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Do Resources of Network Members Help in Help Seeking?

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Abstract

Does social capital as resources of network members affect health information search? Analyzing data from the 2004 General Social Survey in the United States, this study measures two social capital indicators (average education of network members and proportion of network members with a high school degree or higher) using the name generator. Most results are consistent using those two indicators. Both indicators are positively associated with frequency of health information seeking and seekers' frequency of use of two sources (friends or relatives and the Internet). Also average education of network members is positively associated with seekers' diversity of used sources and frequency of consultation with medical professionals. But neither indicator is associated with seekers' frequency of use of other four sources (health-related magazines or newsletters, general magazines, daily newspapers, and radio or television programs). The findings demonstrate the theoretical utility of social capital in the social dynamics of medical help-seeking.

Key Words: network members' resources, social capital, health information search

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1. Introduction

Access to health information is essential for both health and illness behaviors. It is crucial for health literacy improvement, health belief formation, health lifestyle practices, self-care activities, and medical services utilization (Andersen and Newman, 1973; Becker, 1974; Chinn, 2011; Cockerham, 2005; Pescosolido, 1992; Rosenstock, 1966; Segall and Goldstein, 1989). People in sickness or in health are now more health and cost conscious and more active in seeking health information as a result of multiple structural changes in American society. Health consumerism, the shift in medical care toward the prevention and treatment of chronic diseases, and the expanding medicalization encourages consumer participation in health care decision making and empowers consumers in access to health information (Brown, 1995; Conrad, 2005; Reeder, 1972). Also with managed care dominating the health care delivery system and health care costs spiraling, more health responsibility is shifted to individuals and their families (Light, 2004; Mechanic, 2004; Pescosolido and Kronenfeld, 1995; Quadagno, 2005). Furthermore, the rise of information technologies, in particular the Internet, drastically increases people's exposure to health information from more diverse and efficient sources and facilitates their social interaction and health knowledge transfer and exchange (Cotten, 2001; DiMaggio et al., 2001; Hardey, 1999; Wellman, 2001).

Durkheim's classic study on suicide ([1897] 1951) has stimulated a lively research tradition on health consequences of network-based factors (for reviews, see Berkman et al., 2000; House et al., 1988; Smith and Christakis, 2008; Umberson and Montez, 2010). Along that

tradition researchers have long identified the embeddedness of health information search in personal networks (Friedson, 1960, 1961; Suchman, 1964; Suchman, 1965). Studies in the past five decades have contributed to establishing the supremacy of network interaction and documenting the roles of various network factors in the process of medical help and information seeking (for a recent review, see Pescosolido, 2006). However, the question as to the role of one important network structure factor—resources possessed by network members (Freidson, 1960)—in that process still remains underexplored. Also network influences on the prevalence of health information search, the diversity of used sources, and the use of impersonal sources are underexamined.

In this study we argue that one of the network-based theories of social capital can help explore that remaining question, which conceives social capital as network members' assets and operationalizes it as those members' structural positions in the socioeconomic hierarchy (Lin, 1982; Lin, 2001). There are diverse theoretical and methodological approaches to social capital (e.g., Burt, 1992; Bourdieu, 1986 [1983]; Carpiano, 2006; Coleman, 1990; Lin, 1982; Lin, 2001; Putnam, 2000; Sampson et al., 1999). In this study Lin's network-based approach (1982; 2001) helps bridge the above research gap and does not go beyond available data. Also data from the 2004 General Social Survey (GSS) allow examination of the relationships of social capital to the frequency of health information search, the number of consulted sources, and the consultation with two personal and five impersonal sources, including the Internet, an increasingly powerful electronic source of health information (Cotten, 2001; Hardey, 1999). Findings in this study contribute to a fuller picture of "socially constructed" health care decision making (Pescosolido, 1992: 1096), and add to multiple schools of literature including social capital, social networks, help-seeking, social stratification, and media use, in particular Internet use.

This paper is organized as follows. First, it reviews the literature on social networks, social capital as network members' resources, and health information seeking, and identifies the research gaps. It then proposes research hypotheses. Next, it analyzes data from the 2004 GSS and reports results. It concludes with the theoretical implications of this study for future research.

2. Literature Review: Social networks, social capital as network members' resources and health information search

The existing social network studies on health information search have centered on the pathway to medical care, that is, health information seeking from medical professionals (for a recent review, see Pescosolido, 2006). The seminal theory of lay referral system draws our attention to the impacts of interpersonal influence and information flow through daily social intercourse with others on the use of professional medical services (Friedson, 1960, 1961). The theory conceives one's personal network as a set of ties to potential or actual lay health consultants, and argues that the structure of that network and its health and medical culture shape one's acceptance of or resistance to professional services. The theory also emphasizes the importance of another network structure factor—"diagnostic resources" of network members—in the process of help-seeking, but it does not operationalize that factor (Freidson, 1960: 376).

Empirical studies in the past five decades have documented the impacts of diverse network factors on the pathway to medical services (e.g., Calnan, 1983; Horwitz, 1977; Kadushin, 1966; McKinlay, 1973; Perrucci and Targ, 1982; Perry and Pescosolido, 2010; Pescosolido, 1986; Pescosolido et al., 1998; Pescosolido et al., 1998; Suchman, 1964; Wellman, 1995; Zola, 1973). Drawing on those empirical studies, the social organization strategy framework prioritizes the "primacy of social interaction" in medical decision making and

conceptualizes social networks as the mechanism of facilitating or constraining help and information seeking (Pescosolido, 1992: 1098). Arising out of that framework, the network-episode model outlines three aspects of social networks involved in the dynamic illness career: network structure (e.g., size, tie strength), network content (beliefs and attitudes toward health and medical care), and network functions (social support and social regulation) (Pescosolido, 1991, 2006).

While the above prior studies contribute to our better understanding of how diverse aspects of social networks shape health-related help and information seeking behaviors, one initial insight of lay referral system theory introduced above—the resources that network members control—has been underexplored (Freidson, 1960). Network members' resources represent an important network structure factor. It is a direct resource locator compared with other network structure factors such as network size and tie strength. It can directly determine the nature of network content (e.g., cultural norms on the use of indigenous versus professional practitioners within personal networks), the direction and degree of social regulation, and the quality and quantity of solicited or unsolicited social support (Abrums, 2000; Beggs et al., 1996; Freidson, 1961; Lin and Ao, 2008; McDonald et al., 2009).

In this study we argue that one of the network-based theories of social capital as network members' resources can help revitalize the research on that underexplored insight (Lin, 1982, 2001). This theory defines social capital as resources embedded in social networks that are accessed and/or mobilized in purposive actions, operationalizes it as resources under the control of one's network members, and measures it as the structural positions of those network members, in particular their socioeconomic positions inasmuch as those positions determine the amount of scarce resources they possess (Blau and Duncan, 1967). Individuals access and use social capital

only through direct and indirect social ties with their network members. This theory adopts a social resource perspective, and conceives social capital as a unique resource locator and a stratifier at the relational level. It proposes that social capital advances instrumental returns (e.g., wealth, power, and reputation) through multiple mechanisms, including exerting influences, offering information, serving as social credentials, and reinforcing group identity and recognition (Lin, 2001). A substantial body of empirical research has systematically examined and verified the contribution of social capital to status attainment, on the job market in particular, across cultures and societies over the past three decades (for reviews, see Lin, 1999; Portes, 1998).

Recently, the theoretical and empirical extension of social capital as socioeconomic positions of network members to health returns has been growing (for a review, see Song et al., 2010). Theoretically, social capital thus conceptualized and measured protects health through diverse potential pathways (Erickson, 2003; Song, 2011): exerting influence on access to health care, encouraging engagement in healthy behaviors, providing social support, decreasing exposure to stressors, advancing objective social status, enhancing subjective social status, and reinforcing psychological resources such as self-esteem and sense of control. As a growing body of quantitative studies in different societies has documented, social capital is positively associated with self-reported health, life satisfaction and smoking cessation, and negatively related to anomia, mental distress and being overweight (Acock and Hurlbert, 1993; Christakis and Fowler, 2008; Moore, Daniel, Gauvin, and Dubé, 2009; Moore, Daniel, Paquet, Dubé, and Gauvin, 2009; Moore et al., 2011; Song, 2011; Song and Lin, 2009; Webber and Huxley, 2007). The role of social capital in the process of health information seeking, however, remains unclear.

The purpose of this study is to investigate the direct impact of social capital as resources of network members on health information search behaviors. Also note that the outcome of interest in prior social network studies on health information seeking is primarily help seeking from personal sources, in particular medical professionals (Pescosolido, 1992). Other outcomes— such as the prevalence of health information search in general, the diversity of used information sources, and the consultation with impersonal sources—are underexamined. Data from the 2004 GSS provide a unique opportunity to study those outcomes apart from consultation with personal sources. In the next section we propose a set of hypotheses.

3. Hypotheses: Social capital as network members' resources and health information search

In this study based on available data, we ask whether social capital as network members' resources influences the frequency of health information seeking, the diversity of consulted information sources by those health information seekers, and the frequency of those seekers' consultation with two personal health information sources—medical professionals, and friends or relatives—and five impersonal ones, including the Internet, health-related magazines or newsletters, general magazines, newspapers, and radio or TV programs.

We argue that people with more social capital—that is, connection to network members with richer resources—are more active in health information seeking, and that those seekers in connection with network members with more assets are likely to consult more diverse sources and to use each source available to them. Individuals' personal capital, which is their own socioeconomic status (SES), proves to be a fundamental cause of their health (Link and Phelan

1995). Their social capital is the aggregate personal capital of their network members. From the social resource perspective, social capital can influence the frequency of health information seeking and the diversity of used sources positively through three mechanisms: increased exposure to health information, enhanced seeking abilities, and reinforced health culture or norms embedded in social networks.

The first mechanism is increased exposure to health information. People with more socioeconomic resources, in particular education, are more demanding about health information, more knowledgeable and informed about health maintenance and promotion, and more aware of health information from different sources (Freidson, 1961; Langlie, 1977; Suchman, 1965; Viswanath et al., 2006; Warner and Procaccino, 2007). People who are more attentive to health information are also more likely to serve as mavens, disseminating health information to their network members through their advice and word of mouth (Kontos et al., 2011; Valente and Pumpuang 2007). Therefore when in connection with resource-richer network members, individuals are more likely to be exposed to health advice and recommended sources—solicited or unsolicited—from their network members, which can motivate individuals to enter health consultation with various sources for further confirmation and medical help (Abrums, 2000).

The second mechanism is enhanced seeking abilities. With ties to resource-richer social contacts, individuals are more likely to receive diverse forms of social support (e.g., material, financial and emotional support) beyond the aforementioned informational aid from those contacts, and also more likely to obtain more socioeconomic and psychological resources (Abrums, 2000; Beggs et al., 1996; Erickson, 2003; Lin, 1999; Lin and Ao, 2008; McDonald et al., 2009; Song, 2011), which can enhance individuals' capability of seeking health information and medical help from various sources.

Another mechanism is reinforced health culture embedded in social networks, that is, norms surrounding attention to health information, attitudes toward different personal or impersonal information sources, and motivation to seek information. People with more socioeconomic resources, in particular educational achievement, are more engaged in seeking health information and medical help (Cotten and Gupta, 2004; Dutton, 1978; Lutfey and Freese, 2005; Ramanadhan and Viswanath, 2006; Ross and Wu, 1995; Schaffer et al., 2008). Thus with asset-richer network members, individuals are embedded in a stronger network norm of health maintenance and health information seeking from different sources (Freidson, 1961; Langlie, 1977; Suchman, 1965), which exerts influential peer pressure and informal social regulation and encourages individuals' disposition to look for health information from multiple sources.

Thus we propose three hypotheses from the social resource perspective: social capital as network members' resources is positively associated with the frequency of health information search (H1), the diversity of sources those health information seekers consult (H2), and the frequency of health information seekers' use of every source available to them (H3).

Furthermore, we argue that of those different sources, social capital is likely to influence the use of three sources more powerfully: medical professionals, friends or relatives, and the Internet. Consultation with medical professionals depends more likely on network members' resources because resource-richer network members, in particular more educated network members, help form a stronger network culture of health which is science-oriented and characterized by greater trust and acceptance of medical practitioners (Freidson, 1961; Langlie, 1977; Suchman, 1965). If in need of health information, individuals embedded in such network culture are more likely to be referred to those professionals by their network members or are

more inclined to visit medical professionals under the influence of medical norms within their networks.

Also, we argue that consultation with friends or relatives relies more likely on network members' resources. In this study we capture social capital using the name generator, which maps personal networks characterized by strong ties, including ties to friends or relatives (Campbell and Lee, 1991; Granovetter, 1973; Marsden, 1987). As argued above, people with more socioeconomic resources have higher health literacy and better diagnostic resources (Freidson, 1961; Langlie, 1977; Suchman, 1965; Viswanath et al., 2006; Warner and Procaccino, 2007). Thus the more resources those strong-tie network members possess, the more attractive and trustworthy they are to individuals as health information sources.

In addition, Internet browsing for health information may be more contingent on network members' resources because of the socioeconomic digital divide (Cotten, 2001; DiMaggio et al., 2001). People with higher socioeconomic standing are more likely to use the Internet for health purposes (Cotten and Gupta, 2004; Schaffer et al., 2008). When surrounded by network members with more socioeconomic resources, individuals are more likely to be directed to the Internet by their network members.

Thus we propose the fourth hypothesis: of those different sources, social capital is more likely to influence the use of three sources: medical professionals, friends or relatives, and the Internet (H4).

4. Data and methods

4.1. Data

Data were drawn from the 2004 General Social Survey (GSS; Smith et al., 2011a). The GSS is a repeated cross-sectional survey of a nationally representative sample of non-institutionalized U.S. adults, which has been conducted by the National Opinion Research Center since 1972. Using a full-probability sample design, the GSS interviewed respondents face to face through computer-assisted personal interviewing. The GSS regularly includes topical modules apart from core items, but does not administer all modules to all respondents. When analyzing questions from these different modules, the sample will still be nationally representative but the sample size will be much smaller than the full sample size (Cotten and Gupta, 2004; McPherson et al., 2006). The 2004 GSS includes two modules among others—social networks and information society—and provides a unique opportunity to examine the relationship of health information search behaviors to social capital.

The 2004 GSS has a response rate of 70.4 percent with a sample size of 2,812. The subsample for this study included only those respondents who were administered both the social networks module and the information society module (N=984). The comparison of all used variables' characteristics in the full GSS sample and the subsample found no significant difference.[1] As in previous studies on ego-centered networks (e.g., Acock and Hurlbert, 1993; Beggs et al., 1996; Marsden and Campbell, 1984; Song 2011), we had to exclude social isolates whose social capital and tie strength cannot be calculated due to their naming no contact (N=235), and the subsample size dropped to 749 after that exclusion.[2] The listwise deletion of cases with missing values on the variables of interest can further incur a loss of 16 percent of the

subsample (N=120). Thus we used a multiple imputation method to correct missing-data bias, and imputed missing values in independent variables (N=92) based on ten imputations using one Stata user-written program, Ice (Royston, 2004).[3] Each of these ten imputed data sets included 721 respondents. Table 1 shows the summary of sample characteristics averaged over these ten imputed data sets. Also the 2004 GSS adopted a non-respondent, sub-sampling design, and we weighted its data using one sampling weight variable, WTSS.[4]

Insert Table 1 about here

4.2. Dependent Variables

The information society module in the 2004 GSS first asked respondents how often they had looked for information about a health concern or medical problem in the past year. It then asked seekers how often they had sought health information from seven different kinds of sources: daily newspaper articles, general magazine articles, health-related magazines or newsletters, medical professionals, friends or relatives, radio or television programs, and the Internet. These eight ordinal items were rated on a four-point scale (1=not at all; 2=1 or 2 times; 3=3–5 times; 4=6 or more times). We constructed one continuous variable to measure the total number of sources those seekers mentioned.

4.3. Independent Variables

The 2004 survey collected information on ego-centered networks using the name generator (Burt, 1984; McCallister and Fischer, 1978). The original wording for the first question is: "From time to time, most people discuss important matters with other people. Looking back over the last six months, who are the people with whom you discussed matters important to you? Just tell me their first names or initials." The first five names (alters) were recorded. Respondents who named one or more alters were further asked the highest educational level of each alter (1=0–6 years; 2=7–9 years; 3=10–12 years; 4=high school graduate; 5=some college; 6=associate degree; 7=bachelor's degree; 8=graduate or professional degree).[5] As in previous studies (Acock and Hurlbert, 1993; Beggs et al., 1996; Marsden and Campbell, 1984), we calculated two indicators of social capital based on alters' education: average education of alters and the proportion of alters with a high school degree or higher. These two indicators were highly correlated with each other. To avoid multicollinearity, we conducted analyses separately using those two indicators. Also we controlled for another two network structure factors for a robust test of the impact of network members' resources: network size (the number of alters), indicating the degree of social integration, and average frequency of talking to alters rated on a four-point scale (1=less than once a month; 2=at least once a month; 3=at least once a week; 4=almost every day), indicating tie strength (Granovetter, 1973).

All analyses controlled for four demographic factors, employment status, and three socioeconomic indicators. Demographic factors included age in years, gender (0=female; 1=male), race/ethnicity (0=minority, including black and other races/ethnicities; 1=white), and marital status (0=unmarried; 1=married). Employment status was a dummy variable (1=employed full time). Three socioeconomic indicators included education (years of schooling),

occupational prestige coded through the NORC/GSS Occupational Prestige scores (Nakao, Hodge, and Treas, 1990; Nakao and Treas, 1990), inflation-adjusted family income in constant dollars. We applied a logarithmic transformation to normalize the distribution of family income.

4.4. Analytic Strategy

We ran a series of ordinal logistic regression models to estimate the frequency of health information search and the frequency of those seekers' search respectively from seven sources, and a series of ordinary least squares (OLS) regression models to predict the number of used sources among health information seekers. We first estimated the basic model with only control variables. Then we entered the two social capital indicators separately into the basic model, and investigated their direct effects on each outcome.

5. Results

Table 2 shows the summary of health information search. Approximately sixty-five percent of respondents sought health information at least once in the past year (N=471). Among the seekers, the average number of used sources was around four. Consistent with previous research (Colon-Ramos et al., 2009; Fox, 2011; Pescosolido, 1992) "medical professionals" was the most frequently used source (eighty-six percent), followed by "the Internet" (seventy-four percent), "friends or relatives" (sixty-three percent), "health-related magazines or newsletters" (forty-six percent), "general magazine articles" (thirty-six percent), "daily newspapers articles" (thirty percent), and "radio or television programs" (about thirty percent).

Insert Table 2 about here

We first ran ordinal logistic regressions of the frequency of health information search in the past year (see Models 1, 2, and 3 in Table 3). Model 1 was the basic model with only control variables. Among control variables, men (-.409) and people contacting network members more frequently on average (-.302) sought health information less actively than women and those who were in contact with network members less frequently on average; the married (.485) and people with higher-prestige occupations (.025) and larger personal networks (.186) looked for health information more actively than the unmarried and those with lower-prestige jobs and smaller networks. Also there was marginal evidence that people with more family income (-.195) sought health information less actively than those with less family income. After the entry of two social capital indicators, Models 2 and 3 show evidence for the first hypothesis on the positive association between social capital and frequency of health information search (H1). In the past year, people whose network members achieved on average more education (.283) or with proportionally more network members achieving a high school degree or more (.780) sought health information more actively than those with on average less educated network members or with proportionately fewer network members obtaining a higher school degree or more.

Insert Table 3 about here

We then ran OLS regressions of the number of used sources by those who sought health information in the past year (see Models 4, 5 and 6 in Table 3). Model 4 was the basic model with only control variables. Among control variables, male (-.414) and white seekers (-.976) used fewer sources than female and minority ones; those seekers with larger networks (.153) used more sources than those with smaller networks. Also there was marginal evidence that seekers with higher-prestige jobs (.013) used more sources than those with lower-prestige jobs. After the addition of social capital, Model 5 but not Model 6 shows evidence for the second hypothesis on the positive association between social capital and the diversity of used sources (H2). Health information seekers connected to on average more educated network members consulted more diverse sources than those tied to on average less educated network members (.205). The proportion of network members with a high school degree or more was positively associated with the diversity of used sources (.584), but that association was not significant.

Next we ran ordinal logistic regressions of those seekers' frequency of health information seeking respectively from the seven sources. Models 7, 8, and 9 in Table 3 show results on seekers' frequency of use of the most frequently used source, medical professionals. Model 7 was the basic model. Among control variables, age had a significant effect and occupational prestige exerted a marginally significant effect. Older seekers (.015) and seekers with higher-prestige jobs (.016) visited medical professionals more frequently than younger ones and those with lower-prestige occupations. After the entry of social capital, Model 8 but not Model 9 shows evidence for the third hypothesis (H3). Health information searchers with on average more educated network members consulted medical professionals more frequently than those with on average less educated network members (.218). The proportion of network members

with a high school degree or more was positively associated with seekers' frequency of consultation with medical professionals (.419), but that association was not significant.

Table 4 shows results on seekers' frequency of use of three sources: friends or relatives, the Internet, and health-related magazines or newsletters. Models 1, 2, and 3 show results on seekers' frequency of consultation with friends or relatives. Among control variables (see the basic model, Model 1), only network size had a significant effect. Searchers with larger networks turned to friends or relatives more frequently for health information than those embedded in smaller networks (.211). After the addition of social capital, Models 2 and 3 show evidence for the third hypothesis (H3). Health information searchers with on average more educated network members (.141) or with proportionally more network members achieving a high school degree or more (.755) consulted friends or relatives more actively than those with on average less educated network members or with proportionately fewer network members obtaining a higher school degree or more.

Insert Table 4 about here

Models 4, 5, and 6 show results on seekers' frequency of health information search on the Internet. Among control variables (see the basic model, Model 4), age, education, and family income exerted significant impacts and gender had a marginally significant effect. Older seekers (-.036) and male seekers (-.348) were less active in using the Internet as a health information source than younger ones and female ones. More educated seekers (.145) and seekers with more

family income (.319) visited the Internet more frequently for health information than less educated ones and those with less family income. After the entry of social capital, Models 5 and 6 shows evidence for the third hypothesis (H3). Those seekers with on average more educated network members (.279) or with proportionately more network workers achieving a high school degree or more (1.116) looked for health information on the Internet more actively than those with on average less educated contacts or with proportionately fewer contacts obtaining a high school degree or more.

Models 7, 8, and 9 show results on seekers' frequency of use of health-related magazines or newsletters. Among control variables (see the basic model, Model 7), gender and race/ethnicity had significant effects and occupational prestige exerted a marginally significant effect. Male (-.443) and white (-.824) seekers consulted health-related magazines or newsletters for health information less actively than female and minority seekers. Seekers with higher-prestige jobs (.015) used health-related magazines or newsletters for health information more frequently than those with lower-prestige occupations. After the entry of social capital, Model 8 but not Model 9 shows marginal evidence for the third hypothesis (H3). Health information seekers in connection with on average more educated network members (.163) read health-related magazines or newsletters for health information more actively than those tied to on average less educated network members. The proportion of network members with a higher school degree or more (-.160) was negatively associated with seekers' frequency of use of health-related magazines or newsletters, but that association was not significant.

Finally, we analyzed health information seekers' frequency of search respectively from another three sources: general magazine articles, daily newspaper articles, and radio or television

programs (see Table 5). Models 1, 4, and 7 were basic models with only control variables. Among control variables (see Model 1), male (-.581) and white (-.938) seekers turned to general magazine articles less frequently than female and minority ones. As Model 4 shows, white seekers (-.822) and seekers contacting network members on average more frequently (-.385) used daily newspapers articles less actively than minority ones and those making on average less frequent contact with network members. As Model 7 shows, white (-1.342) and more educated (-.099) seekers used radio or television programs for health information less frequently than minority and less educated ones, while seekers embedded in larger networks (.192) turned to radio or television programs more frequently than those with smaller networks. Also there was marginal evidence that older seekers (.013) used general magazine articles or daily newspaper articles for health information more frequently than younger ones, and seekers with higher-prestige jobs (.018) turned to radio or television program more frequently than those with lower-prestige occupations. After the addition of social capital, Models 2, 3, 5, 6, 7 and 8 show no evidence for the third hypothesis (H3). Those seekers in connection with on average more educated network members or with proportionately more network members obtaining a high school degree or more consulted those three sources more frequently than those tied to on average less educated networks members or proportionately fewer network members achieving a high school degree or more, but those six positive effects were not significant. Comparison of results from Tables 3, 4, and 5 shows evidence for the fourth hypothesis (H4) that social capital is more influential in the use of the three more frequently used sources (medical professionals, friends, or relatives, and the Internet).

Insert Table 5 about here

6. Conclusion and discussion

This study examines the association of social capital as assets of one's network members with health information seeking behavior. Analyzing data from the 2004 GSS in the United States, this study measures two social capital indicators (average education of network members and proportion of network members with a high school degree or higher) using the name generator. Most results are consistent using those two indicators. Both indicators are positively associated with frequency of health information seeking and seekers' frequency of use of two sources (friends or relatives and the Internet). Also average education of network members is positively associated with seekers' diversity of used sources and frequency of consultation with medical professionals. But neither indicator is associated with seekers' frequency of use of other four sources (health-related magazines or newsletters, general magazines, daily newspapers, and radio or television programs).

This study extends relevant literature theoretically and methodologically in five ways. First, this study demonstrates the utility of one network-based theory of social capital as network members' resources in the social organization of health information seeking behaviors (Lin, 1982, 2001). Consistent with the social resource perspective, its findings show that access to more social capital, that is, a higher-SES network context is related to more active health information search and the mobilization of more diverse sources, independent of individuals' demographic and socioeconomic characteristics and the size and tie strength of their networks.

Also its findings indicate the varying role of higher-SES networks in the consultation with different sources. Embeddedness in such networks is associated with the use of three out of seven sources—medical professionals, friends or relatives, and the Internet. To achieve more knowledge about varying facilitating functions of higher-SES networks, future research needs to directly and systematically examine and compare the explanatory power of potential pathways such as solicited or unsolicited health-related informational support or other forms of social support from network members and health culture—norms surrounding health information seeking from various sources—within social networks (Song et al., 2011). Future research also needs to explore how social capital as one endogenous factor links other established structural antecedents to health information search, such as gender, race/ethnicity, socioeconomic status, and social integration (Song, 2012). In addition, the name generator is not as useful and efficient as other network instruments, such as the position generator for mapping structural positions of network members and the name generator for capturing actual resources of network members (Lin et al., 2001; Van der Gaag et al., 2008). Future research should examine social capital measured through those two generators to more fully capture impacts of network members' resources.

Second, this study contributes to a fuller picture of the embeddedness of medical help seeking in social networks, and expands the social organization strategy framework and the network-episode model (Pescosolido, 2006). Medical help seeking is not a pure rational choice behavior but rather a social network phenomenon (Pescodolido, 1992). Social networks based on daily social intercourse constitute structural contexts that constrain choices individuals actually make. Findings in this study show that in comparison with individuals' own socioeconomic standing, a higher-SES network context is a more important determinant of health information

seekers' use of diverse sources, in particular consultation with medical professionals and friends or relatives. Also in comparison with network size and tie strength, a higher-SES network context is a more important network-based determinant of seekers' consultation with medical professionals and the Internet. Extending prior research on the social construction of health care decision making by network interaction, these findings suggest that hierarchical positions of network members indicating the volume of resources available from them can be another crucial aspect of network structure, and as a network-based resource locator can directly stratify structural opportunities affecting individuals' decision making activities.

Third, this study adds to the social network literature on social stratification and mobility. Although prior studies in the last three decades have well documented the positive relationships of social capital and the use of personal contacts to status attainment (e.g., Bian, 1997; Campbell, et al., 1986; De Graaf and Flap, 1988; Fernandez et al., 2000; Granovetter, 1995; Lai et al., 1998; Lin et al., 2009; Lin et al., 1981; McDonald, 2012; Wegener, 1991), they have stimulated debates over the causal role of social capital. One mobilization argument states that individuals with more social capital should be more likely to use contacts if social capital does have a causal effect (Mouw, 2003). Theoretically that argument is criticized for ignoring other mechanisms linking social capital to status attainment such as the receipt of unsolicited job information (Lin and Ao, 2008; McDonald and Elder, 2006). Empirically one study using nationally unrepresentative data does not find a positive effect of social capital on use of job contacts (Mouw, 2003). Analyzing nationally representative data, this study finds that people with more social capital are more active health information seekers and that health information seekers with better social capital more actively mobilize friends or relatives as well as use diverse sources, medical professionals, and the Internet. Although cross-sectional and health-focused, findings in

this study support the causal impact of social capital in purposive actions. Individuals must have social capital to be able to actively mobilize social contacts (Granovetter, 1995; Lin, 2001).

Furthermore, this study expands the burgeoning literature on social dynamics of media use, in particular Internet use for health purposes (Seale, 2003). The Internet is now an increasingly powerful source in our information society (Cotten, 2001; Hardey, 1999). As this study shows, among health information searchers the Internet is the most sought-after medium and the second most frequently used source of information after medical professionals. Prior research focuses on individual-level social determinants of Internet use for health purposes (e.g., Cotten and Gupta, 2004; Drentea and Moren-Cross, 2005; Schaffer et al., 2008). Extending prior research, findings in this study indicate the unique embeddedness of Internet use in social networks in comparison with the use of other media. As this study shows, a higher-SES network is related only to the use of Web sites, but not to the use of four other types of media (health-related magazines, general magazines, newspapers, and radio or television programs). Among health information seekers, a higher-SES network is positively associated with their consultation of the Internet. These findings suggest that social capital as resources of network members contributes to the digital divide in our information age and that social capital is more influential in directing seekers' attention to the new popular medium, the Internet. For a more comprehensive understanding of how social capital stratifies the use of information technologies, future research needs to directly explore potential mechanisms, such as social support, through which social capital embedded in personal networks transfers and functions in computer networks and in cyberspace (Cotten, 2001; Wellman, 2001).

Beyond the substantive findings, this study has methodological implications for the measurement of social capital as network resources using the name generator. Previous studies capture individuals' social capital by calculating average education of their network members and the proportion of network members with a high school degree or higher (Acock and Hurlbert, 1993; Beggs et al., 1996; Marsden and Campbell, 1984). The former indicator reflects the average quality of social capital (Van der Gaag et al., 2008), while the latter indicator corresponds to the share of high-quality social capital. Results in this study using those two indicators are substantively consistent with two exceptions: average quality of social capital but not the share of high-quality social capital is positively associated with the size of sources used by health information seekers and those seekers' frequency of consultation with medical professionals. Such inconsistent findings imply that average quality of social capital is a more powerful predictor of health information search behaviors than simply the share of high-quality social capital. The volume of resources under control of every network member rather than only high-status network members in individuals' personal networks can influence individuals' health information seeking processes. In other words, every network member matters in medical help seeking.

It has been five decades since the seminal theory of lay referral system took on the challenge of assessing the "ubiquitous" but "hard-to-recall" interpersonal influence on health consultation (Friedson, 1961: 144). This study represents a major advance by shedding light on the function of social capital as resources of lay referral network members in the social dynamics of health information seeking behaviors. It is the first effort to examine the association between social capital and health information search using cross-sectional data. Future longitudinal research controlling for potentially confounding factors such as personality that may influence

both social capital and health information search is warranted for stronger causal inference on the stratified health information seeking by social capital. Also future comparative studies are needed to examine the generalizability of findings in this study to other societies and cultures.

ENDNOTES

1. Results are available upon request.

2. There are discussions over whether the number of social isolates naming no contacts is overestimated in the 2004 GSS survey (Fischer, 2009; McPherson et al., 2006; McPherson et al., 2009). Those discussions are beyond the theoretical and methodological scopes of this paper. The association between social isolation and health information search is also beyond the theoretical scope of this paper, and reserved for future research. As our supplemental multivariate analyses show, in comparison with those who named at least one contact, social isolates were less likely to search for health information in the past year; if they did look for health information in the past year, they were less likely to consult medical professionals or use the Internet.

3. Missing values in dependent variables (N=8) were not imputed (Royston, 2004). Missing values in occupational prestige were not imputed for respondents who never worked as long as one year (N=20).

4. The sampling weight variable, WTSS, "takes into consideration a) the sub-sampling of non-respondents, and b) the number of adults in the household" (Smith et al., 2011b: 3103).

5. The 2004 GSS collect information on only one indicator of alters' socioeconomic status, education, and information on alters' occupation or income is unavailable.

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Table 1. Summary of Sample Characteristics

Variables	Mean(SD)/Percent
Explanatory Variables (N=721)	
Social Capital as Network Members' Resources	
Average Education of Alters	5.33 (1.53)
Proportion of Alters with a High School Degree or More	87% (29%)
Control Variables (N=721)	
Age (Years)	45.78 (16.29)
Gender (1=Male)	43.13
Race/Ethnicity	
White	82.39%
Minority (Black and Other Race/Ethnicity)	17.61%
Marital Status (1=Married)	57.56%
Education (Years)	14.01 (2.89)
Employment Status (1=Employed full time)	55.20%
Occupational Prestige	46.86(14.38)
Family Income (Dollars)	57,648 (50,195)
Network Size (Number of Alters)	2.64 (1.37)
Tie Strength (Average Frequency of Contact with Alters)	3.45 (.59)

Table 2. Summary of Health Information Search

Dependent Variables	Mean(SD)/Percent
Frequency of Health Information Search (N=721)	
Not at All	34.67%
1 or 2 Times	12.76%
3-5 Times	20.11%
6 or More Times	32.45%
Health Information Seekers (N=469)	
Number of Used Sources	3.65 (1.79)
Search from Medical Professionals	
Not at All	14.23%
1 or 2 Times	35.03%
3-5 Times	25.48%
6 or More Times	25.27%
Search from Friends or Relatives	
Not at All	37.23%
1 or 2 Times	33.19%
3-5 Times	15.96%
6 or More Times	13.62%
Search from the Internet	
Not at All	26.11%
1 or 2 Times	20.81%
3-5 Times	20.38%
6 or More Times	32.70%
Search from Health-Related Magazines or Newsletters	
Not at All	53.62%
1 or 2 Times	24.89%
3-5 Times	9.79%
6 or More Times	11.70%
Search from General Magazine Articles	
Not at All	63.06%
1 or 2 Times	21.44%
3-5 Times	6.37%
6 or More Times	9.13%
Search from Daily Newspaper Articles	
Not at All	70.28%
1 or 2 Times	15.71%
3-5 Times	4.25%
6 or More Times	9.77%
Search from Radio or Television Programs	
Not at All	70.06%
1 or 2 Times	16.14%
3-5 Times	6.37%
6 or More Times	7.43%

Table 3. Ordinal Logistic Regression of the Frequency of Health Information Search, OLS Regression of the Number of Used Sources, and Ordinal Logistic Regression of the Frequency of Health Information Search from Medical Professionals.

	Frequency of Health Information Search			Number of Used Sources			Medical Professionals		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	.002	-.000	.001	-.004	-.004	-.005	.015*	.016*	.015*
	(.006)	(.006)	(.006)	(.006)	(.006)	(.006)	(.007)	(.007)	(.007)
Gender (1=Male)	-.409*	-.407*	-.407*	-.414*	-.418*	-.407*	-.117	-.122	-.110
	(.161)	(.161)	(.161)	(.182)	(.183)	(.183)	(.196)	(.196)	(.196)
Race/Ethnicity (1=White)	.102	.105	.089	-.976***	-.985***	-1.004***	-.215	-.234	-.227
	(.239)	(.244)	(.241)	(.244)	(.249)	(.246)	(.267)	(.269)	(.267)
Married	.485**	.462*	.492**	.099	.088	.094	.321	.306	.321
	(.187)	(.190)	(.187)	(.214)	(.215)	(.213)	(.234)	(.234)	(.231)
Education (Years)	.053	-.002	.033	-.009	-.044	-.024	.004	-.028	-.004
	(.040)	(.038)	(.040)	(.037)	(.037)	(.037)	(.037)	(.036)	(.037)
Employed full time	-.200	-.213	-.231	.041	.049	.009	-.373	-.360	-.376
	(.189)	(.188)	(.189)	(.207)	(.206)	(.208)	(.231)	(.231)	(.230)
Occupational Prestige	.025***	.022**	.025***	.013†	.011	.013†	.016†	.014	.016†
	(.007)	(.007)	(.007)	(.008)	(.008)	(.008)	(.009)	(.009)	(.009)
Family Income (log)	-.195†	-.263*	-.228*	.018	-.043	.015	-.122	-.200	-.149
	(.103)	(.107)	(.105)	(.120)	(.122)	(.123)	(.137)	(.145)	(.136)
Network Size (Number of	.186**	.163**	.178**	.153*	.146*	.148*	-.007	-.021	-.011
Alters)	(.060)	(.061)	(.061)	(.067)	(.065)	(.067)	(.078)	(.076)	(.077)
Tie Strength (Average Frequency	-.302*	-.240	-.281†	-.247	-.178	-.270	.116	.194	.133
of Contact with Alters)	(.152)	(.157)	(.151)	(.176)	(.185)	(.174)	(.210)	(.200)	(.204)
Social Capital									
Average Education of Alters		.283***			.205**			.218**	
		(.066)			(.071)			(.080)	
Proportion of Alters with a			.780*			.584			.419
High School Degree or More			(.318)			(.415)			(.445)

Constant				4.412***	4.334***	4.320***			
				(1.242)	(1.283)	(1.252)			
Cut1	-1.244	-1.355	-1.218				-1.472	-1.461	-1.458
	(1.105)	(1.171)	(1.153)				(1.437)	(1.429)	(1.398)
Cut2	-.637	-.729	-.604				.354	.391	.372
	(1.106)	(1.171)	(1.154)				(1.434)	(1.424)	(1.394)
Cut3	.288	.228	.329				1.566	1.616	1.586
	(1.103)	(1.168)	(1.151)				(1.437)	(1.427)	(1.397)
Observations	721	721	721	469	469	469	469	469	469
Adjusted/Pseudo R-Squared	.048	.062	.053	.071	.095	.076	.021	.029	.022

Notes: Standard errors in parentheses; *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$

Table 4. Ordinal Logistic Regressions of the Frequency of Health Information Search from Friends or Relatives, the Internet, and Health-Related Magazines or Newsletters.

	Friends or Relatives			Internet			Health-Related Magazines/Newsletters		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	-.009	-.009	-.010	-.036***	-.037***	-.037***	.008	.008	.008
	(.008)	(.007)	(.008)	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)
Gender (1=Male)	-.097	-.098	-.081	-.348†	-.372†	-.349†	-.443*	-.455*	-.443*
	(.198)	(.198)	(.198)	(.201)	(.202)	(.202)	(.217)	(.217)	(.216)
Race/Ethnicity (1=White)	-.109	-.119	-.142	.030	.028	-.005	-.824**	-.836**	-.822**
	(.249)	(.253)	(.253)	(.276)	(.270)	(.277)	(.270)	(.274)	(.267)
Married	-.017	-.027	-.032	-.017	-.028	.006	.038	.016	.029
	(.214)	(.215)	(.212)	(.243)	(.243)	(.243)	(.246)	(.248)	(.246)
Education (Years)	-.001	-.025	-.016	.145**	.099*	.128**	-.029	-.056	-.030
	(.043)	(.046)	(.044)	(.046)	(.046)	(.046)	(.050)	(.050)	(.051)
Employed full time	-.114	-.110	-.151	-.181	-.180	-.206	-.133	-.130	-.146
	(.224)	(.223)	(.225)	(.228)	(.226)	(.228)	(.240)	(.242)	(.241)
Occupational Prestige	.012	.011	.011	.011	.009	.012	.015†	.013	.015
	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)
Family Income (log)	-.097	-.137	-.099	.319*	.253†	.247†	-.068	-.111	-.035
	(.119)	(.121)	(.116)	(.146)	(.148)	(.141)	(.130)	(.130)	(.132)
Network Size (Number of	.211**	.207**	.208**	.084	.071	.074	.015	.013	.018
Alters)	(.074)	(.074)	(.073)	(.076)	(.078)	(.076)	(.079)	(.078)	(.080)
Tie Strength (Average Frequency	.068	.108	.064	-.184	-.113	-.166	-.253	-.187	-.295†
of Contact with Alters)	(.182)	(.184)	(.183)	(.185)	(.184)	(.179)	(.177)	(.185)	(.173)
Social Capital									
Average Education of Alters		.141*			.279***			.163†	
		(.071)			(.076)			(.090)	
Proportion of Alters with a			.755*			1.116*			-.160
High School Degree or More			(.382)			(.450)			(.498)

Cut1	-.801	-.736	-.511	2.573†	2.771†	2.598†	-1.573	-1.419	-1.566
	(1.201)	(1.221)	(1.230)	(1.498)	(1.532)	(1.506)	(1.300)	(1.337)	(1.335)
Cut2	.692	.767	.991	3.719*	3.951*	3.763*	-.368	-.205	-.360
	(1.195)	(1.215)	(1.225)	(1.507)	(1.539)	(1.517)	(1.297)	(1.337)	(1.332)
Cut3	1.638	1.717	1.941	4.708**	4.966**	4.759**	.395	.561	.404
	(1.183)	(1.203)	(1.213)	(1.513)	(1.548)	(1.525)	(1.299)	(1.340)	(1.334)
Observations	469	469	469	469	469	469	469	469	469
Pseudo R-Squared	.014	.019	.018	.073	.087	.079	.022	.026	.022

Notes: Standard errors in parentheses; *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$

Table 5. Ordinal Logistic Regressions of the Frequency of Health Information Search from General Magazine Articles, Daily Newspaper Articles, and Radio or Television Program.

	General Magazine Articles			Daily Newspaper Articles			Radio or Television Program		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	.013†	.013†	.013†	.013†	.013†	.013†	.012	.012	.011
	(.007)	(.007)	(.007)	(.007)	(.007)	(.007)	(.008)	(.008)	(.008)
Gender (1=Male)	-.581**	-.583**	-.579**	-.096	-.094	-.087	-.305	-.306	-.298
	(.219)	(.220)	(.219)	(.238)	(.239)	(.240)	(.230)	(.230)	(.230)
Race/Ethnicity (1=White)	-.938***	-.948***	-.944***	-.822**	-.831**	-.833**	-1.342***	-1.344***	-1.358***
	(.264)	(.266)	(.264)	(.286)	(.289)	(.284)	(.260)	(.260)	(.263)
Married	.001	-.004	-.013	-.176	-.194	-.172	-.014	-.017	-.014
	(.255)	(.255)	(.256)	(.266)	(.272)	(.264)	(.289)	(.290)	(.289)
Education (Years)	-.037	-.054	-.043	.003	-.016	-.002	-.099*	-.106*	-.105*
	(.049)	(.051)	(.052)	(.050)	(.050)	(.052)	(.050)	(.048)	(.051)
Employed full time	.062	.057	.033	-.164	-.160	-.179	.087	.088	.075
	(.239)	(.242)	(.245)	(.249)	(.250)	(.253)	(.260)	(.261)	(.263)
Occupational Prestige	-.005	-.006	-.005	.013	.012	.013	.018†	.017	.017†
	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.010)	(.011)	(.010)
Family Income (log)	.060	.029	.088	.026	-.012	.017	-.029	-.047	-.028
	(.125)	(.126)	(.133)	(.136)	(.139)	(.137)	(.154)	(.159)	(.162)
Network Size (Number of	.112	.110	.113	.032	.031	.032	.192*	.190*	.195*
Alters)	(.084)	(.085)	(.083)	(.089)	(.088)	(.088)	(.078)	(.078)	(.079)
Tie Strength (Average Frequency	-.273	-.233	-.302†	-.385*	-.347†	-.390*	-.139	-.122	-.145
of Contact with Alters)	(.173)	(.182)	(.168)	(.183)	(.186)	(.175)	(.201)	(.210)	(.202)
Social Capital									
Average Education of Alters		.107			.120			.051	
		(.086)			(.091)			(.089)	
Proportion of Alters with a			.115			.266			.227
High School Degree or More			(.479)			(.571)			(.463)

Cut1	-.465	-.391	-.324	.327	.370	.340	-.504	-.495	-.443
	(1.247)	(1.260)	(1.331)	(1.273)	(1.306)	(1.329)	(1.543)	(1.564)	(1.586)
Cut2	.792	.871	.935	1.419	1.465	1.434	.718	.729	.781
	(1.220)	(1.232)	(1.307)	(1.271)	(1.304)	(1.329)	(1.547)	(1.568)	(1.590)
Cut3	1.402	1.484	1.545	1.850	1.898	1.865	1.490	1.501	1.555
	(1.228)	(1.241)	(1.314)	(1.259)	(1.293)	(1.317)	(1.525)	(1.546)	(1.570)
Observations	469	469	469	469	469	469	469	469	469
Pseudo R-Squared	.032	.035	.033	.028	.032	.029	.050	.054	.051

Notes: Standard errors in parentheses; *** $p < .001$; ** $p < .01$; * $p < .05$; † $p < .10$