for accurate information, then health education programs can collaborate with these organizations.

Furthermore, this study aspires to determine the impact of social networks to better understand how individuals cope with health issues and to expose vulnerable populations. The influence of a sick member of a social network, such as a family member with cancer, exposes how individuals react to such health experience; does this increase health risk perceptions and information-seeking behaviors? If so, a set of individuals with a shared health experience (i.e. family member with cancer) is revealed. Their health information ambiguities should be addressed specific to their common experience.

The principal research objective is to learn more about how the web of social ties can extend to health behaviors, particularly risk perception and information-seeking. This study will reveal certain connections, or lack thereof, between certain social bonds and social activities, and the aforementioned health behaviors.

## *Social Integration and Health*

Numerous studies have indicated the importance of social support to health; those who are less socially integrated are psychologically and physically less healthy, and consequently have lower mortality rates (House *et al.* 1988). In addition, social support is an effective factor in helping people cease smoking, cope with bereavement and improve immunological resistance (Callaghan and Morrissey 1993).

Social relationships have potent effects on physical and mental health. There are two key terms in understanding social ties: social networks and social integration. Whereas social networks are the “web of social relationships with family and close friends and more formal relationships with other individuals and groups,” social integration is the engagement in social ties, institutional connections or community participation (Seeman 1996). Membership in a social network merely signifies links between individuals but not necessarily the strength of those connections. Social integration is the proactive participation within a group, and can more specifically describe the nature of relationships.

In the mid-1950s, John Barnes and Elizabeth Bott constructed the concept of social networks to “analyze ties that cut across traditional kinship, residential, and class groups to explain behaviors they observed such as access to jobs, political activity or marital roles.” (Berkman *et al.* 2000) The earliest sociological theories on the matter came from Émile Durkheim, who explained how individual pathology was a function of social dynamics by illustrating how social integration and cohesion influenced mortality. According to Durkheim, those who are less socially integrated are psychologically and physically less healthy, and have higher premature mortality rates. (Durkheim 1951)

A series of studies during the 1970s and 1980s consistently illustrated the significant contributions social ties and social networks have on mortality (for almost every cause of death). Most often explored were the links between close friends and relatives, marital status, and participation in religious and voluntary associations, which were identified as “social networks or ties, social connectedness, integration, activity or embeddedness.” (Berkman *et al.* 2000)

Through social network models, the structural properties of relationships began to take form. Network analyses allow for a thorough examination of the characteristic patterns of ties between members in a social system, as opposed to focusing on the individual members themselves. Although a person on her own can tell a revealing story, understanding how that story is linked to the individual’s social network may uncover the “bigger picture.” The structure and composition of the network, and the contents that flow within the network help to clarify how these social structures can influence members’ behavior. Furthermore, both network theorists and Durkheim would agree that the foundation of a community lies within its social structure rather than its spatial design; “the structural arrangement of social institutions shapes the resources available to the individual and hence that person’s behavioral and emotional responses.” (Berkman *et al.* 2000)

The manner to which social integration within networks can influence health is complex and unclear, but an association *is* present. A number of angles may be drawn in relation to social ties such as the structural features of the social environment, the qualitative aspects of the rubric of “social support,” and relational content of social interactions. According to Berkman *et al.*, in order to have a comprehensive framework

of the multiple pathways to which social networks influence health outcomes, we must look both “upstream” and “downstream.” Analysis upstream is a more macro-social perspective that adheres to Durkheim’s examination of how the embedment of social networks within those larger social and cultural contexts shapes the structure of these networks. Downstream of this macro-social context explicates how network structure and function influence social and interpersonal behavior. Berkman *et al.* explain how networks function at the micro-psychosocial and behavioral level:

“We argue that networks operate at the behavioral level through four primary pathways: (1) provision of social support; (2) social influences; (3) on social engagement and attachment; and (4) access to resources and material goods. These micro-psychosocial and behavioral processes, we argue, then influence even more proximate pathways to health status including (1) direct physiological stress responses, (2) psychological states and traits including self-esteem, self-efficacy, security, (3) health-damaging behaviors such as tobacco consumption or high-risk sexual activity, health promoting behavior such as appropriate health service utilization, medical adherence, and exercise, and finally to, (4) exposure to infectious disease agents such as HIV, other sexually transmitted diseases (STDs) or tuberculosis.” (Berkman *et al.* 2000)

The primary focus of this study concerns the downstream social and behavioral pathways to which social networks operate.

### *Social and Behavioral Pathways*

A number of pathways may mediate the way in which networks influence health status. Social support is most often the primary factor considered. Social support is defined as “an exchange of resources between at least two individuals perceived by the provider or recipient to be intended to enhance the well being of the recipient” (Shumaker and Brownwell 1984). Its function is to provide an individual with the sensation that

he/she is loved, cared for, esteemed, valued and belongs to a mutually obliging communication network (Cobb 1976). Not all social ties provide support, and furthermore these ties vary in the type, frequency, intensity and extent of support offered.

Social networks can have a more directly pathological effect by restricting or promoting exposure to infectious disease agents. In this way, the links between epidemiology and networks are prominent; however, efforts to create a mathematical model to better understand the role of networks in epidemiology are in the early stages. The objective of this modeling technique is to understand how and why diseases are primarily transmitted through populations based on geographic location, socio-demographic characteristics (age, race, gender), socioeconomic position, occupation, sexual orientation, etc., rather than randomly. Furthermore, by focusing the analysis on the level of the network instead of the individual, the study of the diffusion of transmissible diseases through populations can help expose the bridging ties *between* networks rather than intra-network.

Networks also influence health via social influence; according to Marsden and Friedkin “the proximity of two actors in social networks is associated with the occurrence of interpersonal influence between the actors.” (Marsden and Friedkin 1994) Social influence is not a measure of face-to-face contact or conscious attempts to modify behavior, but rather “people obtain normative guidance by comparing their attitudes with those of a reference group of similar others. Attitudes are confirmed and reinforced when they are shared with the comparison group but altered when they are discrepant.” (Marsden and Friedkin 1994) Thus, the health behaviors of network members may be the product of shared norms or even peer-pressure. People who have ties with people

who are physically active or maintain certain dietary practices are more likely to follow the model set forth by the group (Berkman 1984). Likewise, social networks can also promote behaviors detrimental to health (i.e. smoking cigarettes, drinking alcohol, etc.)

The variation in types of social support can be categorized as emotional, instrumental, appraisal and informational. Social support is a multi-dimensional package; rooted in social support are opportunities for intimacy and attachment, which are meaningful bonds for not only intimate relationships but also those that are extended: “For instance, when relationships are solid at a community level, individuals feel strong bonds and attachment to places (e.g. neighborhood) and organizations (e.g. voluntary and religious.” (Berkman *et al.* 2000) Accordingly, it is critical to assess the role of community and participation in organizations in grasping the social support mechanism through social integration.

Social networks also promote social participation and social engagement, which “result from the enactment of potential ties in real life activity. Getting together with friends, attending social functions, participating in occupational or social roles, group recreation, church attendance — these are all instances of social engagement.” (Berkman *et al.* 2000) The participation and engagement pathways by which networks may shape health status is intricate in that they often split into other societal implications, such as identifying and reinforcing social roles including parental, familial, occupational, and community roles. In turn, the role performance within the network context provides an individual with a sense of value, belonging, and attachment.

The predominant explanation for the influential nature of social networks on health is the “buffer” theory. The “buffer” theory suggests that social support, for

instance, “maintains or sustains the organism by promoting adaptive behavior or neuroendocrine responses in the face of stress or other health hazards” (House *et al.* 1988). It explains the capacity of the supportive quality of social relationships in buffering or moderating the deleterious effects of stress or other health hazards (Cobb 1976). Health is promoted through regulation of thoughts, feelings and behavior (House *et al.* 1988); and the facilitation of health promoting behaviors (Umberson 1987). Consequently, the manifestation of social support may be structural (marital status, size of support network or frequency of social interaction) and derivative of a range of sources (spouse, partner, colleague or friend; Callaghan and Morrissey 1993).

### *Influence of the Family*

Prior research illustrates the effect of social networks in healthful behaviors by measuring change in physical health, as well as mortality (Berkman and Breslow 1983). In consequence, these findings suggest that social support and social ties impact mortality through their effect on health-related behaviors. A primary social support system is the family, which may be further characterized by the marital relationship and the parental relationship. Informal kin relations of marriage and parenting are intimate ties that have a greater impact on mortality than other, less intimate ties. In addition, these familial connections are examples of primary group ties, which often influence the social integration of an individual into other social networks.

Marital and parental relationships provide the individual with a sense of meaning, purpose and an important set of obligations (Durkheim 1951); “In turn, the sense of meaning and obligations affected the individual’s motivations and lifestyle” (Umberson

1987). Furthermore, family relationships of marriage and parenthood are associated with external regulation and self-regulation of health behaviors; “the unmarried and nonparents are more likely than the married and parents to engage in behaviors that contribute to mortality” (Umberson 1987).

The marital relationship is one of the most consistently significant indicators in predicting mortality. Epidemiologic research indicates that age-adjusted mortality rates from all causes of death, as well as rates of tuberculosis, accidents, and psychiatric disorders are persistently higher among the unmarried compared to the married (House *et al.* 1988). Concomitantly, marriage is associated with better responses to stress, the practice of healthier behaviors, and better health in general (Kiecolt-Glaser and Newton 2001). In addition, research has shown that “being married is more beneficial to health, and becoming widowed more detrimental, for men than women. Women, however, seem to benefit as much or more than men from relationships with friends and relatives” (House *et al.* 1988). However, these studies fail to incorporate the quality of social relationships; for example, women may have higher quality relationships and hence their “true” level of social integration must include quality, as well as quantity in the measurement of social relationship/integration.

Although the influence of parenthood’s protection of mortality has not been measured as extensively, studies indicate that those who are childless have higher premature death rates than those with children; in addition, children have a greater impact on women than men, and for younger parents compared to the older (Kobrin and Hendershot 1977). The shared residence between children and parents reduces the parents’ tendency to engage in adverse health behaviors more so than when they live

separately (Umberson 1987). Additionally, parental status has less impact on women's health behavior than on men's.

Gove (1973) contended that the marital relationship is related to psychological well-being, discouraging activities leading to death, and the willingness and capability to undergo certain treatments. Furthermore, Umberson (1987) extends this theory to all familial relationships (marital and parental) through the notion of social integration as a factor affecting an individual's sense of obligation and responsibility; "These relationships involve elements of obligation and constraint as well as a sense of meaning and purpose. Thus family relationships affect psychological well-being and health behaviors by shaping one's social environment and lifestyle." (Umberson 1987)

In addition, the role of the meaning and obligations involved in family ties contributes to social control, which is "a mechanism by which social relationships affect health behaviors; and that health behaviors affect health outcomes. Social control has been viewed traditionally as an influence over the individual to engage in conventional and nondeviant behavior" (Umberson 1987). Concomitant to social control is the "locus of control," which suggests that "a person who values his or her health and believes that he or she can exercise control more health, will be more likely to engage in health-enhancing (or -maintaining) behaviors." (DeVito *et al.* 1982) Thus, the familial relationships offer social control of health indirectly by providing the framework for an internalized set of norms pertaining to healthful behavior, and directly by distinguishing restrictions for deviation from behavior beneficial to health.

Indirect social control is a result of self-enforcement of norms; through a sense of responsibility to a child or spouse, an individual may internalize norms for behavior

conducive to health. “Individuals committed to relationships, such as those offered by the family, adhere to norms for conventional behavior partly because deviating from those norms threatens the existence of the relationships” (Umberson 1987). Furthermore, the internalization of health behavior norms also contribute to the locus of control that inspires the individual to participate in health-beneficial behaviors. The direct influence of social control is exemplified by a spouse or child’s reminder to engage in health behaviors or to avoid risk-taking. These familial relationships serve to regulate or prevent an individual from behaving in a manner that may be detrimental to his/her health.

Additionally, married couples have “more potential social relations and thus require more income and space.” (Rogers 1996) Living arrangements that involve numerous family members can “promote compliance with group norms, encourage health practices, and reduce stress through emotional reassurance or a helpful appraisal of a difficult situation.”

After an initial review of the literature, an explanation for the incongruity in the impact of marital and parental status on men and women may be in the analysis of gender roles; “women provide more health benefits to their spouses than do men” (Umberson 1987). Furthermore, Umberson explicates that the positive influence of children is greater when the children are young and living with the parents. That members of the family exhibit more responsibility and regulation when children and parents live together may be attributed to a sense of belonging that lessens the likelihood of engaging in harmful health practices. Evidence of this effect from older children living at home is indeterminate. In addition, the frequency of contact with family, friends, neighbors and co-workers is indicative of mortality (after adjustment for age, sex, education,

employment status, immigrant status, physical exercise, and self-reports of chronic conditions; House *et al.* 1988).

Health status can be largely attributed to an individual's living arrangement. For example, twenty-five percent of the elderly population in ill health lives with an adult child, most likely an unmarried daughter (Bumpass 1990; Brody *et al.* 1995). The presence of an ill individual within the household may reduce non-household activities, such as those in the neighborhood and community, thus promoting social isolation. This association demonstrates that living arrangements that include family do not necessarily sponsor good health; there is a discrepancy between "those who live together voluntarily and those who live together because of health or financial needs." (Rogers 1996)

However, that is not to say that those who live alone are doomed health-wise. According to Burr and Mutchler (1992), health and financial status are factors that contribute to an individual's well being when living alone. "Widowed and divorced individuals who have lost the support of their spouses, as well as individuals with financial and health problems, may have difficulty living alone." (Rogers 1996) Conversely, those who have never been married yet are financially and physically independent do not appear to suffer health problems. Although those who choose to live alone do not get the health benefits of living with other, they may still compensate for the lack of social integration within the household by obtaining the valuable affects from extrafamilial social relations, such as the community.

### *Extrafamilial Social Relations*

Social support through the community can be obtained through “greater social interaction with friends and relatives; greater attendance at church, concerts, and movies; and more volunteerism.” (Rogers 1996) Seeman *et al.* (1987) found that some social ties, particularly church membership, may be *more* important than marital status in calculating mortality.

Furthermore, the kind of support one receives varies depending on its source. Filial relations span generations, whereas friendships often connect individuals of similar ages and interests. “Family support is often instrumental, obligatory, and available whenever it is needed, whereas support through friends and neighbors is optional.” (Rogers 1996) Accordingly, families provide the foundational support necessary to maintain physical health, but friends provide emotional support and vehicles for socializing, which can contribute to a greater sense of well-being. Because of the obligatory nature that accompanies family support, it is found to provide both positive and negative interactions, and recipients may not have strong emotional bonds to caregivers.

Moreover, social support can also be found among formal institutions. Churches offer formal and informal care, and promote social interaction, communication and friendship. Churches utilize mechanisms such as outreach programs and home visitations in order to facilitate interconnections among its members. Likewise, community events such as shows, sporting events, concerts, and other entertainment can focus “the city’s identity, ignite community spirit, and infuse individuals with a sense of belonging to a community or area.” (Rogers 1996) In addition, volunteer work offers a venue for social

involvement and recognition, social support, and a sense of fulfilling a civic responsibility.

Through the understanding of how family, friends and formal institutions can influence an individual's health, this study questions how these factors of social integration and social networks can predict an individual's health information-seeking behavior and health risk perception.

### *Social Integration and the School*

Schools are fundamental features of communities, thus teachers and other individuals who work within these educational institutions comprise an essential network within every population. Not only do teachers and ESPs establish social networks within the school but these individuals are also deeply embedded within the community, as evident by the ubiquity of Parent Teacher Associations (PTA). Because of the socially integrated character of educational occupations, it is imperative to investigate how a network that is relatively active in the community by nature can perceive the risks of health issues. Therefore, educational professionals are made into a prototype to understand how social integration can influence health, particularly preventative health measures such as health information-seeking and health risk perception.

### *Hypotheses*

Using the literature as a starting point, this study will examine how marital status, the presence of children, the age of children, communication of health-related topics, and community participation influence how these female teachers perceive a breast cancer

risk and information-seeking tendencies. After a review of the literature, I hypothesize that those who are married are more likely to seek out health-related information as opposed to those who are not because of the supportive nature of marital bonds. If marital relations are shown to promote healthy behaviors, does this include information seeking and consequently, increased risk perception?

In addition, this study will execute similar comparative studies concerning parents with young children (age 0-18) versus older children (age 18-above) versus non-parents. The age of the children will be critically considered since younger children, who most likely reside with parents, are hypothesized to be more beneficial. Parents of young children are more prompted to be healthy role models. Consequently, the research question asks, will parents of younger children be more likely to seek out health information than those who have older children and those who have no children?

To understand the role of social networks, the study will also investigate how social networks such as family and extrafamilial relationships (friends and co-workers) can influence health information seeking behavior, for instance, whether the presence of cancer, heart disease or diabetes among family, friends, co-workers and self increases information-seeking behavior. More links between individuals should increase the communicative nature of these relationships and increase experience with health problems. Will these mechanisms of social networks foster positive health behaviors, such as information-seeking?

Furthermore, how do social networks influence risk perception? Using results from the questionnaire, the impact of communication and experience with family, friends and co-workers about health issues on risk perception will also be examined. This

research will test the hypothesis that the communicative and experiential mechanisms of social networks will increase awareness and discourse of health issues, which will consequently increase risk perception and consequently, information-seeking behaviors.

The supportive quality of social integration will be tested through measuring the influence of participation in community groups and general participatory activities on health promotion behaviors. Based on the literature, a broad research hypothesis can be formed: social integration within formal institution such as community action groups, group working on health issues, local political group, PTA, religious groups, etc., will help foster positive health behaviors such as health information-seeking and increased risk perception. Other means of social integration examined in this study include knowledge of local current affairs.

Specifically, the following five research hypotheses will be tested:

H1: Married females will seek out health-related information and have an increased risk perception of breast cancer risk factors compared to single, divorced, separated and widowed females.

H2: Parents will seek out health-related information and have an increased risk perception compared to non-parents. More specifically, parents of young children (age 0-18) will illustrate more health information-seeking behaviors than parents of older children (age 18-above).

H3: Presence of health issues among family, friends, co-workers and the self will increase information-seeking behavior and risk perception.

H4: Communication about health issues with spouse, family, friends at work, friends outside work, and the health care provider will increase information-seeking behavior and risk perception.

H5: Increased social integration, such as participation in various organizations and knowledge of local current affairs, will result in increased health information-seeking behavior and risk perception.

## **METHODS**

Cornell University and the National Education Association (NEA) conducted a regional study of New York State teachers and educational support professionals (ESPs) to investigate their knowledge and perceptions of breast cancer risk factors. During open discussions with a focus group of several dozen NEA/NY members, central themes relating to breast cancer risk were revealed, and subsequently incorporated into a questionnaire to investigate these concerns in further detail. The results from the exploratory focus group research indicated that teachers and ESPs have similar perceptions of cancer and environmental risk as other groups of women, including a tendency to emphasize personal responsibility. However, their elevated risk, unique exposures, close social environment at work, and special community roles provided grounds for distinction.

A pretest found that data collection from a random sample of teachers was highly problematic. This included problems of access to mailing lists through the NEA in order to send surveys out to teachers, gaining compliance, and follow-up. Consequently, the collection of data was designed using a teacher representative in selected school districts as recruiters to help obtain 40 responses from their district. Teacher-recruiters were selected at a state-wide meeting of the NEA, trained in data collection (distributing the surveys to an adequate representation of teachers with different teaching assignments, and adequate representation of ESP, and an adequate geographic coverage of New York State) and instructions on follow-up and survey return. 40 NEA/NY members served as recruiters to help distribute the questionnaires and instructions in 39 school districts

within 19 counties in New York State. The data was collected between the periods of April 2005 and May 2005.

The overall response rate was 65% (N = 1114). The study sample is all female, with 65% teachers and 35% ESPs. (See Appendix Table 1 for demographic-based results.) There are some important differences between teachers and ESPs as groups. ESPs include all school personnel who are not teachers, such as school administrators, registered nurses, cafeteria monitors, bus drivers, teachers' aides and so on. Additionally, while teachers are a fairly homogenous group in terms of educational requirements for entry, ESPs form a heterogeneous occupational group that performs a range of tasks and represents diverse education levels.

In order to mitigate concerns about generalizability of the sample, attempts were made in instructing recruiters to ensure an adequate representation of teachers with different teaching assignments, an adequate representation of ESPs, and an adequate geographic coverage of New York State. Accordingly, the demographics of the teachers sample in this study are comparable to the national demographics of teachers reported by the NEA. For instance, the median age of teachers in our study corresponds to the age reported in the national NEA sample (45-years-old). Likewise, the median years of experience teachers reported in this study (15 years) are comparable to the figure for the national NEA (14 years). The effectiveness in representing ESPs is more difficult to assess because of the diversity of this population (variation in function and qualification, for example). However, this particular study is less concerned about generalizations on an absolute level (that is, not to formulate conclusions about teachers in New York State as a population) but to elucidate the relationships between variables.

## **RESULTS**

### ***DEPENDENT VARIABLES***

#### *Risk Perception*

Perceived risk is “one’s belief about the likelihood of personal harm.” (Vernon 1999) Accordingly, the measure of risk perception draws upon a collection of inquiries from the questionnaire. The risk perception variables address the extent to which an individual considers a factor one that increases the risk of breast cancer (risk perception), the amount of concern for possible health risks within the school building and community (concern), and the personally attributed likelihood of developing a health problem during an individual’s lifetime.

The questionnaire listed 18 factors to which the sample decided whether or not the factor increases the risk of breast cancer (See Appendix Table 2). The factors are further divided into two groups: controllable and non-controllable. The controllable risk factors are those that can be personally managed or directed (i.e. cigarette smoking, lack of regular exercise, what I eat, etc.). The non-controllable risk factors are those that are out of the hands of human control (i.e. age, late age at menopause, ethnic group, etc.). The categorization of controllable and non-controllable risk factors can be contested (i.e. exposure of pesticides as controllable) but the guidelines were strictly established as those within human control (whether personal or external) versus those out of human control. The purpose is to begin to distinguish social and environmental factors (controllable) from biological factors (non-controllable). For each factor, a coded value is attributed to the degree of agreement the sample has with the view that the named risk

factor increased breast cancer risk, with the lowest value of “1” designated to “strongly disagree,” and the highest value of “4” designated to “strongly agree.” The risk perception variable is the summation of opinions of the risk levels of all the risk factors; higher scores indicate increased perceptions of risk.

The concern variable is the summation of the degree of concern the sample has about school building problems (i.e. asbestos, chemical odors, mold on ceiling/walls, etc.; See Appendix Table 3) and community health risks (i.e. air quality problems, cancer cluster, chemical spill, etc.; See Appendix Table 4). Finally, the likelihood measure of risk perception quantifies the degree to which the sample personally attributes their likelihood of developing a health problem, such as any cancer, diabetes, heart disease, stroke or obesity, at some point in their lifetime (See Appendix Table 5). Again, the higher values indicate increased concern and increased personally attributed likelihood (Table 1).

**Table 1:** Descriptive statistics of risk perception variables.

	N	Range	Mean
<i>Risk Perception</i>			
Controllable	1052	0-48	32.8669
Non-controllable	1035	0-24	16.0860
<i>Concern</i>			
School building	1028	7-35	19.1109
Community	858	9-45	22.6142
<i>Likelihood</i>	1001	0-29	15.9041

### *Health Information-Seeking*

Health information-seeking is measured through two approaches. First, it is measured through whether or not the teacher or ESP has completed any of the 7 health information-seeking behaviors listed in the questionnaire within the past two years (See Appendix Table 6). Therefore, the health information-seeking behavior variable is the summation of all the behaviors performed; each executed behavior is attributed with the value “1” and higher scores indicate more health information-seeking behavior.

The second approach for assessing health information-seeking is through measuring the degree to which the teacher or ESP agrees with the following statement: “I have searched actively for information about breast cancer risk” (See Appendix Table 7). The active search effort variable is the personal attribution of their amount of information-seeking. Again, higher scores indicate a higher belief of personal search effort (Table 2).

**Table 2.** Descriptive statistics of health information-seeking variables.

	N	Range	Mean
<i>Health information-seeking behavior</i>	1100	0-7	2.0064
<i>Active search effort</i>	996	1-4	2.2309

## ***ANALYSIS***

The risk perception and health information-seeking variables were linearly regressed on: (1) a block of familial status variables; (2) a block of social networks variables; (3) a block of social integration variables. A probability level of  $p < 0.05$  is used as the base level of statistical significance.

### *Familial Status*

Among the all female sample of teachers and ESPs, 72.5% are married, 14.2% are single and 13.2% are either divorced, separated or widowed. In addition, 68.1% of the sample has at least one child and 21.9% has no children. Among the parents, 38.6% have one or more children under 18, while 51.0% have children over 18.

Regression tests indicate that the correlation between the familial status variables and the risk perception and health information-seeking variables is minimal. In the block of risk perception variables, none of the familial status variables were significant predictors of risk perception behaviors (Table 3). In the case of health information-seeking, familial status variables had a minimal predictor disposition. Only marital status is shown to be a significant predictor of health information-seeking behaviors, and having no children is a significant predictor of personally attributed level of search effort for information about breast cancer (Table 4).

**Table 3.** Linear regression analysis of familial status variables and their associations with risk perception ( $p < 0.05$ ).

Independent variable	Risk perception		Concern		Likelihood
	<i>Controllable</i>	<i>Non-controllable</i>	<i>School building</i>	<i>Community</i>	
<i>Marital status</i>	.424	.712	.087	.958	.151
<i>Children under age 18</i>	.960	.911	.663	.273	.901
<i>Children above age 18</i>	.455	.835	.367	.507	.735
<i>No children</i>	.331	.274	.163	.895	.071

**Table 4.** Linear regression analysis of familial status variables and their associations with health information-seeking ( $p < 0.05$ ).

Independent variable	Health information-seeking behavior	Active search effort
<i>Marital status</i>	.008	.623
<i>Children under age 18</i>	.648	.092
<i>Children above age 18</i>	.538	.418
<i>No children</i>	.963	.022

### *Social Networks*

For the purposes of this study, social networks describe the people teachers and ESPs interact with. The importance of social networks is to evaluate how personal relationships can be influential to an individual's health, and which ones are more significant. Consequently, the social networks variable is calculated through the teacher or ESP's communication about health issues with members of her social network, and experience with health problems.

The communication variable measures whether or not the sample has ever spoken to their spouse/partner, family, friends at work, friends outside work and health care provider about health problems (See Appendix Table 8). The communication variable is the summation of how many people the sample spoke to about each health problem. Higher scores indicate more overall communication about any type of health problem.

The experience variable measures whether or not the teacher or ESP has ever personally developed a health problem, or had someone in their social network afflicted with a health problem (See Appendix Table 9). The experience variable is the summation of all health problems the self and members of the sample's social network. Similarly, the higher the value, the more experience the sample has with health problems (Table 5).

Regression analysis testing the predictability factor of social network variables on risk perception variables generated mixed results. Communication of health issues among members of the sample's social network is a significant predictor of *all* risk perception variables (risk perception of controllable risk factors and non-controllable risk factors, concern about the school building and the community, and personally attributed

likelihood of developing a health problem during the lifetime). Increased experience with health problems either through personally having a disease or through a member of a social network is only a significant predictor of health concerns within the community and personally attributed likelihood of developing a health problem (Table 6).

For the health information-seeking variables, communication of health issues is also a predictor of both health information-seeking behaviors and personally attributed level of search effort concerning information about breast cancer risk. On the other hand, experience with health problems is only a predictor of health information-seeking behaviors (Table 7).

**Table 5.** Descriptive statistics of social network variables.

Independent variable	N	Range	Mean
<i>Communication</i>	1109	0-25	10.3959
<i>Experience</i>	1109	0-19	6.9197

**Table 6.** Linear regression analysis of social network variables and their associations with risk perception ( $p < 0.05$ ).

Independent variable	Risk perception		Concern		Likelihood
	<i>Controllable</i>	<i>Non-controllable</i>	<i>School building</i>	<i>Community</i>	
<i>Communication</i>	.031	.000	.002	.005	.002
<i>Experience</i>	.056	.507	.236	.001	.000

**Table 7.** Linear regression analysis of familial status variables and their associations with health information-seeking ( $p < 0.05$ ).

Independent variable	Health information-seeking behavior	Active search effort
<i>Communication</i>	.000	.000
<i>Experience</i>	.022	.114

### *Social Integration*

The social integration variable measures the *active* participation within a social network. Social integration is computed through three measures: awareness of local news, community participation and general participation activities. The awareness of local news variable measures how frequently the sample watches local television news and reads the local daily newspaper (See Appendix Table 10). The frequency ranges from almost never to nearly every day; the higher the score the more the sample watches local television news and reads the local paper.

The community participation variable measures the sample's attendance at various community organizations (See Appendix Table 11). Higher values indicate higher frequency of attendance to activities and meetings of community organizations. The general participation activities variable, on the other hand, measures whether or not the teacher or ESP has ever contributed to any of the listed general participation activities (i.e. asked school administration to make changes, signed a petition, voted in a local election, etc.; See Appendix Table 12; Table 8). Higher values for the general participation activities variable denotes increased participation behaviors.

Data analysis through linear regression tests suggest that awareness of local news through watching the local television news and reading the local daily newspaper is only a predictor of concern about school building problems. Alternatively, community participation is a significant predictor of increased risk perception of controllable and non-controllable risk factors, concern about potential health hazards within the community (but not of the school building), and likelihood of developing a health problem. General participation activities are shown to be a significant predictor of increased risk perception of controllable risk factors, but not non-controllable risk factors. Additionally, general participation activities are significant predictors for both concerns about health risks in the school building and the community, as well as an increased personally attributed likelihood of developing a health problem (Table 9).

Social integration variables are good predictors of health information-seeking behaviors. Only awareness of local news is shown to be a poor predictor of health information-seeking behaviors. However, increased frequency of watching and reading the news is a significant predictor of the degree of search effort for information about breast cancer risk. Community participation and general participation activities are both significant predictors of health information-seeking behaviors and personally attributed active search efforts (Table 10).

**Table 8.** Descriptive statistic of social integration variables.

Independent variable	N	Range	Mean
<i>Awareness of local news</i>	1073	2-10	5.2684
<i>Community participation</i>	995	11-41	20.5085
<i>General participation activities</i>	1075	0-8	4.6512

**Table 9.** Linear regression analysis of social integration variables and their associations with risk perception ( $p < 0.05$ ).

Independent variable	Risk perception		Concern		Likelihood
	<i>Controllable</i>	<i>Non-controllable</i>	<i>School building</i>	<i>Community</i>	
<i>Awareness of local news</i>	.202	.527	.000	.282	.585
<i>Community participation</i>	.001	.009	.062	.001	.040
<i>General participation activities</i>	.028	.199	.000	.005	.001

**Table 10.** Linear regression analysis of social integration variables and their associations with health information-seeking ( $p < 0.05$ ).

Independent variable	Health information-seeking behavior	Active search effort
<i>Awareness of local news</i>	.381	.000
<i>Community participation</i>	.000	.000
<i>General participation activities</i>	.000	.000

## DISCUSSION

Because the associations between social support and health status have been consistent and noteworthy, this research thesis sought to examine the mechanisms of social support in the health-related behaviors of risk perception and information-seeking. The mechanisms of social support explored are familial status, membership in social networks, and social integration.

Familial status variables were poor indicators of both risk perception and information-seeking. Parental relations failed to predict risk perception and information-seeking yet the literature fervently suggests otherwise, particularly in the case of marriage. With this said, the only association made is between the marital relation and health information-seeking behavior; married individuals are more likely than their unmarried counterparts to engage in the following behaviors: asking doctor about breast cancer risk factors, buying a book related to breast cancer, contacting a local breast cancer group for information, etc.

One major limitation of this analysis is that the research hypotheses, particularly the one concerning parents versus non-parents, relied on assumptions about living arrangements; an assumption is made that parents with children under 18 will live with their parents. This is not to say that failure to find a significant link between familial relationships and risk perception, and information-seeking is to the fault of this assumption, but to acknowledge the weaknesses of the familial status measure.

According to Debra Umberson (1989), the relational content between parent and child must be considered in assessing the effect of parenthood on a parent's well-being.

Family theorists argue that the contemporary family has lost its intrinsic instrumental functions. Instead of providing economic value, children are often an economic liability. The added stress of children may therefore explain why individuals with no children are shown to be associated with health information-seeking tendencies (active search effort). Perhaps, non-parents have more free time, and thus more time to search for information compared to parents who must allot time out for child management. Albeit the parent-child relationship is one of the strongest bonds between two individuals and the parental role necessitates certain behaviors, attitudes, values and adjustments that may be beneficial to health, it is also an intense commitment. Additionally, the parental role is a commitment to care for the well-being of another—the child, particularly at younger ages. The intensity of the parent-child relationship along with the obligations of the parental role may contribute to additional stress and negligence of one's own health

The modern trends of familial dynamics, such as single parenthood, divorce and the increased female participation within the workforce may strain parent-child relationships, as well as the marital relationships. Consequently, the instrumental value of familial relationships in health status may require reassessment with consideration of the changes in family structure and social roles; what it means to be a wife and a mother may vary greatly from one generation to another. Future analysis of familial dynamics will also consider how these familial ties may affect other relations (i.e. friendships) and facilitate or impede social integration (i.e. participation in social networks outside that of the family).

Social network and social integration illustrated more definitive associations with health behaviors. Communication about health issues and experience with health

problems among individuals of a social network are significant predictors of risk perception and information-seeking. Most notably, increased communication about health issues is significantly linked with all tested aspects of risk perception and information-seeking.

Moreover, social integration factors of community participation and general participation activities are similarly confirmed as strong predictors of risk perception and information-seeking. However, the linear regression tests indicate that community participation is not a strong predictor of concern for health hazards in the school building, and general participation activities are not associated with increased risk perception of non-controllable risk factors. Awareness of local news is shown to predict concern for health hazards within the school building, and personal belief that their search efforts for information about breast cancer have been active.

Why these social networks and social integration variables only predict some aspects of risk perception and information-seeking is unknown. Additional examination on the mechanisms of social networks and social integration will be pursued in the future to identify more specific details about the influence these factors have on health behaviors. Refining how these variables are defined may be the solution.

In addition the social networks and social integration variables can be split into more specific relationships. For example, how does communication about health issues with family members differ from communication with friends (both from work and outsider work)? Furthermore, how do occupational friendships compare to non-occupational friendships? Likewise, similar questions will be posed to differentiate the relationships involved in the experience with health problems variable. Will personal

experience with health problems be more influential in altering health behaviors than the experience of a sick family member or a sick friend? The breakdown of the larger social network can expose key players. Uncovering the strength of particular social ties is essential for understanding how communicative and experiential encounters can alter health behaviors.

In the same way, the social integration variables can be dissected in order to generate more precise conclusions. Which community organizations more prominently affect risk perception and information-seeking behaviors? The questionnaire includes a list of community organizations that are widely varied in purpose; some are specific to health while others are religious, social or political. Future research will investigate how these organizations can differentially influence health behaviors.

Perceived risk and information-seeking behaviors are central constructs in health behavior models, and particularly an important motivator of several health-related behaviors. Accordingly, it is imperative to understand the determinants of risk perception and information-seeking to unveil the roots of this web of associations. With this, effective risk communication messages can be informatively designed to encourage the adoption of behaviors that will improve health status. The influence of social support on health status is the “big picture” that this research thesis sought to refine. Although some associations between social support and health status began to take form, the web is far more intricate and convoluted. Only further examinations can expose those links that appear nonexistent in the “big picture,” but are evident upon closer inspection.

## REFERENCES:

1. Berkman, Lisa F. (1984) "Assessing the physical health effects of social networks and social support." *Annual Review Public Health* 5: 413-432.
2. Berkman, Lisa F., Thomas Glass, Ian Brissette, and Teresa Seeman. (2000) "From social integration to health: Durkheim in the new millennium." *Social Science and Medicine* 51: 843-857.
3. Bernstein, Leslie, Mark Allen, Hoda Anton-Culver, Dennis Deapen, Pamela L. Horn-Ross, David Peel, Richard Pinder, Peggy Reynolds, Jane Sullivan-Halley, Dee West, William Wright, Al Ziogas, and Ronald K. Ross. (2002) "High breast cancer incidence rates among California teachers: Results from the California Teachers Study (United States)." *Cancer Causes and Control* 13(7): 625-635.
4. Burr, Jeffrey A. and Jan E. Mutchler. (1992). "The Living Arrangements of Unmarried Elderly Hispanic Females." *Demography* 29: 93-112.
5. Callaghan, Patrick, and Jean Morrissey. (1993). "Social support and health: A review." *Journal of Advanced Nursing* 18: 203-210.
6. Carpenter, Lucy, and Eve Roman. (1999). "Cancer and occupation in women: Identifying associations using routinely collected national data." *Environmental Health Perspectives* 107(2): 299-303.
7. Cobb, Sidney. (1976). "Social support as a moderator of life stress." *Psychosomatic Medicine* 38: 300-314.

8. DeVito, Anthony J., Joan Bogdanowicz, and Marvin Reznikoff. (1982). "Actual and intended health-related information seeking and health locus of control." *Journal of Personality Assessment* 46(1): 63-69.
9. Durkheim, Emile. (1951). *Suicide: A Study in Sociology*. Translated by John A. Spaulding and George Simpson. New York: The Free Press.
10. Gove, Walter R. (1973). "Sex, marital status, and mortality." *American Journal of Sociology* 79: 45-67.
11. House, James S., Karl R. Landis, and Debra Umberson. (1988). "Social relationships and health." *Science* 241: 540-545.
12. Kiecolt-Glaser, Janice K., and Tamara L. Newton. (2001). "Marriage and health: His and hers." *Psychological Bulletin* 127(4): 472-503.
13. Kobrin, Francis, and Gerry Hendershot. (1977). "Do family ties reduce mortality? Evidence from the United States, 1966 – 1968." *Journal of Marriage and the Family* 39: 737-745.
14. Marsden, Peter V., and Noah E. Friedkin (1994). "Network studies of social influence." In S. Wasserman, & J. Galaskiewicz, *Advances in social network analysis: research in the social and behavioral sciences*. Thousand Oaks, CA: Sage. 3-25.
15. Pollán, Marina, and Per Gustavsson. (1999). "High-risk occupations for breast cancer in the Swedish female working population." *American Journal of Public Health* 89(6): 875-881.

16. Reynolds, Peggy, Eric P. Elkin, Michael E. Layefsky, and Geraldine M. Lee. (1999). "Cancer in California school employees, 1988-1992." *American Journal of Industrial Medicine* 36(2): 271-278.
17. Robinson, Cynthia F., and James T. Walker. (1999). "Cancer mortality among women employed in fast-growing U.S. occupations." *American Journal of Industrial Medicine* 36(1): 186-192.
18. Rogers, Richard G. (1996). "The effects of family composition, health, and social support linkages on mortality." *Journal of Health and Social Behavior* 37: 326-338.
19. Rubin, C.H., C.A. Burnett, W.E. Halperin, and P.J. Seligman. (1993). "Occupation as a risk identifier for breast cancer." *American Journal of Public Health* 83(9): 1311-1315.
20. Seeman, Teresa E. (1996). "Social Ties and Health: The Benefits of Social Integration." *Annals of Epidemiology* 6(5): 442-451.
21. Seeman, Teresa E., George A. Kaplan, Lisa Knudsen, Richard Cohen, and Jack Guralnik. (1987). "Social Network Ties and Mortality Among the Elderly in the Alameda County Study." *American Journal of Epidemiology* 126: 714-723.
22. Shumaker, Sally A., and Arlene Brownell. (1984). "Toward a theory of social support: Closing conceptual gaps." *Journal of Social Issues* 40(4): 11-36.
23. Umberson, Debra. (1987). "Family status and health behaviors: Social control as a dimension of social integration." *Journal of Health and Social Behavior* 28(3): 306-319.

24. Umberson, Debra. (1989). "Relationships with children: Explaining parents' psychological well-being." *Journal of Marriage and Family* 51: 999-1012.
25. Vernon, Sally W. (1999) "Risk perception and risk communication for cancer screen behaviors: A review." *Journal of National Cancer Institute Monographs* 25: 101-119.
26. Zheng, T., T.R. Holford, S. Taylor Mayne, J. Luo, P. Hansen Owens, S. Hoar Zahm, B. Zhang, Y. Zhang, W. Zhang, Y. Jiang, and P. Boyle. "A case-control study of occupation and breast-cancer risk in Connecticut." *Journal of Cancer Epidemiology and Prevention* 7(1): 3-11.

## APPENDIX

**Appendix Table 1.** Frequency of responses concerning demographic information.

	Percentage
<i>Community Type</i>	
On a farm	3.2
Rural area with farmland near	27.9
Rural area with no farmland near	3.3
Small neighborhood in a rural area	14.2
Edge of town or city near farmland	19.5
Inside town or city not near farmland	31.9
<i>Teaching Assignments</i>	
Elementary (Pre-K through sixth grade)	28.6
Teacher: middle/junior high	8.3
Teacher: high school	15.5
Teacher: other	8.0
ESP (teacher's aides, assistants)	17.5
ESP (administrative)	3.6
ESP (transportation, food service)	2.8
Other	15.7
<i>For Teachers, Tenure Area</i>	
Art	1.5
Elementary (Pre-K through sixth grade)	20.7
English	4.1
Foreign Languages	1.5
Health	0.9
Home economics	0.4
Industrial arts	0.0
Mathematics	3.8
Music	0.0
Physical education	1.3
Remedial reading/speech	3.2
Science	2.4
Social studies	2.3
Special Ed.	12.3
Supportive educational services (guidance counselor, library media specialist, school social worker etc.)	3.6
Vocational areas	0.9
Other	4.6

**Appendix Table 2.** Frequency of responses for the degree to which teachers and ESPs agree that the following factors increase risk of breast cancer (N=993; the following values are the percentages).

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
<i>Controllable</i>					
Being older when first child born	2.1	25.8	33.2	13.8	25.0
Chemical residues in food	0.6	5.6	46.7	34.9	12.1
Cigarette smoking	0.6	4.5	34.5	54.9	5.4
Environmental pollution	0.5	3.4	37.9	50.9	7.7
Exposure to pesticides	0.5	3.7	38.9	45.6	12.0
Exposure to radiation	0.7	2.5	35.6	52.2	9.0
Hormone Therapy	0.9	6.3	38.8	35.2	18.8
Lack of regular exercise	2.0	16.8	45.1	30.5	15.0
Not breastfeeding	6.2	28.9	23.2	11.0	30.7
Stress	1.5	13.3	40.6	25.9	18.7
Weight / obesity	1.3	12.4	41.7	28.7	15.9
What I eat	1.5	10.0	46.5	29.3	12.6
<i>Non-controllable</i>					
Age	1.8	12.6	51.9	29.0	4.6
Early age at menarche (or start of menstruation)	2.5	25.7	30.4	10.2	31.2
Late age at menopause	2.1	32.1	22.0	6.1	37.7
Ethnic group	0.9	13.7	43.5	20.0	21.8
Family history of breast cancer	0.1	0.8	16.0	80.5	1.6
Genes	1.0	1.6	21.7	72.1	3.5

**Appendix Table 3.** Frequency of responses measuring the extent that teachers and ESPs think the following are a problem in their school building (N=1028; the following values are the percentages).

	Not at all a problem	Not much of a problem	Somewhat of a problem	Quite a problem	A big problem
Asbestos	30.7	31.5	27.7	6.9	3.3
Availability of healthy foods	14.5	21.4	33.3	18.3	12.5
Chemical odors	22.2	40.7	27.1	7.2	2.7
Indoor temperature	7.5	20.2	41.0	19.9	11.4
Mold on ceilings/walls	30.4	33.8	20.3	9.5	6.0
Time and space for the school staff to exercise	10.2	15.8	25.6	23.0	25.4
Ventilation	11.1	28.2	30.4	16.1	14.3

**Appendix Table 4.** Frequency of responses measuring the degree to which teachers and ESPs are concerned about how any of these community problems might affect their own health or their family's health (N=858; the following values are the percentages).

	Not at all concerned	A little concerned	Somewhat concerned	Concerned	Very concerned	Not applicable
Air quality problems	21.1	27.4	23.5	15.1	12.2	0.7
Availability of healthy foods	56.5	15.9	10.7	9.5	6.2	1.2
Cancer cluster	20.0	16.9	19.0	17.2	22.3	4.7
Chemical spill	40.6	17.5	12.8	10.3	9.9	8.9
Lack of place for exercise	64.4	10.6	10.4	7.4	3.1	4.1
Polluting industry	20.7	25.2	19.3	15.3	16.3	3.2
'Sick building'	30.5	18.6	14.5	12.3	15.8	8.3
Soil contamination	20.3	21.9	18.9	17.7	18.0	3.2
Water quality problems	17.7	20.5	18.5	20.5	21.3	1.5

**Appendix Table 5.** Frequency of responses measuring the degree of personally attributed likelihood of developing a health problem (N=1001; the following values are the percentages).

	Almost no chance	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely	Almost certain	Not sure	I have already been diagnosed
Any cancer	2.4	5.9	16.8	44.4	12.5	3.0	11.6	3.3
Breast cancer	3.1	12.0	27.5	34.9	6.2	1.1	12.0	3.1
Diabetes	7.9	17.4	21.8	30.8	10.1	2.2	6.2	3.7
Heart disease or stroke	3.0	8.9	19.3	42.0	13.4	3.4	7.7	2.2
Obesity	20.5	23.5	15.4	16.5	6.2	3.5	4.1	10.2

**Appendix Table 6.** Frequency of responses of whether or not the following health information-seeking behaviors were performed in the last two years (N=1100).

	Percentage Yes
Asked your doctor about breast cancer risk factors	33.1
Bought a book related to breast cancer	6.2
Bought a magazine for specific information about breast cancer	12.4
Contacted a local breast cancer group for information	4.9
Talked to a friend/family member who has been diagnosed with breast cancer about breast cancer	55.8
Visited a web site about any health topic	67.4
Visited a web site about breast cancer	21.2

**Appendix Table 7.** Frequency of responses measuring the extent to which teachers and ESPs believe they have searched actively for information about breast cancer risk (N=996; the following values are the percentages).

	Strongly disagree	Disagree	Agree	Strongly agree
I have searched actively for information about breast cancer risk.	15.1	43.8	26.5	4.7

**Appendix Table 8.** Frequency of responses measuring whether or not teachers and ESPs have talked to any of the following people about any cancer, breast cancer in particular, diabetes, heart disease, or obesity (N=1109).

	Percentage Yes
Talked to spouse about any cancer	55.2
Talked to family about any cancer	63.7
Talked to friends at work about any cancer	63.3
Talked to friends outside work about any cancer	52.8
Talked to health care provider about any cancer	37.6
Talked to spouse about breast cancer	31.8
Talked to family about breast cancer	42.2
Talked to friends at work about breast cancer	52.5
Talked to friends outside work about breast cancer	38.3
Talked to health care provider about breast cancer	40.0
Talked to spouse about diabetes	34.2
Talked to family about diabetes	49.4
Talked to friends at work about diabetes	34.8
Talked to friends outside work about diabetes	26.8
Talked to health care provider about diabetes	27.1
Talked to spouse about heart disease/stroke	42.4
Talked to family about heart disease/stroke	51.1
Talked to friends at work about heart disease / stroke	34.6
Talked to friends outside work about heart disease / stroke	29.8
Talked to health care provider about heart disease / stroke	32.6
Talked to spouse about obesity	43.1
Talked to family about obesity	46.9
Talked to friends at work about obesity	44.7
Talked to friends outside work about obesity	35.1
Talked to health care provider about obesity	29.4

**Appendix Table 9.** Frequency of responses measuring whether or not teachers and ESP have experience with any of the following health problems either through the self, family, friends at work or friends outside work (N=1109).

	Percentage Yes
Experienced any cancer in self	6.1
Experienced any cancer among family	70.2
Experienced any cancer among friends at work	47.7
Experienced any cancer among friends outside work	47.9
Experienced breast cancer in self	3.9
Experienced breast cancer among family	37.0
Experienced breast cancer among friends at work	47.2
Experienced breast cancer among friends outside work	40.4
Experienced diabetes in self	4.4
Experienced diabetes among family	63.3
Experienced diabetes among friends at work	30.9
Experienced diabetes among friends outside work	30.7
Experienced heart disease/stroke in self	4.1
Experienced heart disease/stroke among family	68.0
Experienced heart disease/stroke among friends at work	22.5
Experienced heart disease/stroke among friends outside work	30.2
Experienced obesity in self	19.6
Experienced obesity among family	46.0
Experienced obesity among friends at work	36.3
Experienced obesity among friends outside work	35.6

**Appendix Table 10.** Frequency of responses concerning the extent to which teachers and ESPs are aware of or seek out news concerning their local community (N=1073; the following values are the percentages).

	Nearly everyday	4-5 times in a week	3-4 times in a week	1 or 2 times a week	Almost never	There is no local news channel/local paper
In the past week, how many times did you watch local television news?	33.2	17.3	15.9	17.2	14.0	2.4
How frequently do you read a local daily newspaper?	40.1	9.0	11.0	23.2	16.3	0.4

**Appendix Table 11.** Frequency of responses measuring the degree to which teachers and ESPs participate in activities or meeting of the following types of community organizations (N=995; the following values are the percentages).

	Regularly attend meeting or participate in activities	Sometimes attend meetings or participate in activities	Don't usually attend or participate but stay informed about the group	I do not have any interaction with such a group
Community action group	4.1	13.4	32.4	50.1
Cultural or ethnic group	3.6	9.0	19.7	67.7
Group working on health issues	3.7	13.6	29.5	53.2
Group working to improve the environment	1.7	9.5	35.7	53.2
Local political group	2.1	7.6	30.6	59.6
Neighborhood group	2.7	15.0	23.3	59.0
PTA	5.9	23.7	29.4	41.0
Religious group	28.2	23.6	18.0	30.1
Service organization	16.6	21.0	19.9	42.5
Support group of any kind	7.9	16.8	17.7	57.5
Teacher's Association	33.8	31.9	20.9	13.4

**Appendix Table 12.** Frequency of responses measuring whether or not teachers and ESP have contributed to the following general participation activities (N=1075; the following values are the percentages).

	Percentage Yes
Asked school administration to make changes	66.4
Attended a public meeting	77.5
Brought an issue to the attention of the NEA	22.1
Signed a petition	39.2
Volunteered or worked with an organization to organize a campaign	48.4
Voted in local election	93.1
Written a letter to an elected official	55.6
Written to government agency or similar organization about occupational hazard	14.8