SOCIAL DISADVANTAGE AND NETWORK TURNOVER*

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Abstract

Objectives. Several scholarly perspectives suggest that socially disadvantaged groups experience social network change at relatively high rates – a particularly important issue among older adults, who often rely on stable networks for support. This paper therefore examines whether rates of social network change – including the loss/death of network members or the addition of new ones – are associated with social disadvantage.

Method. Social network change was assessed using longitudinal egocentric network data from the National Social Life, Health, and Aging Project, a nationally representative study of older adults conducted between 2005/6 and 2010/11. Data collection in wave 2 included a technique for comparing respondents' network rosters between waves. Rates of network losses, deaths, and additions were modeled using multivariate regression analysis.

Results. Most older adults lost at least one confidant and/or added at least one new one during the five-year study period. African-Americans and low-SES individuals lost significantly more confidants – especially due to death – than did whites and those who had college degrees, respectively. African-Americans added more confidants to their networks than did whites. Neither African-Americans nor low-SES individuals were able to match network losses with new additions to the extent that others did, though, resulting in higher levels of overall network shrinkage and lower levels of overall network growth in these groups.

Discussion. Although some of these differences are explained by group differences in life events like bereavement, significant associations remain unexplained. Additional work may shed light on whether these differences help to explain health disparities among older adults.

Key words: Aging, social networks, network change, social inequality, race, bereavement

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Research in the past couple of decades has underscored the importance of social networks to a variety of individual outcomes, including access to valuable resources and opportunities, social capital and social support, and the capacity for collective action (e.g., Coleman, 1988; Granovetter, 1973; Lin, 2002; Wellman & Wortley, 1990). The social network paradigm has become central to research on a variety of individual-level outcomes that become more salient in later life as well, especially health and mortality (e.g., Holt-Lunstad, Smith, & Layton, 2010; Stephens et al., 2011; York Cornwell & Waite, 2009). Accordingly, social gerontologists and network researchers in other fields have become increasingly concerned with the nature and implications of *change* in individuals' social network connections (Donnelly & Hinterlong, 2010; Shaw et al., 2007; Snijders & Doreian, 2010; van Tilburg, 1998; Wrzus et al., 2013).

Social network change can involve several unique processes – including the loss of old ties, the addition of new ones, and overall network turnover – that are potentially consequential for individuals in their own right, above and beyond the effects of baseline social connectedness (Eng et al., 2002; Giordano & Lindstrom, 2010; Holtzman et al., 2004; Kroenke et al., 2008; Seeman et al., 2011; Thomas, 2011, 2012). The loss of network members, for one, triggers a bereavement process, which in turn often evokes stress, depression, and loneliness (see Stroebe, Schut, & Stroebe, 2007). Network losses can also reduce sense of control and decrease coping capacities (Gerstorf, Röcke, & Lachman, 2010). The addition of network members not only often increases the number, range, and quality of social resources that are available to a person, but also implies an increase or change in physical and social activity associated with cultivating new ties that can be both physically and psychologically beneficial (Cornwell & Laumann, 2013).

Moreover, both losing and gaining network members can result in a complete reshuffling of the social influences and norms that constitute one's social environment. This can give rise to a sense of normlessness or detachment from society (Deflem, 1989), reduced capacity to locate sources of specific forms of support within one's network (Pescosolido, 1992), and general disruption to preexisting social routines and systems of coordination that operated within it (Cornwell & Laumann, 2013). This is particularly true in the case of the loss or addition of a particularly well-connected network member, who may alter the entire structure of one's network. For these reasons, social network change increases the burden on individuals to adapt to or compensate for shifts within their social network environments. As such, it is crucial that we explore determinants of these forms of social network change.

Importantly, several theoretical frameworks suggest that processes of network change operate differently across different social strata. Most broadly, a variety of sociological perspectives suggest that the social environments of socially disadvantaged groups – especially racial minorities and low-socioeconomic-status individuals – are less stable than the environments of more advantaged groups. Socially disadvantaged people – especially the urban poor – must rely disproportionately on network members (especially kin) for social support and for indirect access to resources to survive (e.g., Cantor, 1979). Problems associated with persistent residential instability, unemployment and contingent work, poverty, and incarceration often combine to create unusually high levels of overall environmental instability for these social groups (Atkinson, Liem, & Liem, 1986; Cattell, 2001; Kasarda & Janowitz, 1974; Rose & Clear, 1998; Small, 2007; van Eijk, 2010; Wellman et al., 1997; York Cornwell, forthcoming). This, in turn, may introduce distrust, uncertainty, asynchrony, and a lack of cooperation into disadvantaged groups' social networks (Goffman, 2009; Hartigan, 1999; Miller-Cribbs & Farber, 2008; Smith, 2007), sometimes creating situations in which network ties must be treated as temporary, “disposable,” and substitutable (Desmond, 2012). Though this is debatable, some research also implies that this results in smaller or more restricted networks within disadvantaged social strata, including in later life (see Ajrouch, Antonucci, & Janevic, 2001; Peek & O’Neill, 2001). This situation – which is more common among African-Americans and those with few socioeconomic resources – suggests that socially disadvantaged groups experience network turnover in a manner that mirrors the instability of the broader social environments in which they live. It is important to bear in mind, however, that socially disadvantaged groups may experience network turnover for other reasons, including job changes for reasons other than unemployment (e.g., promotion), and perhaps greater access to a wide range of weaker ties in the broader community thanks to independent mobility.

The expectation of greater instability and turnover within disadvantaged groups’ social networks may be particularly pertinent in the context of late life. Social network change is an important issue in late life – a time when the need for social support increases, when network ties are a primary source of sense of belonging, and when common life-course transitions such as retirement or health decline may drastically alter the structure of one’s network (Charles & Carstensen, 2010; Cornwell, Laumann, & Schumm, 2008; Fiori, Antonucci, & Akiyama, 2008; McDonald & Mair, 2010; Utz et al., 2013). But research suggests that some disadvantaged groups may experience social network change differently and to a greater extent than others (e.g., see Shaw et al., 2007). In addition (and related) to aspects of social disorganization discussed above, members of socially disadvantaged groups also suffer from more health problems and have worse health care, contributing to higher mortality rates (Adler & Rehkopf, 2008; Kawachi, Kennedy, & Lochner, 1997; Link & Phelan, 1995; Williams & Collins, 1995).

By implication, members of socially disadvantaged groups experience bereavement more frequently due to the health-related incapacitation, institutionalization, or death of network members (e.g., see Hawkins & Abrams, 2007).

Higher rates of network loss may also necessitate greater efforts to cultivate new ties among disadvantaged older adults. Continuity and activity theories argue that people grow accustomed to certain social roles and activities during their lives and often attempt to maintain their roles through later-life transitions (Atchley, 1989; Donnelly & Hinterlong, 2010; Moen, Dempster-McClain, & Williams, 1992; Thoits, 1992). The loss of social connections therefore often sparks efforts to adapt to and/or compensate by developing new social ties (Bloem, van Tilburg, & Thomése, 2008; Cornwell & Laumann, 2013; Lamme, Dykstra, & van Groenou, 1996; Zettel & Rook, 2004). As such, higher rates of network loss may also be accompanied by higher rates of tie cultivation within these groups, creating a cycle of network turnover that amplifies preexisting instability within their social environments. At the same time, it is important to consider the possibility that members of more advantaged groups may have more opportunities to develop new contacts within the community.

METHODS

I use recent data from two waves of the National Social Life, Health, and Aging Project (NSHAP), a nationally representative, population-based panel study funded by the National Institutes of Health. The NSHAP focuses on understanding connections between older adults' social lives and health. Wave 1 (W1) was conducted in 2005-6 and consisted of in-home interviews with 3,005 community-dwelling older adults between the ages of 57 and 85. The sample was selected using a multi-stage area probability design that oversampled by race/ethnicity, age, and gender. The final response rate for W1 was 75.5%. In 2010-11, the NSHAP conducted a second wave (W2). Of the 3,005 baseline respondents, 744 (24.8%) were lost to some form of attrition. NSHAP's W2 response rate from among eligible surviving baseline respondents (N = 2,548) is 88.7%. The NSHAP re-interviewed 75.2% of W1 respondents, yielding a panel of 2,261 older adults.

This analysis focuses on confidant turnover that occurred during the study period. The NSHAP collected respondents' egocentric network rosters at both waves. The NSHAP also devised a CAPI exercise to reveal specific network changes between waves. Not only were the same network data collected at W2 as at W1, but the NSHAP also devised a CAPI exercise to reveal specific confidant changes between waves among the 2,261 respondents who participated at both W1 and W2. At W2, interviewers first collected each respondent's confidant roster and preliminary information about respondents' relationships with confidants as described above. The respondent's W1 roster was preloaded into the CAPI instrument and was not visible to the respondent while completing this step. After the respondent completed the W2 roster, the CAPI was programmed to display a visual representation linking matches between the W1 and W2 rosters (see Figure 1). The respondent was asked to verify if these computer-programmed matches were correct, and was given the opportunity to correct any mismatches. The W1 roster line corresponding to a given W2 alter was then recorded.

-- Figure 1 about here --

To capture turnover, we measure several different aspects of network change. First, we calculate the number of confidants who were named as confidants at W1 but who were not named as confidants again at W2 (confidants "lost"). Second, we calculate the number of confidants who were named at W2 but who had not been named as such at W1 (confidants "added"). To capture net shifts in network contacts, we measure overall change in network size between waves by subtracting W1 network size from W2 network size ("overall change"). Finally, as an adjunct to the analysis of network loss, we also calculate the number of W1 confidants who died between waves, which may be particularly relevant to network turnover in late life.

Multivariate Poisson regression analyses are used to predict the overall number of confidants lost from these respondents' networks, as well as the number who died, and the number of new network members added. Poisson is appropriate here because these dependent variables are count models, and there is no evidence of overdispersion in these measures. The number of network members at baseline was included as the exposure variable, thus effectively controlling for network size effects. Multivariate OLS regression is used to predict overall net change in the size of respondents' networks during the study period.

-- Table 1 about here --

The models proceed first by regressing each of these variables on a set of socio-demographic predictors, including age, gender (male/female), race (white, African-American, other), ethnicity (Hispanic, non-Hispanic), and socioeconomic status (high school education or less, some college, or college/professional degree). (See Table 1 for more detailed descriptions of variable construction, means/proportions, and standard deviations.) These initial models provide information about whether aspects of race and/or SES significantly predict the above aspects of network change. Note that the first models for each dependent variable also control for respondents' average frequency of contact with and closeness to their W1 network members, the kin composition of their W1 networks, and their frequency of attendance at religious services. These baseline characteristics help to capture the structural network features of one's social networks and community involvement that affect the stability of one's network and one's opportunities to maintain and develop ties within the community.

For each dependent variable, a second set of models include a larger set of life-course-related measures that help capture later-life transitions that are potentially related to social network change. Life-course factors include baseline marital status and change in marital status between waves, as well as baseline employment status and change in employment status. These second models also include measures of functional health, overall self-reported health, and depression. To measure functional impairment, we construct an index comprised of seven items ($\alpha = .84$) that assesses how much difficulty respondents have with everyday tasks (e.g., trouble walking). We also examine overall self-rated health, which is reported by respondents as "poor," "fair," "good," "very good," or "excellent." We also consider depressive symptoms, which are measured using a modified Center for Epidemiologic Studies Depression scale (CES-D-ml), which is the average of standardized responses to 10 ordinal items assessing the respondents' depressive symptomology, such as feeling sad "most of the time" as opposed to less frequently ($\alpha = .77$). The CES-D-ml scale does not include one measure typically included in the CES-D, which asks respondents how often they feel "lonely." Leaving this item in the scale would give it a social dimension that is partially captured in other network measures, such as number of non-partner confidants, and thus would increase any endogeneity problems (York Cornwell & Waite, 2009).

Finally, residential mobility is important to consider. The NSHAP included a leave-behind questionnaire (LBQ) that respondents could complete and mail in later. On this, respondents reported how long they had lived at their current residence, which we used this to create an indicator of whether respondents moved anytime during the past five years. Unfortunately, 286

(12.7%) respondents did not complete the LBQ, creating additional selection issues. Therefore, we include the residential mobility indicator only in a set of supplemental analyses (see Appendix Table A1). The results of these analyses are discussed below.

All models take into account the clustering and stratification of NSHAP's sample design and include NSHAP-supplied weights to account for respondents' differential probabilities of selection at W1. We also take into account the non-random loss of respondents due to attrition. We begin by creating a variable for each of the 3,005 W1 respondents that indicates whether they were part of the final W2 sample and in the final model for a given dependent variable. We predict this indicator using a logit model, with baseline socio-demographic variables, health, and other factors entered as predictors. From this, we derive a predicted probability that each W1 respondent appears in the analysis. We take the inverse of this probability and multiply it by the NSHAP-supplied weight for that person at W1. Using these adjusted weights as the sampling weights in the models give more weight to individuals who were less likely to be in the W2 sample, effectively adjusting estimates toward where they would have been had all W1 respondents made it into the W2 sample (see Austin, 2011).

RESULTS

This sample reported considerable network change within their networks over the 5-year study period. Of the 2,126 respondents who provided valid data, only 7.2% reported a completely stable confidant network that involved neither losses nor additions during this time. In general, respondents were more likely to add network members than to lose them. Fully 81.6% of the sample added at least one new network member between waves, while 73.5% of respondents lost at least one network member. The average number of confidants lost between waves was 1.48

(95% C.I.: 1.40, 1.57), and the average number added was 1.90 (95% C.I.: 1.83, 1.97). Just over one-fifth of respondents (21.9%) experienced the death of at least one network member. All told, most networks grew between waves, with an average net change in network size of .19 (95% C.I.: .12, .26).

Race and Ethnicity

Race and ethnicity appear to play important roles in several aspects of network turnover. Descriptively speaking, African-American respondents experienced higher levels of turnover than respondents from other racial backgrounds. White respondents were 88.3% more likely than African-Americans, and those of other racial backgrounds were 85.5% more likely than African-Americans, to maintain the same exact confidant network over time (see Appendix Figure A1 for rates). Whereas 7.6% of white respondents and 7.4% of those from other racial backgrounds reported neither losing W1 confidants nor adding new confidants at W2, only 4.0% of African-American respondents did. Likewise, African-American respondents were 10.8% more likely to experience turnover that involved both multiple network members lost and multiple network members gained than whites and 43.9% more likely than members of other racial groups, with 44.2% of blacks experiencing this level of turnover compared to 39.9% of whites and 30.7% of others.

-- Table 2 about here --

These patterns are reinforced in the multivariate analysis. As shown in the first column of Table 2, African-Americans experienced a 21.5% higher overall rate of loss from their confidant networks than whites over the five-year study period (Incidence rate ratio [*IRR*] = 1.215, S.E. = .053). This coefficient is reduced slightly but remains highly significant at $p < .01$ when life-course changes such as retirement, widowhood, and health measures are taken into account. Beyond this, African-Americans reported significantly higher rates of death among their confidants during this period (*IRR* = 1.342, S.E. = .159). This difference remains substantial but is reduced to non-significance when life-course and health covariates are taken into account.

Supplemental analyses show that no single measure is crucial in the reduction of this association, but the inclusion of the health measures alone is enough to reduce the association to marginal significance. It is worth noting that Hispanic reporting nearly just half the rate of confidant mortality as non-Hispanics (*IRR* = .551, S.E. = .129), a difference that remains once other factors are controlled. This is the only significant ethnicity association in these measures of network turnover. It is also important to note that these associations are not substantively different in the supplemental analysis that includes information about residential mobility (see Appendix Table A1).

African-Americans do report slightly higher rates of adding new confidants during the study period than whites (*IRR* = 1.073, S.E. = .036). However, this association is not significant when life-course factors are included. OLS regression analyses show that, in the end, African-Americans experienced larger net losses in the sizes of their networks than whites (*b* = -.303, S.E. = .098), a difference that remains after controlling for other covariates. The lack of significance with respect to race is reinforced by the supplemental analysis that includes information about residential mobility (Appendix Table A1). However, note that the coefficient for African-Americans is not significant in the initial model, which may reflect selection issues associated with missing data on the LBQ portion of the study.

Socioeconomic Status

Socioeconomic status is also associated with network turnover, but not to the same extent as race. In general, respondents who had less formal education experienced comparable levels of complete network stability (7.0%) as those who earned college degrees (7.7%). The main significant difference with respect to SES occurs with respect to network loss. As shown in Table 2, those who had nothing beyond a high school education lost their network members at a 14.0% greater rate than those who earned college degrees (*IRR* = 1.140, .S.E. = .057). This association is reduced to marginal significance ($p < .07$) when life-course and health factors are taken into account, though no one of those measures alone accounts for this reduction in the association. Note that there are no statistically significant differences between those who had some college but did not earn a degree and those who went on to earn a college degree.

There is a particularly strong association between SES and confidant mortality. The lowest-SES group lost their network members to death at a 37.6% greater rate than those who earned college degrees (*IRR* = 1.376, S.E. = .186). This association is also explained when life-course and health factors are taken into account. Supplemental analyses (available upon request) show that the reduction in this association is to some extent an artifact of the fact that low-SES individuals were more likely to become unmarried due to widowhood during the study period. Controlling for the health measures without controlling for life-course transitions also reduces the association to marginal significance. Supplemental analyses that take into account residential mobility (Appendix Table A1) echo the above findings.

In the main sample, levels of formal education are not significantly associated with the addition of new network members over the study period. In the supplemental analysis Thus, low-SES individuals experienced less overall network change compared to those who had college degrees. The OLS regression analyses predicting overall network change show that, in the end, those with only a high school (or less) education reported significantly more overall negative change in the sizes of their networks compared to those who had a college degree (*b* = -.213, S.E. = .093). This net difference in network size change remains despite controlling for other covariates (*b* = -.199, S.E. = .144). Note that the supplemental analysis shown in Appendix Table A1 provides some evidence that those who had only some college experienced more network growth than those who had a college degree. However, there is no evidence in this more select sample that SES is associated with overall network change.

Stratified Network Loss

While the above analyses provide some clues as to group differences in network change, they are not definitive accounts of different groups' experiences with network instability. Nonetheless, there are systematic differences in different groups' reports of why their networks changes. Unfortunately, the NSHAP did not inquire about how new confidant relationships were developed. But the team did inquire about "lost" network members. For any W1 confidant who was not named again at W2, respondents reported whether that network member was still alive and, if so, why the relationship ended. Based on coding of open-ended responses, the NSHAP team devised several broad classes of network loss. Key categories are presented in Table 3.

-- Table 3 about here --

Based on an analysis of the 1,551 individuals who experienced the loss of at least one confidant and who provided valid information about these losses, Table 3 shows some significant differences in causes of network loss. Perhaps the most important finding echoes findings from the multivariate regression analysis just discussed – that African-Americans were more likely than members of other race groups to experience the death of a confidant. Specifically, 34.8% of

African-Americans who lost a network member lost one due to death, compared to 30.1% of whites and 11.8% of members of other races. And while African-Americans were more likely than whites to experience the loss of network members due to residential mobility or some other distance issue (37.0% versus 31.8%, respectively), members of other race groups were significantly more likely to experience loss due to this (47.0%). With respect to SES, the biggest difference between groups is that more highly educated respondents were most likely to lose a network member due to a job-related change, as opposed to some other cause such as the death of a confidant.

CONCLUSION

Motivated by the dual observations that social network change has important implications for older adults (Eng et al., 2002; Gerstorf, Röcke, & Lachman, 2010; Holtzman et al., 2004; Stroebe, Schut, & Stroebe, 2007; Thomas, 2011, 2012) and that members of socially disadvantaged groups tend to face more instability in their broader social environments (Ajrouch, Antonucci, & Janevic, 2001; Hawkins & Abrams, 2007; Peek & O'Neill, 2001; Shaw et al., 2007), this study sought to examine whether network turnover is related to social disadvantage. Analyses reveal that members of socially disadvantaged groups do experience more social network change in later life than others do. In particular, African-Americans and low-SES individuals lost more of their network members over the five-year study period – especially due to death – than did non-Hispanic whites and those who had college degrees, respectively. Neither African-Americans nor low-SES individuals were able to match network losses with network additions to the extent that members of other groups did, ultimately resulting in more network shrinkage and less network growth than was seen in other groups. These associations are partly due to socially disadvantaged groups' greater likelihood of transitioning out of marriage – either due to divorce or (more likely) widowhood – but significant differences between these groups with respect to rates of network turnover remain unexplained.

One particularly disturbing set of findings concerns the strong associations between being African-American, low SES, and the risk of confidant mortality. The greater propensity for low-SES individuals to experience this is explained in part by their higher rates of widowhood. Variation in physical and mental well-being also helped to explain the association between both SES and race and confidant mortality. This latter pattern raises the possibility that health-related homophily (see McPherson, Smith-Lovin, & Cook, 2001; Schaefer, Kornienko, & Fox, 2011; Steglich & Snijders, 2010) plays a significant role in shaping older adults' closest social network connections. It may be that older adults who experience health problems – who are themselves disproportionately low-SES and African-American – become increasingly connected (e.g., through greater mutual exposure through health-treatment centers) to others who are also in poor health. It is possible that this reflects a premature depletion of disadvantaged older adults' stock of healthy potential social contacts, combined with limited capacity to cultivate new ties. Regardless, the aforementioned statistical explanations for the link between SES, race, and later-life network instability highlight the fact that socially disadvantaged people are disproportionally connected to more vulnerable confidants. This has potentially serious implications for disadvantaged individuals' abilities to access to social resources, such as instrumental and emotional social support, in the face of already difficult later-life challenges such as widowhood and health decline.

When combined with mounting evidence that socially disadvantaged groups have smaller social networks and less access to forms of social capital that create opportunities for upward mobility (e.g., see Lin, 2000; McDonald, Lin, & Ao, 2009; York Cornwell & Cornwell, 2008) – including in later life (Ajrouch, Antonucci, & Janevic, 2001) – the fact that the social networks that members of these groups do have are less stable suggests a particularly precarious situation for aging African-Americans and low-SES individuals. In light of the fact that social disadvantage is associated with disinvestment in social capital (possibly at both the individual and neighborhood level), which in turn is associated with higher rates of health problems and mortality (e.g., see Cattell, 2001; de Leon & Glass, 2004; Kawachi et al., 1997), future research should examine the possibility that network instability is one mechanism through which race- and SES-based health disparities develop.

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Table 1. Descriptions, Weighted Means, and Standard Deviations of Key Variables (N = 2,119)[a]

Variable	Description	Proportion or mean	s.d.
Age	R's age at baseline (in years, divided by 10). Range: 5.7 to 8.5.	6.800	.760
Female	Whether R is female	.516	.500
African-American	Whether R is black	.099	.299
Hispanic	Whether R is Hispanic	.072	.258
Education (W1)	R's had high school education or less	.455	.498
	R has some college, but no degree	.299	.458
	R has a college or professional degree	.247	.431
Working	Whether R was workinng at both W1 and W2	.175	.380
Stopped working	Whether R stopped working between W1 and W2	.177	.382
Not working	Whether R was not working at both waves	.613	.487
Married	Whether R was married at both W1 and W2	.577	.494
Became unmarried	Whether R became unmarried between W1 and W2	.086	.280
Not married	Whether R was not married at both waves	.325	.468
Functional impairment (W2)	R's self-rated ability to complete each of 7 activities of daily living on their own at W1. Responses range from "unable to do" (= 1) to "no difficulty" (= 4) (α = .841). Items are averaged together. Range: -4.790 to .390.	.050	.675
Self-rated health (W2)	R's self-rated overall health, ranging from "poor" (=1) to excellent (=5).	3.265	1.104
Depressive symptoms (W2)	Average of R's standardized responses to 10 ordinal items from the CES-D scale assessing depressive symptoms. Responses range from "rarely or none of the time" (= 0) to "most of the time" (3). Items are averaged together. Range: -.602 to 2.832.	-.017	.564
W1 network size	Number of confidants at W1. Range: 1-5.	3.587	1.392
Δ in network size	Network size at W2 minus network size at W1. Range: -5 to 4.	.187	1.576
Confidants lost	Number of confidants lost between W1 and W2	1.486	1.252
Confidants added	Number of new confidants added between W1 and W2	1.897	1.369

[a] Estimates are weighted using NSHAP W1 person-weights (adjusted for attrition and selection at W2). Estimates are calculated for all respondents who have non-missing data for key variables in the final models for all outcome variables.

Table 2. Coefficients from Multivariate Regression Models Predicting Different Aspects of Network Turnover among Older Adults

Predictor	Poisson Models Predicting Number of Network Members: Lost for any reason[a]		Died[a]		Added[b]		OLS Models Predicting[c] Change in Network Size	
Age (divided by 10)	1.037	1.019	1.354***	1.221**	1.015	1.012	-.096*	-.085*
	(.021)	(.020)	(.089)	(.074)	(.018)	(.019)	(.038)	(.042)
Female	.959	.918**	1.051	.948	.977	.952	.223***	.236**
	(.031)	(.028)	(.119)	(.113)	(.027)	(.025)	(.057)	(.066)
African-American	1.215***	1.161**	1.342*	1.250	1.073*	1.051	-.303**	-.297**
	(.053)	(.048)	(.159)	(.172)	(.042)	(.036)	(.098)	(.092)
Hispanic	1.040	1.013	.551*	.535**	1.027	1.012	-.101	-.092
	(.080)	(.066)	(.129)	(.119)	(.042)	(.039)	(.143)	(.144)
≤ High school education	1.140*	1.094	1.376*	1.188	1.045	1.035	-.213*	-.199*
	(.057)	(.052)	(.186)	(.166)	(.043)	(.041)	(.093)	(.085)
Some College	1.056	1.044	1.189	1.104	1.054	1.050	-.044	-.046
	(.044)	(.041)	(.176)	(.118)	(.028)	(.028)	(.092)	(.086)
Not working at either wave		.946		1.045		.962		.076
		(.037)		(.140)		(.027)		(.106)
Stopped working since W1		1.028		.979		1.041		.200
		(.054)		(.158)		(.035)		(.106)
Not married at either wave		1.137***		1.265		1.045		-.012
		(.037)		(.180)		(.030)		(.071)
Became unmarried since W1		1.575***		3.935***		1.284***		-.224
		(.068)		(.491)		(.058)		(.138)
Functional impairment		.969		.931		.962		.021
		(.035)		(.082)		(.023)		(.087)
Overall self-rated health		.985		.929		1.004		.017
		(.017)		(.048)		(.013)		(.034)
Depressive symptoms (CES-D)		1.043		.969		1.013		.001
		(.036)		(.120)		(.032)		(.074)
F	27.76***	32.81***	12.19***	38.21***	59.65***	60.66***	69.39***	63.33***
	(10, 41)	(17, 34)	(10, 41)	(17, 34)	(14, 37)	(21, 30)	(14, 37)	(21, 30)
N	2,124		2,124		2,113		2,124	

* p < .05, ** p < .01, *** p < .001

Note: All models control for frequency of interaction with, emotional closeness to, and kin composition of W1 confidants, religious attendance, and the intercept.

[a] Coefficients are incidence rate ratios, and standard errors are presented in parentheses below these estimates. Number of W1 confidants is used as the exposure.

[b] Coefficients are incidence rate ratios, standard errors are presented in parentheses. W2 network size is used as the exposure, and W1 network size is controlled.

[c] Coefficients are unstandardized coefficients from OLS regressions, and standard errors are presented in parentheses below these estimates. Number of W1 confidants is controlled.

Table 3. Distribution of Aspects of Confidant Network Change by Race, Ethnicity, and SES (N = 1,551)[a]

	Race				Highest Level of Education			
Lost Any Confidant(s) for Following Reason:[b]	White	Black	Other	χ^2	≤ HS	Some College	College	χ^2
R or confidant moved/now too "distant"	31.8	37.0	47.0	16.44**	31.4	32.7	36.7	6.21
The confidant died	30.1	34.8	11.8	25.92**	31.4	31.0	25.0	10.59
They "drifted apart"/circumstances changed	23.2	20.7	23.5	1.05	20.5	24.3	25.6	8.15
R or confidant suffers from health problems	12.3	10.8	11.6	.56	12.8	12.7	10.1	3.68
There was a falling out/disagreement/conflict	7.8	10.6	2.8	8.27	6.4	8.4	9.5	6.98
R or confidant retired or changed jobs	6.0	2.9	2.4	7.92	1.7	7.0	10.2	71.59***

[a] Estimates are weighted using NSHAP W1 person-weights, and adjusted using propensity score weighting. Singificance of group differences as indicated by chi-squared statistics are determined using a design-corrected F-test.

[b] Categorization based on assessments of two independent coders (80.1% agreement). Estimates ignore those who had any trouble with the roster matching exercise or who had missing data on any alter. "Lost" confidants do not include those appearing in Rosters B or C at W2.

Appendix Figure A1. Percent of Respondents in Each Race Group Who Experienced Given Levels of Turnover in their Social Networks during the Study Period

White (N = 1,516)

Number of W1 Confidants Lost	Number of New Confidants at W2: 0	1	2	3	4	5
0	7.55	6.55	6.45	3.65	1.68	0.09
1	4.95	8.59	8.15	3.58	1.98	0.50
2	3.63	4.80	9.08	4.63	2.34	0.84
3	2.14	2.19	2.33	4.64	2.06	0.64
4	0.58	0.44	0.82	1.07	1.70	0.71
5	0.03	0.08	0.52	0.10	0.35	0.55

African-American (N = 347)

Number of W1 Confidants Lost	Number of New Confidants at W2: 0	1	2	3	4	5
0	4.01	5.61	5.33	3.65	2.77	0.00
1	4.78	9.47	5.66	2.52	5.08	0.86
2	2.85	4.80	11.03	3.63	1.74	0.72
3	2.87	1.52	4.88	4.19	2.50	0.23
4	0.38	2.61	1.48	0.57	2.18	0.92
5	0.00	0.84	0.00	0.25	0.00	0.09

Other (N = 263)

Number of W1 Confidants Lost	Number of New Confidants at W2: 0	1	2	3	4	5
0	7.44	7.76	8.48	8.04	3.81	0.55
1	8.22	6.13	8.09	1.81	4.96	1.20
2	1.97	4.50	4.42	3.38	1.54	1.78
3	0.65	1.96	4.18	2.26	2.43	0.00
4	0.22	0.00	0.75	0.00	0.98	1.47
5	0.00	0.00	0.49	0.32	0.24	0.00

Note: Estimates are weighted using NSHAP W1 person-weights, and adjusted using propensity score weighting.

Appendix Table A1. Coefficients from Multivariate Regression Models Predicting Different Aspects of Network Turnover among Older Adults, Including the Indicator of Residentia Mobility from the Leave-Behind Questionnaire

Predictor	Poisson Models Predicting Number of Network Members:						OLS Models Predicting[c] Change in Network Size	
	Lost for any reason[a]		Died[a]		Added[b]			
Age (divided by 10)	1.037	1.034	1.379***	1.224**	1.013	1.017	-.114**	-.115**
	(.024)	(.024)	(.095)	(.077)	(.022)	(.024)	(.036)	(.041)
Female	.947	.916**	1.079	.920	.958	.939	.183**	.188**
	(.034)	(.030)	(.139)	(.123)	(.030)	(.028)	(.060)	(.069)
African-American	1.162**	1.117*	1.450*	1.293	1.009	.984	-.422**	-.419**
	(.060)	(.055)	(.209)	(.202)	(.041)	(.036)	(.124)	(.118)
Hispanic	1.005	1.007	.472**	.456**	.993	.983	-.067	-.050
	(.083)	(.055)	(.107)	(.113)	(.072)	(.043)	(.141)	(.146)
≤ High school education	1.142*	1.104*	1.485**	1.302	1.064	1.057	-.169	-.155
	(.057)	(.052)	(.211)	(.198)	(.046)	(.045)	(.105)	(.096)
Some College	1.058	1.046	1.230	1.161	1.069*	1.069*	-.001	-.001
	(.048)	(.044)	(.206)	(.219)	(.033)	(.033)	(.095)	(.090)
Not working at either wave		.954		1.200		.994		.154
		(.039)		(.181)		(.026)		(.121)
Stopped working since W1		1.064		1.033		1.088*		.253
		(.059)		(.228)		(.037)		(.117)
Not married at either wave		1.123**		1.299		1.042		.002
		(.037)		(.203)		(.031)		(.081)
Became unmarried since W1		1.509***		3.913***		1.238***		-.141
		(.073)		(.576)		(.065)		(.136)
Functional impairment		1.017		.835		.991		.036
		(.032)		(.072)		(.027)		(.070)
Overall self-rated health		.971		.979		.996		.029
		(.019)		(.045)		(.015)		(.040)
Depressive symptoms (CES-D)		1.032		.982		1.001		-.015
		(.041)		(.139)		(.034)		(.072)
Moved in last five years		1.101		1.116		1.087*		.051
		(.054)		(.174)		(.039)		(.097)
F	32.03***	32.62***	9.86***	35.71***	37.54***	39.49***	53.93***	38.29***
	(10, 41)	(18, 33)	(10, 41)	(18, 33)	(14, 37)	(22, 29)	(14, 37)	(22, 29)
N	1,779		1,779		1,779		1,779	

* p < .05, ** p < .01, *** p < .001

Note : All models control for frequency of interaction with, emotional closeness to, and kin composition of W1 confidants, religious attendance, and the inte

[a] Coefficients are incidence rate ratios, and standard errors are presented in parentheses below these estimates. Number of W1 confidants is used as the e:

[b] Coefficients are incidence rate ratios, standard errors are presented in parentheses. W2 network size is used as the exposure, and W1 network size is con

[c] Coefficients are unstandardized coefficients from OLS regressions, and standard errors are presented in parentheses below these estimates. Number of ` confidants is controlled.