Health and Network Centrality in a Continuing Care Retirement Community

Markus H. Schafer

Department of Sociology, University of Toronto, Ontario, Canada.

Background. The overlap between social networks and health represents a key area of research in social gerontology. Set in a continuing care retirement community, this research focuses on how health is related to outgoing and incoming reports of social interaction among residents.

Method. Study participants (n = 123) were given the RAND 36-item Health Survey and asked about their social interaction with other people living at the retirement community. Negative binomial and linear regression analysis was used to assess associations between measures of network centrality and health.

Results. Retirement community residents in better health received more nominations from their peers about general socializing, net of how many ties they themselves reported. The ties received by healthier people, moreover, tended to come from others who were central in the network. Conversely, those in better health reported fewer close ties with their coresidents, net of the alter reports.

Discussion. Results are interpreted in light of status processes, which emerge in bounded social settings.

Key Words: Centrality—Health—Retirement community—Social network—Status.

THE link between social connectedness and health is among the most enduring topics of interest in social gerontology. For many years, social scientists have taken a Durkheimian approach, identifying how social relationships protect well-being and mollify health decline (Berkman, Glass, Brissette, & Seeman, 2000). This stimulating corpus of work is important in its implication that social connectedness is not merely a pleasant asset but a central aspect of successful aging (Moen, Dempster-McClain, & Williams, 1992).

Recently, scholars have begun to systematically consider the reverse facet of this association: How is health related to position within social networks (e.g., Cornwell, 2009; Javenic, Ajrouch, Merline, Akiyama, & Antonucci, 2000)? Overlooking health’s influence on networks risks overestimating the true benefits of social support and participation because the two processes are highly endogenous and reciprocal (Haas, Schafer, & Korienko, 2010). Moreover, beyond representing only an analytic end point or consequence, health may embody a resource that confers status and social prestige—an important outcome in its own right. Sociologists have argued that status is fundamentally flexible and situational, an emergent property of the valued traits that differentiate people (Collins, 2000); in older age, good health becomes increasingly scarce and likely surfaces as a relevant status characteristic.

Attention to the health–network association signifies a paradigmatic shift by expanding the lens through which social gerontologists view health. The purpose of the current study is to continue this emerging line of research with a full network of 123 adults in a continuing care retirement community (CCRC). This article analyzes several types of social relationships occurring within this facility, considering the perspective of both outgoing and incoming reports. In the paragraphs to follow and in the presentation of results, status-based processes are proposed as a relevant heuristic for understanding the health–network association.

Social Networks and Health

For social gerontology, general interest in the health–network association ranges back to disengagement theory, which portrayed aging as an irreversible process of shedding social roles and the weakening of social attachments (Cumming & Henry, 1961). The picture of community-dwelling adults, however, is far more complex than disengagement would imply. More recent studies, both of community-dwelling adults and those living in special institutions, suggest that older adults are not necessarily disengaged isolates (Cornwell, Schumm, & Laumann, 2008; Hirdes & Scott, 1998; Walters & Bartlett, 2009). Furthermore, the availability of social partners and the belongingness to a cohesive community denote key motivations for moving to retirement communities (Evans, 2009; Shippee, 2008)—the particular setting which the current study exploits.

At the same time, health-related declines represent a potential disruption to social engagement. Several studies identify poor health as a restrictive factor for adults’ community involvement and volunteer activity (Herzog, Kahn, Morgan, Jackson, & Antonucci, 1989; Wilson & Musick, 1992).
Moreover, bridging disparate social networks is a demanding task requiring physical and cognitive stamina (Cornwell, 2009). More lamentably, ill health can become a stigmatizing trait, leading to the disintegration of former support networks and unreciprocated friendship gestures (Shippee, 2008, 2009). This mutuality of social network influences—(a) individuals acting in accordance with their health status, and (b) others responding toward them on that basis—means that an ideal strategy for understanding social interaction would incorporate both processes.

The last point is especially relevant when health is considered as a basis of social status. Prior literature from divergent perspectives suggests that good health is a highly regarded trait among older people. This is reflected from studies of institutional settings in which social barriers marginalize people in declining health (Shippee, 2008, 2009) as well as more psychologically oriented research that shows health decline to be an unbecoming trait because it induces unwelcome reminders of finitude (Cicirelli, 2002). The notion of “health as status” will be discussed below, in light of concepts from social network analysis.

**Attractiveness, Expansiveness, and Health: A Status-Based Approach to Social Relations**

Notwithstanding the contributions identified above, many studies on the social networks of older adults suffer from a nontrivial limitation: information used to draw inferences about relationships is typically gleaned only from the individual subject (ego). This often takes the form of a social network module embedded in a more general survey using a probability sample of a known population (e.g., Cornwell, Schumm, Laumann, & Graber, 2009). Many of these studies—based on an ego network design (Marsden, 2005)—are informative but not optimally suited to address certain aspects of social relations. When links (i.e., social ties) are necessarily symmetric—as in the relationship “married”—the network is said to be undirected, and ego-centered approaches are not necessarily problematic. When, as in the current study, ties need not be reciprocated—as in nominations of friendship—the network is said to be directed (Wasserman & Faust, 1994). Feld and Carter (2002) showed that relying on ego’s viewpoint to make assumptions about network structure induces systematic bias. In essence, an ego-centered perspective can artificially “symmetrize” what is going on in the world by assuming nondirectionality—that a reported tie from X to Y equals a tie from Y to X.

Although pinpointing these dilemmas may appear as a statement about methodology, the central issues of concern here are actually theoretical. At root, an egocentric perspective downplays the transactional and relational elements of social life (c.f. Emirbayer, 1997). Specific to the current study, a full-network (or sociocentric) perspective provides a conceptual advantage in that it enables us to observe key substantive issues related to status and asymmetry in a network.

As a point of basic orientation, consider the concept of degree centrality, the number of social ties involving actor X in a network (Wasserman & Faust, 1994). Though somewhat elementary, this form of network embeddedness is a key building block for other network concepts. Out-degree centrality represents a count of ties from X to his or her alters, whereas in-degree centrality is the number of ties that X receives from his or her available alters. Under the surface of these simple definitional differences lie important theoretical distinctions (Feld & Carter, 2002). Out-degree reflects “expansiveness,” the extent of ego’s outgoingness. To the extent that people’s outgoingness exceeds (or falls short) of their reported in-degree, there exists expansiveness bias. In-degree, on the other hand, taps how “attractive” ego is to his or her counterparts in the social network. Again, attractiveness bias is a tendency toward people receiving more reports of social interaction than they themselves report. The underlying distinction between attractiveness and expansiveness tendencies is useful for understanding social relations in light of status processes. Indeed, social scientists conceptualizing issues such as prestige have capitalized on the fact that in- and out-degree centrality indicators can vary widely in their correlation, giving particular focus the former construct (Bonacich, 1987; Gould, 2002). For example, in a recent study of high school students, Haas and colleagues (2010) demonstrated an intriguing incongruity in which less healthy youths report no fewer friends than others in their school, but classmate reports belie their unappraised estimation. On the basis of in-degree data, adolescents in worse health received fewer friend nominations and were more likely to be entirely isolated, suggesting that the behavior of alters reveal aspects of social desirability that would go unnoticed in the preferences of unhealthy teens themselves. As discussed above, there is rationale to believe that this general finding should also hold in an older population. If people in poor health receive fewer ties from others, it would support the idea that health is a form of social status.

Alongside the health-as-status perspective, it may be that poorer health is associated with fewer social ties because people become less interested in expending time and energy toward peripheral friends as they near death. In social gerontology, this important insight is developed by socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999). Hence, although less healthy people may have fewer loose friendships and are less embedded in a larger network (Cornwell, 2009), the apparent marginalization could reflect or coincide with his or her purposive choice. Should the actions or attention of one’s alters correspond with a person’s own socioemotional preference, a status process interpretation would be far less tenable.

To help weigh the status argument in light of this other perspective, out-degree—or what Feld and Carter (2002) call “expansiveness”—marks another relevant consideration for the present study. Healthier people may indeed
receive the most reports of social engagement from their peers (in-degree), but this pattern becomes more indicative of prestige if they did not themselves report more social ties (out-degree). Under these conditions, the balance of alters’ attention remains in their favor. As Gould (2002) maintained, a disposition of choosiness reveals an important dimension of prestige: “Someone who pays less attention to you than you pay to her implicitly asserts that she is superior to you in status” (p. 1151).

In essence, an additional way to receive more than to give, sociometrically speaking, is to have lower out-degree net of in-degree. Related to status processes, this is analogous to how high-status colleges can be more selective about applicants or in which high-status women can be more selective about marriage partners. As mentioned above, selectivity in social networks is clearly articulated by gerontological theories, which prioritize the emotional motivation and agency of an actor (Carstensen et al., 1999). But whereas the theory of socioemotional selectivity, in its purest form, would assume that in-degree and out-degree reports are roughly equal, status-based selectivity would allow them to differ (i.e., asymmetry)—so long as the healthier (i.e., higher status) adults were the ones with a net sociometric advantage. Importantly, then, in-degree and out-degree centrality must be considered in relation to one another.

To summarize the foregoing argument, health may emerge as a relevant basis of social status among older adults; this overall pattern would be demonstrated by two corresponding patterns: (a) healthier people receiving more reports of social ties net of how many ties they report and (b) healthier people reporting fewer social ties net of how many reports they receive from others.

Several additional considerations apply to this study—both, while introduced here, are elaborated more fully in the description of the data and the presentation of results. First, status-based explanations may differ according to the type of relationship considered—casual social relations may reflect different properties of status than more intimate ties. Second, the notion of centrality has many extensions beyond simple in- and out-degree, several of which capture more nuanced aspects of network position. The analyses to follow will also examine Bonacich centrality, a more global measure which regards network position a function of alters’ status.

**Method**

*Study Setting*

Retirement communities represent an ideal setting for sociometric study and an increasingly popular living option for older adults. The current study is set in one such community, following the author’s experience of gaining entrance to a population of independent living residents. Social scientists have seized upon this particular sort of “natural laboratory” to observe core social processes such as the dialectic of conflict and solidarity (Streib & Metsch, 2002). Aside from the analytic benefits of being a discrete and bounded setting, retirement communities now represent the living choice of nearly a million American adults (Greene, 2010). Understanding the social dynamics of such facilities is therefore becoming an important substantive matter in its own right.

*Data Collection*

Data for this study come from a CCRC located in the Midwestern United States. Predominantly White (>98%), educated, and well-off, the population of retirement community residents is very characteristic of the growing number of CCRCs in the United States. The facility is organized in three distinct residential divisions, with most tenants housed in the independent living section and having their own apartments. This study includes independent living residents only.

The initial population included 158 persons. Aside from 7 persons who died, 1 who moved away, 9 who transitioned from an independent living apartment to another setting within the facility, and 6 who lived independently with a spouse but were cognitively unfit for an interview, 135 remained for a valid study population. Interviews were conducted with 123 of these residents over a six-month period (91% response rate). Over the course of the half-year, 14 residents moved into the facility; these individuals were not solicited for interviews because they had little time to acclimate to the community.

The primary data from this article come from structured interviews, but archival records and participant observation were also used to inform the analysis. All components were approved by the university institutional review board. Interviews were conducted in a small office in the facility or privately in interviewee’s own apartments, lasting approximately 50 min on average.

During the interview, respondents were first given a map of their floor. Over each apartment in the figure was the name of the occupant(s). After briefly explaining the figure, the interviewer pointed to the first apartment unit shown in the map and asked the respondent whether he or she would typically spend time interacting or socializing in a given week with the occupant of that apartment. Answers from this question were used to derive the measure for a simple social tie. Responses were dichotomized so that reports of 30 min or more of interaction per week indicated a “spend time with” tie. Time spent with married or nonmarried cohabiting partners was the only type of interaction not measured in this protocol.

After going through each of the 12 floors (four floors within three buildings) of the facility in this manner, interviewees were asked to verbally list the people (besides...
spouse or partner if applicable) that they talked to about important matters in the retirement community. Prompts were used after their response to make sure that they were not leaving out anyone. These responses were the operationalization for a “confidant” social tie, coded as 1 = yes, 0 = no. To reduce the time burden of the interview, sociometric data were collected only for community residents; staff and administration were considered outside the scope of the study.

Lastly, interviewees were given a questionnaire form of the RAND Health Survey SF-36 to complete (Hays, Sherbourne, & Mazel, 1993; Ware & Sherbourne, 1992). This measure includes 36 items related to different aspects of health, including physical functioning, disturbance of normal roles due to physical reasons, disturbance of normal roles due to emotional problems, energy/fatigue levels, emotional well-being, social-functioning and disruption of social activities, bodily pain, and overall health evaluations. Details on the items and their scoring can be found elsewhere (Hays et al., 1993). To avoid conflating the independent and dependent variables, the two items related to social activity were removed from the index. As a single measure, the 34-item index has high reliability (α = .92). All analyses are conducted after z-transforming the measure.

In addition to these sociometric and health questions, records were also obtained on a variety of demographic variables. This analysis will use five dummy variables as controls, including sex (1 = female, 0 = male), local (1 = originally moved to facility from the same city, 0 = moved from elsewhere), outside social engagement (1 = consistent socializing with nonkin friends outside of facility, 0 = otherwise), see kids often (1 = have children and see them at least weekly; 0 = otherwise), and partnered (1 = married or living in a marriage-like relationship; 0 = otherwise). The “partnered” covariate is especially important because social ties between spouses/partners were not measured. Additional variables were used in preliminary analyses (e.g., tenure in facility, age) but were dropped from the final regression models because they did not have a significant association with the dependent variables.

**Analysis**

Network variables including out-degree and in-degree centrality were calculated in UCINET (Borgatti, Everett, & Freeman, 2002). First, two matrices were developed in which rows and columns were each defined by the 123 interviewees—one matrix for the “spend time with” ties and another for “confidant” ties. Rows of each matrix represent outgoing ties (X) from ego i to alter j. Looking down the columns indicates incoming ties (X) from alter j to ego i. Out-degree centrality for each person is simply the sum across their row, whereas in-degree centrality is the sum of their column.

A series of regression analyses utilized the network measures of out- and in-degree centrality as dependent variables and find their association with ego’s health. Models predicting out-degree controlled for in-degree and vice versa. This makes the interpretation of out-degree a count of reported ties net of incoming ties reported from alters (and vice versa for in-degree). Because sum of out- and in-degree social ties are count variables, negative binomial regression will be used for parameter estimation to account for variance over-dispersion. For out-degree, the basic regression model takes the form:

\[ \sum X_{ij} = \alpha + \sum X_{ji} + \beta_i (\text{health}) + \text{covariates + } \epsilon. \]

The in-degree centrality model takes the basic form:

\[ \sum X_{ji} = \alpha + \sum X_{ij} + \beta_i (\text{health}) + \text{covariates + } \epsilon. \]

Both models were estimated for each of the two types of network ties, “time spent with” and confidant.

A final regression analysis estimated Bonacich centrality, a more encompassing indicator of network position than in- and out-degree alone. Distinct from these simple measures (or from closeness or betweenness centrality), Bonacich centrality weighs ego’s ties by an eigenvector-based parameter (β) that accounts for the degree centrality of ego’s alters (Wasserman & Faust, 1994). Bonacich centrality is a useful outcome variable because it accords with the status-based expectation that health will be associated with a more prestigious network position based on alter’s reports. Following Haas and colleagues (2010), β is set to 1, which yields higher values for ties coming from more central actors. Therefore, a positive coefficient for health would indicate that healthier people are named more frequently by more popular peers.

**Results**

Figure 1 provides visual depictions of the networks formed by both types of social relation. Descriptive statistics for the study population (including variables used in preliminary analysis) are presented in Table 1.

Table 1 also provides information about the two types of social ties studied in this article, referred to as “time-spent” ties and “confidant” ties. The average resident of this retirement community reported 20.09 time-spent ties, which necessitates mathematically that each resident also received 20.09 time-spent ties on average. The standard deviation of these values, however, can differ (as can the median as a measure of central tendency). There was more variation in the central tendency of out-degree; the standard deviation of reported ties was 16.26 but only 9.44 for received ties (median values: out-degree = 17, in-degree = 19). This pattern is consistent with Feld and Carter’s (2002) observation that out-degree is subject to the idiosyncratic response patterns of each person in a population. In-degree, on the other hand, is more stable—and potentially more accurate—representation of “actual” social activity because it aggregates...
across people who are either under- or overreporting their social participation. Therefore, standard deviations of average reported ties ought to be larger than those of average received ties.

Confidant relations form an interesting basis of comparison with time-spent ties. As with the latter form of social relation, there was more variability in people’s reports of confidant ties than in the average number of confidant ties received (SD: 2.20 vs. 2.02). The number of such relations is considerably lower than the time-spent ties in this population (mean values: 2.24; median values: out-degree = 2, in-degree = 2). This is a reasonable finding, considering the generality of definition given to a “time-spent” tie versus the more concrete and more intimate intimations associated with a confidant relation.

Also interesting is the greater asymmetry in confidant relations than among time-spent ties. Though not a focus of this article per se, the overall low rates of reciprocation across both types of relations suggest that a great deal of interpretation goes in to considering someone a “confidant” or even an often-seen acquaintance. Accordingly, ties reported by these individuals cannot be assumed to represent reality as it is found in the retirement community; they are “cognitivist” portrayals of social reality that reflect wishful constructions of the world (Krackhardt, 1987). In addition, the lower rate of reciprocity in confidant relations relative to time-spent ties suggests that there is more ambiguity in defining the former type of relationship. Consequently, the proposed status-conferring effects of health—as reflected by in-degree and Bonacich centrality—may not be as readily observable for the in-degree reports of confidant ties as among time-spent ties.

Multivariate regression analysis follows in Table 2. The first pair of models focuses on in-degree social ties, adjusting for out-degree, gender, locality, partnership status, outside-facility social engagement, and frequency of interaction with children. Beginning with time-spent ties, health is associated with a .09 log-unit increase in expected count of in-degree ties. The standardized coefficients, which exponentiates the log-odds values for clearer interpretability, indicate that a standard deviation increase in health status predicts a 10% increase in the number of ties received from others in the network. Females also tended to receive more ties \( b = .25 \), net of their outgoingness. No other personal characteristics were associated with increased in-degree for time-spent ties. Confidant in-degree was not predicted by health or by any covariates besides out-degree (Column 2). Therefore, although a standard deviation increase in confidant outgoingness predicted a 25% increase in confidant reports from one’s peer, health appears to play little role in increasing the likelihood of an incoming confidant tie.

Columns 3 and 4 examine out-degree net of incoming ties (attractiveness). These findings pose some interesting contrasts with the time-spent social ties. Whereas the health coefficient was positive for the receipt of time-spent ties and for confidant relations (though only statistically significant for the former), health is negatively associated with out-degree, net of corresponding in-degree ties and covariates. The effect fails to reach significance at the level of .05 for time-spent relations (all test are two tailed), but it is strong and statistically significant in the case of confidant ties \( b = -.36, p < .001 \). As may be expected by the tendency toward

---

Table 1. Descriptive Statistics of Study Population \((n = 123)\)

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health (SF-36)*</td>
<td>16.35–95.59</td>
<td>58.52 (17.45)</td>
</tr>
<tr>
<td>Network ties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time spent, out-degree</td>
<td>0–90</td>
<td>20.09 (16.26)</td>
</tr>
<tr>
<td>Time spent, in-degree (% of time-spent ties reciprocated = .33)</td>
<td>1–43</td>
<td>20.09 (9.44)</td>
</tr>
<tr>
<td>Confidant, out-degree</td>
<td>0–12</td>
<td>2.24 (2.20)</td>
</tr>
<tr>
<td>Confidant, in-degree (% of confidant ties reciprocated = .20)</td>
<td>0–9</td>
<td>2.24 (2.02)</td>
</tr>
<tr>
<td>Bonacich centrality, time-spent ties</td>
<td>-3.04–29.01</td>
<td>8.39 (7.29)</td>
</tr>
<tr>
<td>Bonacich centrality, confidant ties</td>
<td>0–33.68</td>
<td>8.05 (7.66)</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0–1</td>
<td>0.69</td>
</tr>
<tr>
<td>Local</td>
<td>0–1</td>
<td>0.72</td>
</tr>
<tr>
<td>Partnered</td>
<td>0–1</td>
<td>0.38</td>
</tr>
<tr>
<td>Outside social engagement</td>
<td>0–1</td>
<td>0.68</td>
</tr>
<tr>
<td>Have Children</td>
<td>0–1</td>
<td>0.92</td>
</tr>
<tr>
<td>Of those who “yes”, see them at least weekly</td>
<td>0–1</td>
<td>0.52</td>
</tr>
<tr>
<td>Age</td>
<td>74–96</td>
<td>85.95 (4.35)</td>
</tr>
<tr>
<td>Tenure in facility</td>
<td>0.5–21</td>
<td>5.29 (5.39)</td>
</tr>
</tbody>
</table>

*Two items were removed from the SF-36 that referred to social interaction, leaving 34 total items. Measure was z-transformed for use in multivariate analysis.
reciprocity, more in-degree ties were associated with a greater count of out-degree ties for both types of relations.

The final analysis focuses on Bonacich centrality. Are healthier people likely not only to receive more ties but ties from the most prestigious people in the network? Analysis of both time-spent and confidant ties (Table 2) reveals that status-oriented in-degree patterns are evident for the former but not for the latter type of social relation. Accordingly, regression results for Bonacich centrality will likely show a relationship between health and network position for time-spent relations only. For the sake of consistency, however, confidant results are also presented in the Table 2.

Table 3 reveals that each standard deviation increase in health is associated with a .18 SD increase in Bonacich centrality for time-spent ties. In essence, healthier people receive ties from others who themselves tend to be selected in the network. Similarly, women tend to have relatively prestigious positions in the network (β = .23), whereas those who see their children at least weekly tend not to be selected by central people in the retirement community network (β = −.20). As anticipated above, health was not related to Bonacich centrality for the case of confidant relations. Model fit for this analysis was quite poor (R² = .03), indicating that the dynamics of prestige in confidant relations is considerably more complicated.

**Discussion**

The aim of this article was to bring fresh perspective to an enduring topic of interest in social gerontology. Scholars have long focused on the health-enhancing role of social relationships (Moen et al., 1992), but recent research has demonstrated the bi-directionality of this association by inverting the question: Does health influence social interaction (Cornwell et al., 2009; Haas et al., 2010)? In pursuing this line of investigation, special attention was given to differentiating in- from out-degree ties in a whole network study design drawn from a retirement community. In addition to these basic measures of connectivity in the network, a more explicit aspect of overall network position was employed—whether ego tended to be selected by others who were central.

Findings from this retirement community population highlight the utility of conceptually partitioning social ties into their out-degree and in-degree components. That is, for a less intense type of social ties (reports of spending time together), better health is associated with higher levels of nomination by one’s peers, whereas health is not related to a person’s nominations of his or her peers. Furthermore, healthier residents of the CCRC were selected by others who themselves have greater centrality in the network. On the other hand, the health effect for a stronger sort of tie was essentially opposite of time-spent ties: people in better health tended to nominate fewer close discussion partners, but health did not influence how many nominations they received from peers.

These findings suggest that under the broad conceptual tent of “social relations,” different underlying health-related processes are at work, both in terms of who is reporting or

---

**Table 2. Unstandardized and Standardized Coefficients for Negative Binomial Regression of In- and Out-Degree Centrality on Independent Variables (n = 123)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>In-degree, time-spent ties, unstandardized regression coefficient (SE), standardized coefficient</th>
<th>In-degree, confidant ties, unstandardized regression coefficient (SE), standardized coefficient</th>
<th>Out-degree, time-spent ties, unstandardized regression coefficient (SE), standardized coefficient</th>
<th>Out-degree, confidant ties, unstandardized regression coefficient (SE), standardized coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>0.09 (0.04)*, 1.10</td>
<td>0.08 (0.09), 1.08</td>
<td>−0.13 (0.07); 0.88</td>
<td>−0.36 (0.08)***, 0.70</td>
</tr>
<tr>
<td>Out-degree, time-spent ties</td>
<td>0.01 (0.00)***, 1.23</td>
<td>0.10 (0.04)*, 1.25</td>
<td>0.05 (0.01)***, 1.53</td>
<td>0.10 (0.04)***, 1.21</td>
</tr>
<tr>
<td>Local</td>
<td>0.25 (0.09)**, 1.12</td>
<td>0.04 (0.19), 1.02</td>
<td>−0.04 (0.17), 0.98</td>
<td>0.05 (0.19), 1.02</td>
</tr>
<tr>
<td>Outside social engagement</td>
<td>0.14 (0.09), 1.07</td>
<td>0.18 (0.19), 1.09</td>
<td>0.10 (0.17), 1.05</td>
<td>0.05 (0.17), 1.02</td>
</tr>
<tr>
<td>See children at least weekly</td>
<td>−0.14 (0.08)*, 0.93</td>
<td>−0.19 (0.16), 0.91</td>
<td>0.02 (0.15), 1.01</td>
<td>0.27 (0.16), 1.15</td>
</tr>
<tr>
<td>−2LL</td>
<td>431.23</td>
<td>235.46</td>
<td>475.29</td>
<td>226.63</td>
</tr>
</tbody>
</table>

*Notes: Significance tests are two tailed.

*p < .05; **p < .001; ***p < .001; †p < .10.

---

**Table 3. Unstandardized and Standardized Coefficients for Linear Regression of Bonacich Centrality on Independent Variables (n = 123)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Bonacich centrality, time-spent ties, unstandardized regression coefficient (SE), standardized coefficient</th>
<th>Bonacich centrality, confidant ties, unstandardized regression coefficient (SE), standardized coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>1.33 (0.62)*, 0.18</td>
<td>−0.02 (0.73), −0.00</td>
</tr>
<tr>
<td>Female</td>
<td>3.63 (1.41)*, 0.23</td>
<td>−0.03 (1.65), −0.00</td>
</tr>
<tr>
<td>Local</td>
<td>2.24 (0.14), 0.14</td>
<td>0.95 (1.62), 0.06</td>
</tr>
<tr>
<td>Partnered</td>
<td>−2.58 (1.33), −0.17</td>
<td>1.28 (1.55), 0.02</td>
</tr>
<tr>
<td>Outside social engagement</td>
<td>0.78 (1.35), 0.05</td>
<td>1.62 (1.57), 0.10</td>
</tr>
<tr>
<td>See children at least weekly</td>
<td>−2.88 (1.22)*, −0.20</td>
<td>−1.82 (1.42), −0.12</td>
</tr>
<tr>
<td>R²</td>
<td>0.21</td>
<td>0.03</td>
</tr>
</tbody>
</table>

*Notes: Significance tests are two tailed.

*p < .05.
receiving ties and according to what type of social tie is being considered. A logical path of inquiry, then, is to consider what accounts for this pattern of findings. Why might people in better health both receive more incoming ties from others (spending time) but report fewer strong ties to their peers (confidant)?

Each type of relationship considered in this study, time-spent ties and confidant ties, may reflect different aspects of status-based health asymmetries. Time-spent ties are based on an objective condition—two people actually spending time together—and so, in principle, there should be 100% agreement between both parties’ reports. But, of course, people vary in how they define “spending time.” Daily contact between two retirement community residents could be considered by one as incidental small talk but not a purposeful or memorable social occasion. For the other, however, this brief interaction over the course of a week could constitute their most meaningful and anticipated conversation and be affirmed as spending time together. What social contact is “casual,” “incidental,” or “insignificant” cannot be determined by an impartial third party perspective; the meaning of a social tie is created by pairs of people through idiosyncratic transactions in the course of ongoing interaction. Yet this does not imply a network marked by clean symmetrical relationships. Indeed, microlevel asymmetry is an essential building block of social structure, which scales up to the patterns characterizing larger groups and communities (Martin, 2009). On the basis of past research linking health to status—studies on the stigma of poor health among adolescents (Haas et al., 2010) and the tendency to avert the realities of decline and mortality (Cicirelli, 2002)—health was expected to represent an important basis of status. Consistent with this idea, healthier retirement community residents, on average, are the ones with who people disproportionately report spending time. Moreover, healthier people’s ties tend to come from more central actors in the network.

This set of findings speaks clearly to the typical notion of social status. A core element of social hierarchy is that those at the top are most noticed and deferred to but feel less pressure to select or acknowledge their “lesser” peers (Gould, 2002). And this, of course, is the chief advantage of incorporating in-degree centrality measures. The finding that people in better health tend to be chosen by their peers could simply mean that greater health is associated with more sociability. But, the corresponding finding that healthy people are no more likely to choose others speaks to a status-based asymmetry.

The results are somewhat different, however, when we consider more intimate types of social relations. The finding that better health was associated with reporting fewer confidant ties does not fit the expectation that healthier people are more sought after—the most straightforward basis for inferring social status. At the same time, because healthier people did not receive fewer confidant ties, their “stinginess” in nominations may indicate more selectiveness in identifying close associates. In the case of friendships in a retirement community, the ability to withhold close attention from others is another dimension of status but one that is manifested more for confidant relations than for more casual social relationships.

In general, the issue of relational selectivity has a firm foothold in social gerontology. Socioemotional selectivity theory emphasizes older adult’s discretion and preference for choosing their social ties, positing that the older adults are attuned to their shortened time horizon and make “increasingly selective social partner choices” rather than spread their attention and energies among peripheral friends (Carstensen et al., 1999, p. 168). If health problems signify a waning life span, socioemotional selectivity theory may seem to suggest that older people in poorer health—rather than the healthier residents—would name a smaller core of confidants. The empirical results from this study add a complementary perspective to this perspective. Whereas socioemotional selectivity can account for general trends in social network composition across the life course, status selectivity processes may be helpful for understanding the nomination of confidants in a closed community setting such as the retirement community of this study. Under the conditions of a self-contained community, older people have a limited number of potential close friends to pick from, and those with the fewest health problems can afford to be the choosiest in their selection. It may be helpful, then, to differentiate between each type of selectivity and to emphasize that each type is in response to different conditions (emotional needs in the life course vs. group dynamics in a bounded institution).

Overall, both forms of social relations (time-spent ties and confidant ties) may represent different aspects of the health status association in a retirement community setting. An alternate interpretation of the negative association between health and reports of confidant ties is that people in poorer health simply have a greater need of social support and so they tend to report more people in the retirement community as their confidants. This is a likely scenario if many of the important discussion topics in the community center around health problems (Perry & Pescosolido, 2010). The finding that many of such ties are not reciprocated, however, suggests that healthier people interpret these reported friendships somewhat differently than do less healthy people. What is a “close” association for a less healthy person may be a less meaningful or more incidental form of contact for healthier community residents.

A noteworthy limitation of this piece is a reliance on cross-sectional data. Social relationship formation and decay and health are likely dynamic and co-occurring processes, and using advanced stochastic modeling approaches currently in development (e.g., Snijders, van de Bunt, & Steglich, 2010) would add much to the processes inferred by this cross-sectional analysis. Given the emerging consensus that networks and health status are endogenously related
focusing entirely on one aspect of the association risks overestimating the true causal effects. A follow-up wave of sociometric and health data collection is being planned for the current study site and should shed light on the dynamic properties of a changing social setting.

Second, this study focuses on a limited and narrow set of social relationships in which retirement community residents participate. Clearly, CCRC residency does not end engagement in the broader community or communication with family members. Simple controls for these factors were used in multivariate analysis, but detailed information was not gathered due to time constraints during the interviews. By design, this article focused on intrafacility processes, much like studies of school networks that cannot thoroughly attend to family, teachers, or cross-town friends (e.g., Haas et al., 2010). Supplementary analyses revealed that health was not significantly associated with level of non resident social interaction.

A third limitation is the issue of generalizability. The residents of the retirement community represent a high-status and homogenous population (e.g., highly educated, 98% White). It is unclear whether the processes inferred from these data would occur among other types of people. Furthermore, this study was conducted in one particular CCRC; at present, it is not certain that the status-based patterns observed in this setting are identical to those in different sorts of older adult communities.

To come at the above limitation from the opposite angle, the particular setting in this study could be seen as a unique strength. The homogeneity of social class and race serves as a natural control for factors that could otherwise complicate the relationship between health and network centrality. Moreover, congregate living facilities are an increasingly popular option for aging adults, and the social aspect is a driving incentive for moving into such a facility (Evans, 2009; Shippee, 2008). This piece follows in the footsteps of other recent work that views such settings as unique bounded contexts for examining core sociological themes, such as identity negotiation (Moen, Erickson, & Dempster-McClain, 2000), or as a stage for co-occurring conflict and cohesion (Streib & Metsch, 2002). This article considers such communities as an opportunity to investigate complete social networks where health manifests as a status-inducing trait. Status is an emergent phenomenon that arises when traits are valued and unequally distributed (Collins, 2000); such is the case of health in retirement community life (Shippee, 2008).

Further research should explicate the role of health in other network processes, using natural bounded settings of older adults to explore dynamics such as information transmission and the potential to bridge disconnected social groups (Cornwell, 2009).

**Acknowledgments**

I thank Scott Feld, Ken Ferraro, Karen Fingerman, and Jill Suitor for their helpful comments on an earlier version of this manuscript. Kirk Fatool, Ann Howell, and Sarah Poorman provided excellent assistance with data preparation.

**Correspondence**

Correspondence should be addressed to Markus H. Schafer, PhD. Department of Sociology, University of Toronto, 725 Spadina Ave., Toronto, ON, Canada M5S 2J4. E-mail: markus.schafer@utoronto.ca.

**References**


**Funding**

This work was supported by the National Science Foundation (Dissertation Improvement Grant, 1003772), the Purdue Research Foundation, and the Center on Aging and the Life Course at Purdue University.


