

# Chapter 2

## Social Network Type and Health among Older Americans

Sharon Shiovitz-Ezra and Howard Litwin

### 2.1 Social Capital and Social Relationships

Social capital is an umbrella concept encompassing a wide range of resources that are rooted in the social environment. The key components of social capital are norms and networks (Nygqvist et al. 2013; Putnam 2000). The former, which includes a general sense of social trust, refers to the values that guide the nature and the quality of human interaction. The latter reflects the many social relationships that people maintain and from which they gain needed resources, support, feedback and guidance. Although norms and values clearly have relevance for certain health outcomes, we believe that it is the social relationship aspect of social capital that is of primary importance for understanding health and well-being, particularly in older age (see also Berkman et al. 2000). Consequently, this chapter focuses on the role of social networks, and particularly network type, in the facilitation of late-life health.

### 2.2 Social Relationships and Health

Previous research has substantiated that significant associations between social relationships and health outcomes prevail. For example, recent studies have underscored the significant positive associations that exist between social support and the subjective measure of health among older populations (Krause 2004; Okamoto and Tanaka 2004; Zunzunegui et al. 2004). These findings are consistent with the results of many earlier studies and highlight the health benefits of social support (Uchino 2006), which may include lower systolic and diastolic blood pressure (Uchino et al. 1995).

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S. Shiovitz-Ezra (✉) · H. Litwin  
Paul Baerwald School of Social Work and Social Welfare,  
Hebrew University of Jerusalem, Jerusalem 91905, Israel  
e-mail: sharonshi@mscc.huji.ac.il

On the other hand, the lack of social relationships, as reflected by social isolation and low social support, has been consistently related to health-damaging effects such as an increased risk of morbidity and mortality (Berkman 1995; House et al. 1988). For example, among elderly patients with coronary heart disease, lack of emotional support was found to be a strong risk factor for subsequent cardiovascular events (Krumholz et al. 1998). Absence of emotional support was also associated with 6-month mortality among older men and women after a heart attack in an adjusted model that controlled for the severity of the myocardial infarction, comorbidity, smoking, hypertension, and sociodemographic factors (Berkman et al. 1992). Similarly, lack of social support more than doubled the risk of coronary mortality in men and women who had a first myocardial infarction (Welin et al. 2000).

Loneliness, a subjective quality marker of one's social relationships that is derived from perceived unsatisfactory relationships, was also found to be related to health status in a wide range of studies. For example, in a recent study of New Zealanders aged 55–70, loneliness was negatively associated with mental and physical health as assessed by the SF36 Health Survey (Stephens et al. 2011). Perceived social isolation was also associated with poorer self-assessed mental and physical health in a nationally representative sample of community-dwelling individuals aged 57–85 years in the United States (Cornwell and Waite 2009). In a population-based study carried out in Chicago (CHASRS), loneliness was associated with an objective parameter of health, namely, elevated systolic blood pressure, and was found to be a unique predictor of age-related increases in systolic blood pressure (Hawkey et al. 2006). Loneliness is also related to cardiovascular activity in everyday life (Hawkey et al. 2003) and is a significant risk factor for coronary heart disease among older adults (Sorkin et al. 2002).

A study conducted in the Netherlands among community-dwelling individuals aged 55–85 also revealed associations between loneliness and morbidity. Peripheral vascular disease, lung disease, and arthritis were all associated with greater loneliness after adjusting for demographics and other diseases such as stroke and cancer (Penninx et al. 1999). Moreover, cumulative evidence substantiates significant positive associations between loneliness and mortality (Herlitz et al. 1998; Penninx et al. 1997; Shiovitz-Ezra and Ayalon 2010; Stek et al. 2005).

Theoretically, it has been conceptualized that social relationships affect health through a cascading causal process that involves, at the macro level, broader social and cultural factors such as norms, values and discrimination on the basis of ethnicity and sex. These contextual structural factors shape the structure and function of social networks that operate at the mezzo level. Social networks then operate on health through psychosocial mechanisms such as different types of social support that in turn impact health through varying pathways, such as the adoption of positive and negative health-related behaviors (Berkman et al. 2000).

It is important to note that the conceptual model raised by Berkman and colleagues focuses mainly on how social networks influence health, Social network is

...the collection of interpersonal ties that people maintain and which provide them with a range of supports, resources and services. Networks are the locus of social capital. They reflect the extent to which one is connected to others (Litwin 2014, p. 341).

Social network characteristics include structural components, such as network size, density and complexity, and interactional components, such as frequency of face-to-face contact and frequency of nonvisual contact (Berkman et al. 2000).

## 2.3 The Concept of Social Network Type

Even though many studies have documented the influence of individual social network characteristics on health, it might also be argued that using a composite measure of the network is more informative. The construct of social network type was developed to provide a means by which to take the complexity of the interpersonal environment in late life into account. It does so by considering the composite collection of network characteristics (Wenger 1991). Support for this approach has been expressed by Fiori and colleagues (2006) who maintain that social network measures that incorporate several aspects of the phenomenon offer a useful way to better understand the social milieu of older people.

The construct of social network type reflects different levels of social capital, defined as “the array of social contacts that give access to social, emotional and practical support” (Gray 2009, p. 6). People tend to have differing degrees of social capital as evidenced by the extent and range of social ties that they maintain. If considered in respect to social network type, it may be claimed that social network types represent differing levels of social capital. This is expressed by the varying extents to which each network component is represented within the given network type. Following from this conceptualization, it can be said that an “endowed” social network type has relatively many social ties and related relational measures. In comparison, a “less endowed” network type is one with few social ties or a limited degree of relationship categories.

The development and application of “network type” in relation to older people first emerged in the early 1990s (Wenger and Tucker 2002). Anthropological observations in Wales by Clare Wenger (1991) and her team identified five unique network groupings. This paradigm was then tested on a larger population and found to effectively identify older persons at-risk (Wenger 1997). More recent analyses have applied the notion of social network typology in various societies. Four particular network types that appear in different studies in several different settings include the “diverse,” “family-focused,” “friend-focused” and “restricted” networks (Fiori et al. 2006).

Diverse networks are those that maintain a range of relationship types, as for example family, friends and neighbors. They are arguably the most endowed in terms of social capital, insofar as they reflect differing kinds of ties with the potential for providing a wider range of benefits. Family-focused networks, by definition, are almost exclusively family based. As such, they are strong on bonding and intimacy, but weaker, perhaps, in terms of bridging and linking functions. In contrast, friend-focused networks offer the typical advantages of “weak ties”, such as linking one with friends of friends. They also reflect ties of choice, as opposed to the ascribed

relationships characteristic of family. Nevertheless, they may be less supportive when it comes to long-term care and commitment. Finally, restricted networks are those having very few members on whom to rely. Among older people, such “lesser endowed” networks are frequently comprised of one social tie only, most usually a son or a daughter.

Nevertheless, cross-cultural variations in social network type are also evident. For example, Fiori, Antonucci and Cortina and colleagues (2006) found a differentiation between two types of restricted social networks in an American sample: “non-family restricted” and “non-friend restricted” networks. In Japan, a “married and distal” network type was identified which accounted for 24% of the study sample (Fiori et al. 2008). In Germany, no additional network types were found, but two sub-types for the friends-focused type emerged, “supported” and “unsupported”, as well as two sub-types for the restricted groupings, “non-friend-unsatisfied” and “non-family-unsupported” (Fiori et al. 2007). A unique “widowed” network grouping was found in Mexico (Dobova et al. 2010). In Israel, two additional types found were the “community-clan” and “neighbors” networks (Litwin and Shiovitz-Ezra 2006). In Korea, three traditional social network types were found (“diverse”, “family” and “isolated”) but no “friends” network type (Cheon 2010). In China, a fifth type named “distant family” focused on distant kin, reflecting a unique aspect of Chinese society (Cheng et al. 2009).

The complexity of the social world that is reflected in the range of social network types found in different societies may be attributable, partly, to the varying criterion variables that are included in the respective network-type derivation procedures, most frequently cluster analysis. Although all the cited studies employed structural network characteristics among the clustering criterion variables, some of them also added function and quality components (Fiori et al. 2007, 2008). Nonetheless, the most common clustering criteria employed for network derivation have been marital status, proximity, frequency of contact with family and friends and engagement in social activities. These criteria reflect the structural and dynamic aspects of social networks, which are claimed to be more objective (Berkman 1984).

Network types have been shown in a range of studies to predict mental and physical health outcomes. For example, belonging to different network types is related to depressive symptomatology (Fiori et al. 2006) and to morale (Litwin 2001). Embeddedness in different network constellations is also associated with such physical health outcomes as visual difficulty and incontinence (Litwin 1998), functional dependency (Dobova et al. 2010), and survival (Litwin and Shiovitz-Ezra 2006). Research has also shown that social network types are related to differing degrees of formal service utilization, such as public home care (Litwin 2004). In sum, evidence from all of these studies underscores on the whole, that people who are located in social networks that have greater social capital tend to enjoy better health.

## 2.4 Which Network Types are Prevalent Among Older Americans?

We look here at the social network types that are most common among older Americans and their associations with health. For this purpose, we review recent analytical studies that we have performed based on the data from the National Social Life, Health and Aging Project. We also introduce a new analysis of these same data. NSHAP is a key survey of older Americans that examines social environments and health. The data from this survey are especially suitable for the analysis of network types and their relationships with health-related indicators, due to the wide range of relevant measures queried.

The questionnaire employed in the first wave of NSHAP, conducted in English and Spanish, was delivered by means of a 2-h in-home computer-assisted personal interview (CAPI). The survey achieved a weighted sample response rate of 75.5%. The instrument included a brief self-administrated questionnaire for which the response rate was some 84% (O'Muircheartaigh et al. 2009; Smith et al. 2009). We limited the studies that are reviewed in this chapter to NSHAP respondents aged 65–85 (the maximum age in the survey), in order to focus on the older population. The analytical sample included only those older respondents who participated in both the CAPI interview and the self-administrated questionnaire ( $N=1462$ ).

The network type measure, the key variable in the studies presented here, was derived through K-means cluster analysis. Seven criterion variables from the realm of social capital were applied in the procedure for the identification of the network clusters. They included: current marital status; number of children; number of close relatives; number of friends; the frequency of getting together with neighbors; the frequency of attendance at religious services; and the frequency of attendance at organized group meetings. We note that these indicators constitute the key components of the social networks of older persons as described in the literature (Berkman and Syme 1979; Lubben et al. 2006; Wenger 1991).

Marital status was measured as a dichotomous variable: (1 = married or living with a partner; 0 = other). The number of children was a count from 0 to 6 (the final category represents six or more children). Both the number of close relatives and friends were tapped on a six-point scale with the following values: 0 = none; 1 = 1; 2 = 2–3; 3 = 4–9; 4 = 10–20; and 5 = more than 20. The frequency of getting together with neighbors (in general) was measured on a 5-point scale that ranged from hardly ever (1) to daily or almost daily (5). The frequency of attendance at religious services and at organized group meetings (during the past 12 months) were both measured on 5-point scales that ranged from never (0) to weekly or more (4).

We derived five prototypical network types in this sample of older Americans. Four of the network types—“Diverse”, “Friend”, “Family” and “Restricted”, were largely similar to the network types identified elsewhere, as reported earlier in this chapter. The procedure also identified an additional network constellation that seems to be based upon religious social ties, a grouping we chose to name the “Congregant” network type. This additional grouping was the interpersonal milieu of

some 17% of the study sample, indicating that faith-based social networks are currently relevant social environments among American older adults. We summarize each of the network types in the following paragraphs.

The “diverse network” reflected the greatest extent of sociability, comparatively. Those in this grouping had the greatest percentage of married members and the most children and close family members, the highest frequency of getting together with neighbors and the greatest relative attendance at religious services. Older people in this network type were also characterized by having relatively many friends and somewhat frequent participation in organized groups.

Members of the “friend network” had the greatest number of friends and the most frequent attendance at organized group meetings among all the survey respondents. They also attended religious services fairly frequently. Thus, this network grouping was especially strong in its extra-familial ties.

Persons embedded in a “congregant network” had frequent attendance at religious services, but also the lowest rate of attendance at organized group meetings. Moreover, they were not exceptional on any of the other clustering criteria. We interpret these characteristics to suggest that people in the congregant network maintained social relations mainly with other church-goers.

The “family network” was distinguished by its relatively high number of children, on average, and by the relative lack of other kinds of social connections. They were particularly weak in extra-familial ties. When in need, therefore, people embedded in family networks could expect to rely mostly on their children.

Finally, those in the “restricted network” had the lowest scores on most of the clustering criterion variables. The criteria on which they did obtain moderate level rankings were all non-familial. We can state with some degree of certainty, therefore, that older Americans embedded in a restricted network grouping have the least social capital and the poorest social connectivity.

Looking at the frequency distributions of the network types, we found that the majority of older Americans in our study sample had access to a resourceful interpersonal milieu, to varying degrees. The diverse network accounted for 18% of the analytical sample, the friend network, 28%, and the congregant network, 16%. We also note, however, that more than a third of our older sample was embedded in less endowed network groupings. The family network type was the interpersonal milieu of 14% of the respondents, and the restricted network types, 24% (Litwin and Shiovitz-Ezra 2011a).

We should note that social capital is related, to some degree, to human capital (Litwin and Shiovitz-Ezra 2011a). This can be seen vis a vis the respective network types. For example, persons in the socially endowed friend network had both higher education and very good self-rated health. This grouping seems to reflect the “well elderly,” who are currently redefining what it means to be old in America. In contrast, membership in the diverse network was unrelated to education and health, and negatively related to income. These latter findings suggest that human capital may not always be a determining factor in shaping the interpersonal milieu. Moreover, the results indicate that it is possible for some older Americans to belong to a supportive social environment despite having a lower income.

A special word about those in the congregant network, that is the unique network type that was found using the NSHAP data, is required. The data showed that disabled old-old persons were somewhat more likely to belong to this network constellation. Why might this be the case? Krause (2010a, b) maintains that frequent churchgoers perceive their congregations as both highly cohesive and health promoting. The congregant network type may thus be a desirable social milieu for older persons facing greater health risks.

We also found that the family network type, a less endowed grouping socially speaking was also less endowed in terms of human capital. Persons embedded in this network constellation had lower education and poor functional health at younger ages. Interestingly, the least socially endowed of all the network types was not related to human capital. Older Americans in the restricted network type were not worse off in relation to education, income, or health. It could well be, therefore, that other factors influence the type of social network in which one may be embedded in late life.

In sum, our study findings reveal that older Americans are embedded in a range of different social network types. Moreover, background factors are differentially associated with the interpersonal milieus in which these older adults may find themselves. This is particularly relevant, insofar as both social capital and human capital are related to late-life health.

## **2.5 Is Social Network Type Related to Health?**

### ***2.5.1 Social Network Types and Emotional Health***

Our prime interest in this chapter concerns the health consequences of embeddedness in social network types that are characterized by different levels of social capital. Therefore we report first the results of another inquiry based on the same American sample (Litwin and Shiovitz-Ezra 2011b). In that particular study we asked whether there is a significant relationship between network type and emotional health. We measured emotional health in terms of anxiety and loneliness, on the one hand, and in relation to happiness, on the other hand. The findings in the analysis confirmed that the networks with a wider range of social ties were indeed related to better emotional health, independent of the effects of demographic and health confounders. Specifically, the respondents who were embedded in diverse, friend, and congregant network types expressed a superior sense of emotional health as reflected, to varying degrees, in their levels of loneliness, anxiety, and/or happiness. It is important, therefore, to recognize the potentially positive effect of socially endowed social network types on the subjective well-being of their members.

The associations between social network type and emotional health were addressed in yet another recent study based on the same NSHAP subsample (Litwin 2011). In this more recent study, emotional health was measured in terms of depressive symptoms. The network indicators included the social network type variable



as well as relationship quality measures, namely, perceived positive and negative ties with family, friends and spouse/partner. Multivariate logistic regression analyses were performed to examine the associations between the relationship variables (network type and perceived quality) and the depression outcome while controlling for a host of background characteristics: age, gender, education, income, race/ethnicity, religious affiliation, functional health and physical health. The analysis revealed that the relationship quality variables were unrelated to the presence of a high level of depressive symptoms after controlling for the background characteristics. In contrast, the social network type construct retained its significant relationship with the depressive symptom outcome even after taking these same confounders into account. In brief, we found that older Americans who were embedded in resourceful social network types in terms of social capital, the “diverse,” “friend” and “congregant” network types, reported having fewer depressive symptoms, to varying degrees.

A third recent publication based on the NSHAP data sought to clarify whether physical activity promotes mental health, independently of the effects of social network relationships (Litwin 2012). Physical activity has been widely found to play a positive role in the morale and mental state of older adults (Penedo and Dahn 2005). In this particular analysis, the main focus was on the two under-endowed network types, that is, the family and restricted networks. As recalled, these network types are less endowed in terms of social capital because the number of network members they have are fewer or the ties come from a more narrow range of sources. Findings from the multivariate analysis did reveal, at first, that physical activity was negatively related to depressive symptoms after controlling for socio-demographic background, health, and social network type. But, the subsequent inclusion of interaction terms between physical activity and the two network types painted a different picture. The final results were twofold. First, they underscored the presence of positive correlations between the two under-endowed social network type measures and the depression outcome. Second, they largely reduced the independent effect of physical activity on mental health. The conclusion stemming from this series of analyses was that mental well-being in late life is indeed related to social capital, in general, and to network type, in particular.

### ***2.5.2 Social Network Types and Health Promoting/Damaging Behaviors***

Umberson et al. (2010, p. 140) define health-related behavior as “a range of personal actions that influence health, disability, and mortality.” Health-related behavior is one of the key mechanisms in the three downstream social pathways to health in the conceptual model of Berkman and colleagues (2000) cited earlier in this chapter. Moreover, health behavior is the mechanism that underlies the social relationships/health and mortality association (Umberson 1987). Eating well, engaging in physical exercise and adherence to medical regimens can advance good health and



minimize illness. In comparison, such behaviors as smoking, substance abuse and excessive weight gain can damage one's health (Umberson et al. 2010).

Most recently we tested associations between social network type and three health-related behaviors: (1) the risky health behavior of alcohol abuse, (2) the health-promoting behavior of engaging in physical activity, and (3) the practice of health-related help-seeking, measured as the use of complementary and alternative medicine (Shiovitz-Ezra and Litwin 2012). We hypothesized that the respondents who belonged to network types that were more socially endowed (that is, had greater social capital) would engage more frequently in health enhancing behavior. We also hypothesized that those who belonged to networks having lesser social capital would engage more frequently in risky behavior.

Insofar as the quality of the interpersonal environment may play a role in the association between social relationships and health behaviors, we included the variable of loneliness (a negative indicator of social tie quality) in our multivariate models. The findings from the analysis revealed that after controlling for socio-demographic characteristics, health, and the quality of the social relationships, the respondents who were embedded in the less resourceful network types were indeed at greater risk for alcohol abuse, physical inactivity and less use of complementary and alternative medicine. Unexpectedly, the loneliness measure was not associated in the adjusted models with any of the health behavior outcomes. This result further strengthened our view of the importance of the network type for the maintenance of a healthy lifestyle in late life.

### ***2.5.3 Social Network Types and Functional and Physical Health***

For the purpose of the current chapter we ran an additional series of analyses based on the NSHAP data. Our aim here was to examine the relationship between social network types among older Americans and the key functional and physical health indicators of self-reported disability and subjective health. Similar to our previous studies cited earlier in the chapter, we focused in the current analysis on NSHAP participants aged 65–85. Self-reported disability was measured by the extent of difficulty that the respondents experienced in executing six basic activities of daily living (ADL): walking across a room, dressing, bathing, eating, getting in or out of bed, and using the toilet (the items were adapted from the 2002 wave of the Health and Retirement Study, based on the original Katz et al. 1963). Originally, the responses were based on a 4-point ordinal scale ranging from no difficulty to unable to do so. For the purpose of the current analysis a dichotomous indicator was derived to reflect no ADL difficulty (0) and one or more ADL difficulties (1). Table 2.1 indicates that almost 30% of the 65+ NSHAP sub-sample reported one or more ADL difficulties. Physical health was measured using a self-reported question: “Would you say your health is excellent, very good, good, fair, or poor?” In the current analysis we collapsed the five response options into the following two categories: fair or less (0), good, very good or excellent (1). Table 2.1 show that

**Table 2.1** Background characteristics of the 65+ NSHAP sample and bivariate analysis by means of unadjusted logistic regression

Variable	Percentage	Disability <sup>a</sup> OR (SE)	Self-rated health <sup>b</sup> OR (SE)
Disability	27.4	–	–
Self-rated health (good+)	73.5	–	–
<i>Age</i>			
65–74 <sup>c</sup>	59.4		
75–85	40.6	1.71(0.19)***	0.59(0.07)***
<i>Gender</i>			
Men <sup>c</sup>	46.6		
Women	53.4	1.31(0.15)*	1.09(0.12)
<i>High education</i>			
BA or more <sup>c</sup>	20.2		
Some college	28.9	1.28(0.23)	0.64(0.13)*
High school	28.6	1.41(0.26)****	0.50(0.10)**
< High school	22.3	2.25(0.40)***	0.25(0.05)***
<i>High income</i>			
Above Avg. income <sup>c</sup>	23.1		
Avg. income	42.8	1.34(0.25)	0.45(0.10)***
Below Avg. income	34.1	2.06(0.39)***	0.29(0.06)***
<i>Ethnicity</i>			
White <sup>c</sup>	82.4		
Black	9.8	1.05(0.15)	0.57(0.08)***
Other	7.8	1.21(0.21)	0.53(0.09)***

Estimates are weighted to account for differential probabilities of selection, differential non-response and to account for survey sampling design through incorporation of sampling strata and clusters

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , \*\*\*\* $0.05 > p > 0.10$

<sup>a</sup> Disability is measured as 0 = no ADL difficulties and 1 = one or more ADL difficulties; i.e., a score of one reflects greater disability

<sup>b</sup> Self rated health is measured as 0 = fair or less and 1 = good, very good or excellent; i.e., a score of one reflects better health

<sup>c</sup> Reference categories

most respondents (73.5%) reported good health, with only a quarter reporting poor or fair health.

The variable of social network type served in the present analysis as the main predictor of the respective functional and physical health outcomes. In addition, we took into account the social relationship quality marker of loneliness. As noted in Sect. 2.1 of this chapter, loneliness has been found in several studies to be significantly associated with functional and physical health. The social network type variable was the same five network types that were described earlier in this chapter. Loneliness was measured using the sixth item of the CES-D Depression Scale in which participants are asked to indicate how often they felt lonely during the past

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