

## ONLINE SUPPLEMENT to article in

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### The Social Connectedness of Older Adults: A National Profile

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#### POTENTIAL SELECTION ISSUES

A legitimate concern for our descriptive account is that the positive associations between age and some forms of connectedness could reflect selection processes. Three groups of people are excluded from our sample: those who have died, those who are institutionalized, and those who were drawn into the sample but did not participate. The primary purpose of our study is to describe the current population of older adults residing in the larger community. For this purpose, excluding people from the first two groups is not a serious problem. These forms of selection hold in the general population of older adults as well, so findings from our sample merely reflect that more general social fact.

NSHAP's response rate of 75.5 percent is impressive for such a survey, but it nonetheless leaves some room for selection arising from nonresponse.

Comparison of the distributions of other demographic characteristics (including marital status) among older adults, both to the 2005 American Community Survey and the 2002 Current Population Survey (see Table S4 in the Online Supplement), suggests relatively little differential nonresponse. Selection due to social isolation may be a concern, but for contrasting reasons. More connected people may have less time for an interview, but they may also be more sociable and therefore more willing to participate. At the same time, some isolated individuals may be lonely and welcome the opportunity to talk with an interviewer, while others may avoid the contact.

It is interesting to speculate as to the potential impacts of institutionalization on the relationship between age and social connectedness among older adults. Indeed, dismissing institutionalized older adults altogether perpetuates neglect of an

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understudied population. Institutionalization matters for our estimates to the extent that it is linked to social connectedness. There is little research on social connectedness among the institutionalized population. Some work, though, suggests that social isolation increases the risk of being placed in a nursing home (Akamigbo and Wolinsky 2006; Pearlman and Crown 1992). Our estimates may therefore be based partly on more socially connected older adults. Before worrying too much about potential selection effects, it is useful to get a sense of the severity of the problem. According to the 2000 U.S. Census (see Hetzel and Smith 2001), only 1.1 percent of people ages 65 to 74 were institutionalized in nursing homes. This only increases to 4.7 percent among those ages 75 to 84.

At the same time, some work implies that institutionalization is a *solution* for social isolation among older adults. Nursing homes typically encourage increased social connectedness among residents through communal dining, organized social activities, personal contact, and caregiving, sometimes even offering transportation to religious and other community events. Furthermore, some work suggests that older adults are better able to establish new relationships when they are surrounded by people their own age (Rosow 1967). Sample selection is only a threat if less socially connected adults are more likely to be institutionalized, and if that institutionalization does not succeed in reintegrating older adults into a community. But these are unique populations and it may be imprudent to compare social connectedness between institutionalized and non-institutionalized older adults. The meaning and character of social connectedness is likely to differ between these groups. For this reason, future research in social gerontology should focus on this possibility.

### CONDITIONING FACTORS

We are unable to identify the specific mechanisms that govern the apparent increase in associational involvement with age among older adults. The most common explanation is that this increase reflects an intentional adaptive response on the part of older adults who face interpersonal social loss. An alternative explanation is that interpersonal loss is often followed by developments that could affect one's connectedness to the community, such as changes in living arrangements (e.g., taking up residence in a retirement community) or increased outreach efforts by local organizations. The extent to which such mechanisms come into play is likely to condition the impact of life-course challenges on older adults' associational involvement in particular. We are unable, though, to evaluate these possibilities here.

Health also plays an important role because it may condition some aspects of network connectedness. For example, health may condition the extent to which an older adult adapts to and compensates for the loss of close ties by getting involved in the community, or the extent to which sociability is capable of driving such adaptation. While older adults' close relationships with their friends and family may survive the challenges and demands posed by health problems, relations with local organizations and groups may suffer from problems of access caused by disability and severe illness. Outside of the disabilities literature, sociological research on this issue is seriously lacking. While we understand a great deal about the impacts of social network connectedness on health, we are just beginning to understand the reverse process (see Ainlay et al. 1992; Li and Ferraro 2006; Thoits and Hewitt 2001). Such investigations need to develop more refined conceptualizations of health. Kinesthetic, sensory, and cognitive impairments, for instance, likely affect different aspects of network connectedness in different ways. Sorting out these effects may be crucial in efforts to fashion fresh approaches to linking the life course to social connectedness.

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**Table S1.** Details Concerning Multivariate Analysis of Social Connectedness Measures

| Dependent Variable   | Description                 | Regression Model               | Additional Controls <sup>a</sup>  |
|--|-----------------------------|--------------------------------|---|
| Network size   | Ordinal                     | Generalized ordered logit      | Number of children  |
| Volume of contact with network members                       | Count                       | Negative binomial <sup>b</sup> | Whether spouse/partner is in network, proportion of network members in household, average closeness to network members  |
| Closeness to network members                                 | Average of ordinal measures | Linear                         | Network size, whether spouse/partner is in network, proportion of network members in household, average frequency of contact with network members, interaction between age and average frequency of contact |
| Primary group members in network                             | Count                       | Poisson <sup>b</sup>           | Number of children  |
| Network density (i.e., number of ties among network members) | Count                       | Negative binomial <sup>c</sup> | Whether spouse/partner is in network, proportion of network members in household, average closeness to network members, proportion kin in network   |
| Neighborly socializing                                       | Ordinal                     | Generalized ordered logit      | Number of neighbors R knows by name, number of children, network size, proportion of network members in household, volume of contact with network members, inverse Mill's ratio <sup>d</sup>                |
| Religious services attendance                                | Ordinal                     | Generalized ordered logit      | Religious preference, number of children, network size, volume of contact with network members, proportion of network members in household  |
| Volunteer work   | Ordinal                     | Ordered logit                  | Number of children, network size, volume of contact with network members, proportion of network members in household, inverse Mill's ratio <sup>d</sup>   |
| Organized group involvement                                  | Ordinal                     | Ordered logit                  | Number of children, network size, volume of contact with network members, proportion of network members in household, inverse Mill's ratio <sup>d</sup>   |

<sup>a</sup> Estimates for these variables are included in all final models but are not shown to conserve space. All models also include: age, gender, race and ethnicity, education, retirement, widowhood and marital history, and self-rated health and functional health.

<sup>b</sup> Uses network size as the exposure variable.

<sup>c</sup> Uses number of possible alter-alter dyads (given the network's size) as the exposure variable.

<sup>d</sup> This variable is included as a control for selective nonresponse into the leave-behind questionnaire (LBQ), which is the source of information about neighborly socializing, volunteering, and organized group involvement. We model LBQ response using the core independent variables, cognitive function, and measures of respondent candor and difficulty. The control is the ratio of the probability density of a normal curve to its corresponding cumulative probability (derived from predicted probabilities).

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**Table S2.** Unstandardized Coefficients from Regression Models Predicting Older Adults' Volume of Contact with and Closeness to Network Members, Network Composition, and Network Density (full version of in-text Table 3)

| Predictor   | Volume of interaction with net members (visits per year) |          | Closeness to net members |          | Number of primary group members in network |           | Number of relationships among network members |          |
|---|--|----------|--------------------------|----------|--|-----------|---|----------|
|   | (Negative binomial) <sup>a</sup>                         |          | (OLS) <sup>b</sup>       |          | (Poisson) <sup>a</sup>                     |           | (Negative binomial) <sup>c</sup>              |          |
| Age (in decades)                                  | -.456*   | -.377    | -.057***                 | -.121*** | .059**                                     | .059**    | -.006   | -.011    |
|   | (.210)   | (.214)   | (.014)                   | (.032)   | (.018)                                     | (.022)    | (.007)  | (.007)   |
| Age <sup>2</sup>                                  | .030   | .027     |                          |          |  |           |   |          |
|   | (.015)   | (.015)   |                          |          |  |           |   |          |
| Female  |  | .069**   |                          | .126***  |  | -.120***  |   | -.036**  |
|   |  | (.020)   |                          | (.023)   |  | (.031)    |   | (.012)   |
| African American                                  |  | .131***  |                          | .041     |  | -.182**   |   | -.011    |
|   |  | (.033)   |                          | (.029)   |  | (.062)    |   | (.020)   |
| Hispanic  |  | .104***  |                          | -.074    |  | .186**    |   | -.017    |
|   |  | (.027)   |                          | (.038)   |  | (.060)    |   | (.019)   |
| College   |  | -.096*** |                          | .015     |  | -.029     |   | -.049**  |
|   |  | (.018)   |                          | (.019)   |  | (.023)    |   | (.017)   |
| Retirement  |  | -.093*** |                          | .066**   |  | .028      |   | .018     |
|   |  | (.022)   |                          | (.023)   |  | (.035)    |   | (.012)   |
| Widowhood   |  | .117***  |                          | .036     |  | -.166***  |   | .069**   |
|   |  | (.026)   |                          | (.028)   |  | (.034)    |   | (.021)   |
| Never married                                     |  | -.000    |                          | -.121    |  | -1.513*** |   | .038     |
|   |  | (.071)   |                          | (.067)   |  | (.258)    |   | (.049)   |
| Number of children                                |  |          |                          |          |  | .070      |   |          |
|   |  |          |                          |          |  | (.012)    |   |          |
| Self-rated health                                 |  | -.018*   |                          | .045**   |  | .019      |   | .010     |
|   |  | (.008)   |                          | (.012)   |  | (.012)    |   | (.008)   |
| Functional health                                 |  | -.016    |                          | -.016    |  | -.036     |   | -.008    |
|   |  | (.017)   |                          | (.016)   |  | (.025)    |   | (.013)   |
| Network size                                      |  |          |                          | -.020**  |  |           |   |          |
|   |  |          |                          | (.006)   |  |           |   |          |
| Partner in network                                |  | .047*    |                          | .044     |  |           |   | .054**   |
|   |  | (.023)   |                          | (.029)   |  |           |   | (.017)   |
| Proportion of network members in household        |  | .686***  |                          | .181**   |  |           |   | .191***  |
|   |  | (.035)   |                          | (.062)   |  |           |   | (.041)   |
| Closeness to network members                      |  | .195***  |                          |          |  |           |   | .073***  |
|   |  | (.017)   |                          |          |  |           |   | (.013)   |
| Average frequency of contact with network members |  |          |                          | -.000    |  |           |   |          |
|   |  |          |                          | (.001)   |  |           |   |          |
| Proportion kin in network                         |  |          |                          |          |  |           |   | .379***  |
|   |  |          |                          |          |  |           |   | (.030)   |
| Constant  | 7.050***   | 5.905*** | 3.540***                 | 3.380*** | -1.178***                                  | -1.339*** | -.147**                                       | -.664*** |
|   | (.726)   | (.742)   | (.094)                   | (.230)   | (.122)                                     | (.123)    | (.050)  | (.072)   |
| Δ of age estimate (F) <sup>d</sup>                |  | 21.70*** |                          | 2.25     |  | 1.50      |   | 7.36**   |
| (d.f.)  |  | (2, 48)  |                          | (1, 49)  |  | (1, 49)   |   | (1, 49)  |
| N   |  | 2,896    |                          | 2,896    |  | 2,900     |   | 2,560    |

Note: All models are survey-adjusted and include controls for SES, marital history, functional health, and other predictors listed in Table S1.

<sup>a</sup> Number of network members is treated as the exposure variable.

<sup>b</sup> Note that this model also includes an interaction between age and average frequency of interaction with network members.

<sup>c</sup> Number of possible relationships among network members, given network size, is treated as the exposure variable.

<sup>d</sup> Seemingly unrelated estimation test of whether including the life-course factors significantly alters the association between age and connectedness.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests).

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**Table S3.** Log(odds) from (Generalized) Ordered Logit Models Predicting Weekly Neighborly Socializing, Religious Services Attendance, Volunteering, and Organized Group Involvement among Older Adults (full version of in-text Table 4)

| Predictor                                    | Neighborly Socializing | Religious Services  | Volunteering        | Organized Groups    |                     |                     |                     |                     |
|--|------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Age (in decades)                             | .254***<br>(.054)      | .078<br>(.068)      | .263***<br>(.069)   | .340***<br>(.084)   | .095<br>(.052)      | .180**<br>(.053)    | -.001<br>(.060)     | .120<br>(.080)      |
| Female                                       |                        | -.091<br>(.102)     |                     | .492***<br>(.095)   |                     | .225*<br>(.093)     |                     | .176<br>(.104)      |
| African American                             |                        | .200<br>(.245)      |                     | .760***<br>(.123)   |                     | .551**<br>(.150)    |                     | .687***<br>(.153)   |
| Hispanic                                     |                        | .450*<br>(.197)     |                     | .397<br>(.229)      |                     | -.086<br>(.167)     |                     | -.006<br>(.161)     |
| College                                      |                        | -.124<br>(.113)     |                     | .151<br>(.086)      |                     | .467***<br>(.094)   |                     | .778***<br>(.081)   |
| Retirement                                   |                        | .225*<br>(.100)     |                     | .039<br>(.116)      |                     | .209<br>(.062)      |                     | .010<br>(.120)      |
| Widowhood                                    |                        | .240<br>(.132)      |                     | -.028<br>(.107)     |                     | -.051<br>(.139)     |                     | .139<br>(.133)      |
| Never married                                |                        | -.473<br>(.318)     |                     | -.269<br>(.231)     |                     | -.790*<br>(.295)    |                     | -.589*<br>(.262)    |
| Number of children                           |                        | -.024<br>(.043)     |                     | .050<br>(.026)      |                     | -.085*<br>(.034)    |                     | -.078<br>(.042)     |
| Self-rated health                            |                        | .027<br>(.056)      |                     | .021<br>(.061)      |                     | .176**<br>(.050)    |                     | .155**<br>(.052)    |
| Function health                              |                        | -.012<br>(.095)     |                     | .432***<br>(.101)   |                     | .442***<br>(.091)   |                     | .312**<br>(.095)    |
| Network size                                 |                        | -.038<br>(.042)     |                     | .145**<br>(.041)    |                     | .101*<br>(.049)     |                     | .081<br>(.052)      |
| Proportion of network members in household   |                        | -.588**<br>(.184)   |                     | .451*<br>(.213)     |                     | -.129<br>(.234)     |                     | -.332<br>(.251)     |
| Volume of contact with network members       |                        | .002<br>(.002)      |                     | .002<br>(.002)      |                     | .004*<br>(.002)     |                     | .003<br>(.002)      |
| Familiarity with neighbors                   |                        | .809***<br>(.083)   |                     |                     |                     |                     |                     |                     |
| Catholic                                     |                        |                     |                     | .196<br>(.108)      |                     |                     |                     |                     |
| Jewish                                       |                        |                     |                     | -1.757***<br>(.447) |                     |                     |                     |                     |
| Other religion                               |                        |                     |                     | .269<br>(.151)      |                     |                     |                     |                     |
| No religion                                  |                        |                     |                     | -4.188***<br>(.801) |                     |                     |                     |                     |
| Inverse Mill's ratio                         | -.277**<br>(.385)      | -.571<br>(.761)     |                     |                     | -2.348***<br>(.318) | -1.422**<br>(.526)  | -2.543***<br>(.373) | -1.919**<br>(.620)  |
| Constant                                     | -1.933***<br>(.334)    | -2.702***<br>(.575) | -2.003***<br>(.481) | -3.947***<br>(.631) | -1.401***<br>(.376) | -3.798***<br>(.513) | -.349***<br>(.393)  | -2.747***<br>(.531) |
| Δ of age estimate (F) <sup>a</sup><br>(d.f.) |                        | 12.57***<br>(1, 49) |                     | 1.14<br>(1, 49)     |                     | .74<br>(1, 49)      |                     | .02<br>(1, 49)      |
| N  | 2,257                  |                     | 2,878               |                     | 2,346               |                     | 2,344               |                     |

Note: All models are survey-adjusted and include controls for SES, marital history, functional health, and other predictors listed in Table S1.

<sup>a</sup> Seemingly unrelated estimation test of whether including the life-course measures significantly alters the association between age and connectedness. This test is unavailable for generalized ordered logit, so it is conducted using binary logit models

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests).

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**Table S4.** Comparison of Sociodemographic Distribution of NSHAP Sample to Estimates from 2005 American Community Survey (ACS) and 2002 Current Population Survey (CPS)

| Characteristic           | NSHAP            | 2005 ACS | 2002 CPS          |
|--------------------------|------------------|----------|-------------------|
| Gender (female)          | 51.5             | 54.4     | 54.6              |
| Age                      |                  |          |                   |
| 57 to 64                 | 41.3             | 42.2     | 44.1              |
| 65 to 74                 | 34.9             | 33.5     | 33.4              |
| 75 to 85                 | 23.8             | 24.3     | 22.5              |
| Race and Ethnicity       |                  |          |                   |
| White                    | 84.9             | 84.0     | 86.9 <sup>a</sup> |
| African American         | 10.0             | 8.8      | 9.1               |
| Other                    | 5.0              | 7.2      | –                 |
| Hispanic                 | 7.0 <sup>b</sup> | 6.9      | 6.6               |
| Education                |                  |          |                   |
| Less than high school    | 18.5             | 18.8     | 23.1              |
| High school graduate     | 27.0             | 35.5     | 35.1              |
| Some college/Associate's | 30.0             | 23.1     | 20.6              |
| Bachelor's or higher     | 24.5             | 22.7     | 21.2              |
| Marital status (married) | 66.4             | 63.1     | 62.8              |

<sup>a</sup> Includes Latinos.

<sup>b</sup> Based on the question: “Do you consider yourself Hispanic or Latino?”