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Original Article

Age and Gender Differences in Social Network Composition and Social Support Among Older Rural South Africans: Findings From the HAALSI Study

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Abstract

Objectives: Drawing on the "Health and Aging in Africa: A Longitudinal Study of an INDEPTH community in South Africa" (HAALSI) baseline survey, we present data on older adults' social networks and receipt of social support in rural South Africa. We examine how age and gender differences in social network characteristics matched with patterns predicted by theories of choice- and constraint-based network contraction in older adults.

Method: We used regression analysis on data for 5,059 South African adults aged 40 and older.

Results: Older respondents reported fewer important social contacts and less frequent communication than their middle-aged peers, largely due to fewer nonkin connections. Network size difference between older and younger respondents was greater for women than for men. These gender and age differences were explicable by much higher levels of widowhood among older women compared to younger women and older men. There was no evidence for employment-related network contraction or selective retention of emotionally supportive ties.

Discussion: Marriage-related structural constraints impacted on older women's social networks in rural South Africa, but did not explain choice-based network contraction. These findings suggest that many older women in rural Africa, a growing population, may have an unmet need for social support.

Keywords: Constraint theory, Functional selectivity theory, Kin, Marital status, Socioemotional selectivity theory

Personal social networks promote well-being across the life course and are considered a key to "successful aging." Social relationships often provide both emotional and instrumental support, protecting against and aiding recovery from health shocks through numerous mechanisms (Thoits, 2011). In the United States and Europe, fewer numbers and poorer quality of social relationships in later life are associated with depression and loneliness (Stoeckel & Litwin, 2016), cognitive and functional impairment (Kuiper et al., 2015), risk of long-term care institutionalization (Pynnönen, Törmäkangas, Heikkinen, Rantanen, & Lyyra, 2012), and mortality (Shor & Roelfs, 2015).

Supportive networks in Sub-Saharan Africa (SSA) have been shown to improve access to medical care, HIV testing and adherence to antiretroviral therapy (Musheke et al., 2013; Ware et al., 2009). Given the paucity of formal social support on the continent, provision of informal support through personal networks may be more important for physical and mental health than elsewhere (Perkins, Subramanian, & Christakis, 2015). Yet despite recognition that social networks are associated with health (Berkman & Krishna, 2014; Perkins et al., 2015), research on older adults' social networks in low- and middle-income countries, particularly SSA, is limited.

While several qualitative studies of personal networks have been conducted in SSA, including with older adults (De Klerk, 2011; van Eeuwijk, 2014), quantitative studies appear limited to a small study of older HIV-positive Togolese adults (Moore & Prybutok, 2014). In this article, we use personal network data from 5,059 older adults living in rural Mpumalanga, South Africa to examine the extent to which theories developed in higher-income settings about network changes hold in rural South Africa by analyzing how patterns of social contact and support vary by age and gender in this population.

Aging and Network Changes in High-Income Countries

U.S. studies report that in contrast with younger and middle aged adults, older adults have smaller personal networks (Cornwell, Laumann, & Schumm, 2008) and lower rates of daily social contact and participation in social activities (Cornwell, 2011; Marcum, 2013). Two groups of theories explain how social contact patterns change with age in higher-income countries: theories of choice and theories of constraint. These theories have become associated with particular hypotheses, but they are not mutually exclusive, and often interact to impact social activity.

Theories of Choice

Resisting theory that smaller networks in older age are the result of increasing social disengagement (Cumming & Henry, 1961), contemporary scholars emphasize that older individuals' smaller networks may not reflect social isolation (York Cornwell & Waite, 2009). Instead, they may reflect socioemotional or functional selectivity (Cornwell, Schumm, Laumann, Kim, & Kim, 2014). Socioemotional selectivity theory (SST) argues that, as individuals age, they become more aware of their mortality and increasingly invest in a core group of emotionally intimate network members (Carstensen, 1992). This investment leads to the shedding of peripheral ties and networks becoming smaller, denser, more kin-centric, and having greater multiplexity, that is, each social contact provides a greater variety of support types (Fung, Carstensen, & Lang, 2001). The U.S. evidence that emotional support remains stable with age, even as receipt of other support increases and contact with friends declines, seems to support SST (Shaw, Krause, Liang, & Bennett, 2007). Other U.S. work, however, shows a decrease in tie multiplexity with age (Smith et al., 2015). This suggests that older adults maintain contacts fulfilling specific functions, that is, functional selectivity theory (FST), rather than a core of contacts providing multiple functions (Lang, Rieckmann, & Baltes, 2002).

Theories of Constraint

As relationships are drawn from foci of activity, the places in which we live, work, and socialize (Feld, 1981), structural constraints due to life course transitions may cause contraction in personal networks with age. For example, there may be a decrease in network size and change in network support with marriage of adult children, birth of grandchildren, retirement, or change in marital status. Health or functional constraints may also affect personal networks. As adults age, they may lose their ability to reciprocate instrumental support, due to increased functional limitations, cognitive impairment, or chronic conditions (Klein Ikkink & van Tilburg, 1999).

Operating in conjunction with theories of choice, these constraints may determine the set of relationships through which older adults emotionally prioritize (as in SST) or mobilize for specific forms of support (as in FST). For example, cognitive impairments may preference positive, long-term relationships such as kin; functional impairments may preference household members and other proximate relationships.

Finally, norms of contemporaneous reciprocity dictate that relationships remain balanced; when balance is lost, relationships dissolve. However, normative role expectations may mean that individuals are willing to overlook an imbalance with older parents or other relatives (Shaw et al., 2007) if maintenance of currently imbalanced relationships reflects reciprocity from earlier points in time when the relational imbalance was reversed.

Gender and Social Networks in Later Life

In higher-income countries, men and women experience different rates and forms of network change across the

life course due to the gendered nature of family and work trajectories, and these gender differences increases with age (Fischer & Beresford, 2014). Women have larger networks with lower density and higher communication levels (McDonald & Mair, 2010), and greater variety in their networks, maintaining connections to family, friends, and neighbors. In contrast, men are more likely to maintain connections with coworkers (Shaw et al., 2007), and are more severely affected by loss of contacts following retirement (McDonald & Mair, 2010). Women are more likely to both provide and receive emotional, informational and financial support from both kin and spouses (McDonald & Mair, 2010), a difference that widens with age (Fischer & Beresford, 2014). These empirical findings suggest that men may be more functionally selective initially and then more affected by external structural constraints as they age, while women maintain a more stable range of reciprocal relationships, a pattern more in line with socioemotional selectivity.

Aging and Social Dynamics in South Africa

In SSA, the number of people over age 60 is rising rapidly. Between 2015 and 2030, this population is expected to increase by 64% across SSA and 49% in South Africa (United Nations, 2015). This change reflects the shift in disease burdens, from acute, primarily communicable conditions (often affecting working-age individuals) toward chronic conditions resulting in early morbidity but less mortality. This increase will amount to only a small increase in the proportion of SSA individuals aged more than 60 (from 4.8% to 5.3%). In South Africa, however, where the reduction in HIV-related mortality has driven demographic patterns in recent years (Pillay-van Wyk et al., 2013), the older population will increase by 36% (from 7.7% to 10.5% of the total) between 2015 and 2030; by 2050 the proportion more than 60 years will more than double to 15.4%. It is unclear how this increase in older individuals will affect social contact patterns. On the one hand, higher density of similarly aged peers within communities may ensure greater social connectivity and mutual support into older age, generating greater opportunity for network choice. On the other hand, higher proportions of elderly individuals with greater morbidity may strain existing social ties and undermine exchange-based relationships within families and communities, generating greater network constraint.

Older adults in SSA typically have both dependent and productive household roles. Assumed norms of interdependence and reciprocity in "traditional" cultures imply that families will provide most later-life care to their elderly relatives (Manderson & Block, 2016; Schatz, Madhavan, Collinson, Gómez-Olivé, & Ralston, 2015). However, these norms have changed, especially in urban areas, reducing the amount of care provided to older relatives. In addition, the increasing absence of prime-aged adults from rural homes due to migration for work or mortality means older women are left to provide primary care to spouses, grandchildren, and dependent adult children (Schatz, 2007; Schatz & Seeley, 2015). Although these household roles can act as a network constraint, older women may enjoy such productive responsibilities. In addition, they may utilize current norms and socioeconomic realities to their advantage. For instance, older women may emphasize past sacrifices for children, and older men use their earned wealth, to induce social support and care (Cliggett, 2003).

These social and economic processes are particularly apparent in rural South Africa. Here, the substantial impact of HIV-related disease on household composition has been compounded by decades of labor migration, and a high and increasing level of female-headed households (Collinson, Tollman, Kahn, & Clark, 2006; Manderson & Block, 2016; Manderson, Block, & Mkhwanazi, 2016). High rural unemployment post-Apartheid has led men (and increasingly women) to leave their rural villages in pursuit of work. This migration increases the burden on older adults to support the family left behind, and provide the primary source of household income—often via a government-funded means-tested noncontributory pension paid to all those aged more than 60 (Schatz, Gómez-Olivé, Ralston, Menken, & Tollman, 2012). As a result, even if the number of social connections may have risen for older South Africans, the net level of support they obtain may well have declined. Nevertheless, these familial obligations may act to cement ties within a core, intergenerational social network.

Gender remains central to older South African social relations. Economic roles such as mid-life labor migration and later-life pensions inform social roles in gendered ways such that rural South African women are tethered to the household (Camlin, Snow, & Hosegood, 2013; Oberhauser & Pratt, 2004). Men are more likely to migrate for work, and typically migrate further, making them more likely to form social relations with other migrants and receiving community members. Men may also be more heavily impacted by retirement—with the proviso that a minority of rural South Africans are formally employed. Female labor migrants are more likely to migrate to settlements closer to their home villages and maintain familial connections during their migrant years. Additionally, female pensioners are more likely to derive the majority of their income and wealth from government contributions. Aside from these economic factors, gender norms mean that women are expected to manage the household and maintain intergenerational relationships as they age, often contemporaneously caring for their children and grandchildren (Schatz & Seeley, 2015). These social forces may lead to gender-based patterns of social support similar to patterns in higher-income countries.

Analytic Hypotheses

We hypothesize that various age and gender-specific network patterns might be present in cross-sectional data

of older adults in South Africa. Theory and evidence from higher-income countries predict that networks are smaller in older age, that women have higher communication levels, and that this gender gap increases with age. We therefore expect network size and frequency of communication to be negatively associated with age for both men and women, but with a larger difference from a lower base for men.

SST suggests that adults selectively maintain kin relationships either because they represent core connections, or because loss of ability to reciprocate is offset by normative role expectations for individuals to care for older relatives. This leads us to expect larger falls with age in network contact and support from nonkin than from kin. SST also suggests that while network size falls with age, receipt of emotional support may not decline if peripheral connections are dropped but a dense core of contacts remains; we test this possibility by comparing differences across age cohorts in the level of emotional support received with differences across age cohorts for levels of other support. A lesser decline in emotional support with age would support SST.

Furthermore, FST predicts an increasing focus on maintaining links to contacts fulfilling specific functions. We therefore test whether contacts are maintained into old age based on ability to provide support in specific domains by seeing if the number of domains in which contacts provide support (i.e., tie multiplexity) is lower for older individuals.

Finally, we expect external structural constraints to affect social network structure. These constraints include the end of employment (for those previously employed) and the absence of a spouse (e.g., due to widowhood or migration) reducing network size and communication frequency. We expect notably lower levels of contact for people aged more than 60, and for people who have lost or never had a spouse compared to people currently living with one. Given the lower rates of employment in SSA, it is unclear whether any retirement effect will be as strong as reported for the United States. For clarity, we do not consider individual constraints, for example, physical and cognitive limitations, in this analysis since they do not make systematic predictions about social network structure by age or gender.

Methods

Sample

Health and Aging in Africa: a Longitudinal Study of an INDEPTH community in South Africa (HAALSI) is a population-based cohort study of the health, aging and wellbeing of middle-aged and older men and women. The baseline wave of HAALSI was conducted in 27 of the 31 villages that comprise the MRC/Wits Rural Public Health and Health Transitions Research Unit site in Mpumalanga Province, South Africa (hereafter, "Agincourt") (Kahn et al., 2012) between November 2014 and November 2015. Agincourt is one of the 47 Health and Demographic Surveillance Sites worldwide that collaborate as International Network for the Demographic Evaluation of Populations and Their Health (INDEPTH) (Sankoh & Byass, 2012). The study area is close to the Mozambique border and almost one-third of residents are Mozambican migrants, with or without formal residency. HAALSI participants were a random ~40% sample of all residents aged 40 and older in these 27 villages.

The baseline survey was modeled closely on the Health and Retirement Study and its several international sister studies, and was based on a 3 hour household visit including structured quantitative interviews, anthropometric and physiological measurements and blood draws. Experienced local interviewers trained specifically to collect social network data conducted all interviews in the local xiTsonga language. The response rate was 87%. HAALSI was granted ethics approval by the University of the Witwatersrand Human Research Ethics Committee, the Harvard T.H. Chan School of Public Health Office of Human Research Administration, and the Mpumalanga Provincial Research and Ethics Committee.

The HAALSI baseline survey included a social network module, based on the network data collection in the National Social Life, Health, and Aging Project. This module included one name generator question: "Please tell me the names of 6 adults with whom you have been in communication either in person or by phone or by internet in the past six months, starting with the person who is most important to you for any reason." If the respondent was married and living with their spouse, but did not name them, the spouse's name was added to the list. Respondents could provide fewer than six named persons ("alters"). Respondents were then asked questions about each alter's sociodemographic information (age, sex, and residential location), relationship to the respondent, frequency of contact with the alter (in-person, by phone/text/email), how frequently the alter provided support (emotional, informational, physical, financial), and how frequently the ego and alter were in conflict. Finally, respondents were asked about the relationship and frequency of contact they believed each alter had with each other alter. This last method has been described as mapping an "ego-centered cognitive social structure," highlighting that the data reflect respondents' perceptions of others (Marcum et al., 2017).

Previous analysis of responses to this social network module has shown that both month of interview and interviewer identity predict the number of important others named by respondents, possibly due to interviewer learning effects (Harling et al., 2017). However, although 70% of interviews were conducted by women, neither interviewer gender nor interviewer-respondent gender homophily was associated with reported network size. Fieldwork was facilitated by respondents' and interviewers' past experience of participating in various population-based research studies conducted at Agincourt.

Measures

Several domains of social connectedness were measured. First, network size was measured as the number of alters

the respondent communicated with over the past 6 months on an at least monthly basis ("monthly alters"). Second, frequency of communication was measured as the approximate number of days per month, over the past 6 months, in which an alter had contact with a respondent: calculated by valuing "monthly" communication as one, "few times a month" as 2, "weekly" as 4, "few times a week" as 10, and "daily/almost daily" as 30. We used this approach to adjust for the unequal gaps between frequency categories as collected, so to generate an approximate total number of person-days of communication with important individuals per month, calculated as the sum of frequencies across all named alters (i.e., a maximum of 210). We calculated network size and contact frequency both for any social support, and for each of the four types of social support individually. Third, network density was measured as the proportion of alter-pairs who communicated at least monthly; we do not use more nuanced measures given the perceived nature of these data. Finally, mean tie multiplexity was measured as the number of support types provided by each alter, averaged across all alters for each respondent.

Covariates

We conducted our primary analyses using age in five categories (40–49, 50–59, 60–69, 70–79, 80+) to flexibly capture nonlinear associations between age and social connectedness. We also considered various respondent sociodemographic characteristics expected to affect social support levels and differences across age: (a) educational attainment (none, primary, secondary, tertiary); (b) country of origin (South Africa, Mozambique/other); (c) marital status (civil or religious marriage, never married, separated/divorced, widowed); (d) household wealth quintile (including imputed values for 231 [4.6%] individuals with missing data); (e) household size (1, 2, 4–7, 8+); and (f) employment status (not employed, employed, not working outside the home). Finally, we considered three characteristics of the respondent–alter relationship: kinship (kin vs nonkin); gender (homophilous vs nonhomophilous); and alter location (same household, elsewhere in village, elsewhere in Agincourt, outside Agincourt).

Statistical Analyses

We began by describing the data set, including univariate proportions and bivariate associations between respondent covariates and network size and frequency of communication. We additionally visualized a random sample of 25 ego-centered cognitive social structures, to show the range of HAALSI respondents' social structures.

We then ran two-level hierarchical regression models (respondents nested within interviewers) for all HAALSI respondents with various measures of connectedness as outcomes. Our "unadjusted" models contained indicators for age categories interacted by gender, month of interview indicators and random intercepts for interviewers. These models were therefore of the form:

$$\text{Connectedness}_{ij} = \beta_{k-1}\text{Age}_{ij} \times \text{Sex}_{ij} + \gamma_{m-1}\text{Month}_{ij} + \lambda_j + \epsilon_{ij}$$

where respondents i were nested within interviewers j, $k = 10$ and $m = 13$. We also ran "adjusted" models that additionally contained respondent covariates. We used a Poisson link for count variables (except when values were over-dispersed, in which case we used a negative-binomial link), including a zero-inflation term where appropriate. We used the identity link for frequency and density variables. Unadjusted models included all HAALSI respondents; adjusted models used a complete-case approach, dropping 34 (0.7%) individuals with missing data on at least one covariate. From some models, we predicted mean outcome values for each of the 10 age-gender categories, setting the month of interview to that with the highest response rate (December 2014). We did not include fully gender-interacted models (i.e., stratifying the model or also interacting the sociodemographic covariates with gender) to maintain tractability in presenting our results, and because we did not have strong a priori reasons to believe that they would effect-modify our primary age–gender associations with social network characteristics.

To evaluate hypotheses relating to differences in social support by age and gender, we first ran unadjusted regression models of network size and communication frequency, testing for differences across ages within gender, and across gender within age groups, using χ^2_{m-1} tests on the β coefficients. We then measured how these differences were explained by other respondent characteristics, which may mediate associations between age–gender and social network characteristics, in adjusted models.

Results

The 5,059 HAALSI respondents reported communicating at least monthly with 15,058 alters, representing 96.8% of all 15,549 alters nominated (Table 1). Respondents named a median of three alters with whom they communicated at least monthly, with 267 (5.3%) individuals reporting zero alters and 669 (13.2%) reporting only one alter. One hundred fifty (3.0%) currently married respondents reported six nonspousal alters and thus had a total of seven alters. Twenty-five randomly chosen ego-centered cognitive social structures are shown in Supplementary Figure 1, with densities ranging from low (only ego-alter ties) to almost total (all alter–alter ties present).

Both monthly network size and frequency of communication were lower for individuals of older age, with no formal education, not of South African origin, not cohabiting with a partner, living in smaller households, not working and with lower household wealth. Under age 60, women reported larger networks and more frequency of contact than men; above age 60 these patterns were reversed. Almost four-fifths (79.6%) of monthly alters were relatives, 28% lived in the

Table 1. Descriptive Statistics for HAALSI Respondents

	Respondents		Number of contacts		Frequency of communication	
	N	%	Mean	95% CI	Mean	95% CI
Age and gender						
Male 40–49	418	8.3	2.79	[2.63–2.95]	59.5	[55.8–63.2]
Male 50–59	624	12.3	2.97	[2.84–3.10]	59.9	[57.1–62.6]
Male 60–69	643	12.7	3.23	[3.10–3.36]	66.1	[63.0–69.1]
Male 70–79	446	8.8	2.99	[2.83–3.15]	62.9	[59.2–66.5]
Male 80+	214	4.2	2.93	[2.70–3.15]	57.0	[52.3–61.6]
Female 40–49	500	9.9	3.08	[2.94–3.21]	61.5	[58.2–64.7]
Female 50–59	786	15.5	3.09	[2.98–3.20]	63.8	[61.1–66.5]
Female 60–69	661	13.1	3.05	[2.92–3.18]	62.6	[59.5–65.7]
Female 70–79	432	8.5	2.76	[2.61–2.92]	53.7	[50.1–57.2]
Female 80+	335	6.6	2.45	[2.28–2.62]	47.7	[43.9–51.5]
Education level						
No formal education	2,306	45.6	2.81	[2.74–2.88]	56.4	[54.9–58.0]
Some primary (1–7 years)	1,614	31.9	3.12	[3.04–3.20]	64.7	[62.8–66.6]
Some secondary (8–11 years)	537	10.6	3.09	[2.96–3.23]	62.5	[59.4–65.7]
Secondary or more (12+ years)	585	11.6	3.12	[2.99–3.25]	63.5	[60.6–66.4]
Country of origin						
South Africa	3,528	69.7	3.02	[2.96–3.07]	61.3	[60.1–62.6]
Mozambique/other	1,526	30.2	2.88	[2.79–2.96]	58.7	[56.8–60.6]
Marital status						
Currently married/cohabiting	2,575	50.9	3.43	[3.37–3.49]	71.1	[69.7–72.5]
Never married	290	5.7	2.06	[1.88–2.23]	43.9	[39.8–48.1]
Separated/divorced	650	12.8	2.57	[2.45–2.69]	50.6	[47.9–53.4]
Widowed	1,540	30.4	2.56	[2.48–2.64]	50.2	[48.3–52.1]
Household composition						
Living alone	534	10.6	2.31	[2.18–2.45]	43.7	[40.7–46.8]
Living with 1 other person	538	10.6	2.88	[2.75–3.02]	58.2	[55.0–61.5]
Living in 3–6 person household	2,438	48.2	3.01	[2.94–3.07]	61.7	[60.2–63.1]
Living in 7+ person household	1,549	30.6	3.19	[3.10–3.27]	65.4	[63.5–67.3]
Employment status						
Not working	3,719	73.5	2.81	[2.76–2.86]	58.9	[57.7–60.2]
Employed (part or full time)	805	15.9	3.06	[2.95–3.17]	63.6	[61.1–66.1]
Not working outside the home	521	10.3	4.07	[3.92–4.21]	67.5	[64.3–70.7]
Wealth index						
Least wealthy quintile	1,046	20.7	2.63	[2.53–2.73]	53.8	[51.5–56.2]
Quintile 2	1,001	19.8	2.88	[2.78–2.98]	58.1	[55.8–60.5]
Quintile 3	991	19.6	3.10	[3.00–3.21]	61.9	[59.5–64.3]
Quintile 4	1,007	19.9	3.06	[2.96–3.16]	62.2	[59.9–64.6]
Most wealthy quintile	1,014	20.0	3.22	[3.12–3.32]	66.9	[64.6–69.2]

Note: Number of contacts: at least monthly over the past 6 month; frequency of contacts: approximate number of contacts in a month on average over past 6 months. Based on Kruskall–Wallis tests, differences in the mean number of respondents reported were significant at $p < .01$ for all variables. Overall $N = 5{,}059$. Thirty-four individuals missing at least one covariate: education level, $n = 17$; country of origin, $n = 5$; marital status, $n = 4$; employment status, $n = 14$.

same household as the respondent, 43.7% elsewhere in the same village, and 12.0% elsewhere in Agincourt. Frequency of contact ranged from zero to 210 contacts per month (Supplementary Figure 2). The distribution was right-skewed with a median value of 60 and interquartile range 30–90, and had large masses at multiples of 30, reflecting the large proportion of respondents (43.7%) who only reported important alters with whom they communicated daily or almost daily. Respondents reported daily/almost daily in-person communication with 82.7% of same-household alters, 62% of same-village alters, and 24.6% of those living further away.

Variation in Social Network Structure

In unadjusted models, the number of monthly alters and frequency of monthly communication were lower for women over age 60 and men over age 70, for both in-person and phone/digital ("remote") communication

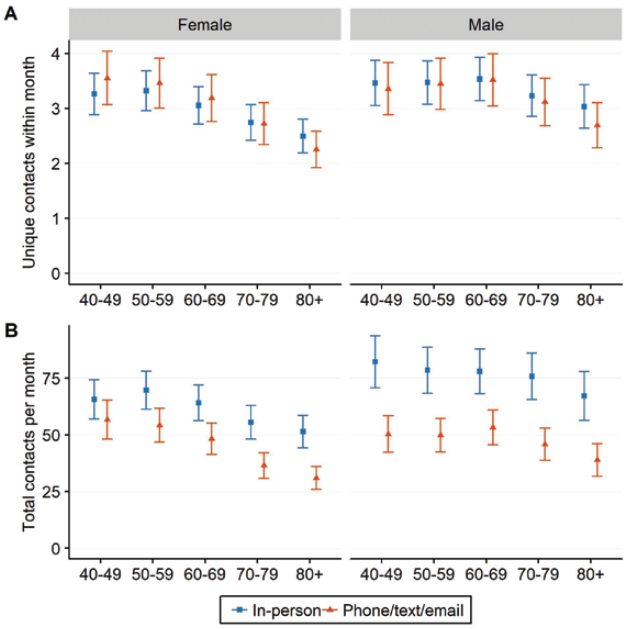

Figure 1. Predicted number of unique contacts with important monthly alters per month and total number of contacts per month. Values from two-level Poisson regression models containing age/sex, month of interview, and random effects for interviewer identity. Points represent predicted mean numbers of social contacts of the relevant type for individuals in the respective 10-year age groups at December 2014 response rates. Bars represent 95% confidence intervals around these point estimates.

(Figure 1). Monthly alter differences by age were significant for both genders, although substantially greater in magnitude for women, such that over age 60 women had significantly lower levels of contact than their male counterparts (Table 2). This differential fall-off was explained by marital status, shown by the changes in effect size for age and gender when marital status was added in model 3. The social network difference reflected a shift from similar married/cohabiting levels at age 40 to very different levels at older ages (Figure 2). Results were similar when we stratified by communication type, that is, in-person versus remote (Supplementary Table 1), and for frequency of communication (Supplementary Table 2).

Network density was significantly higher among both older men and women compared to their younger same-sex peers in unadjusted models; this association was reduced after adjusting for respondent characteristics (Table 3). This result may reflect the high average level of density: 82% of all possible alter–alter ties were reported to exist based on at least monthly contact.

Tests of Theorized Social Network Patterns

In unadjusted models, men reported receiving each support type from a similar number of unique individuals than did women (Table 4). Levels of emotional support were not higher for older respondents; indeed both older men and women were less likely to report receipt of emotional support than their younger same-gender peers. These findings were not affected by adjusting for respondent characteristics (Supplementary Table 5) or when considering frequency of support provision (Supplementary Table 6). Thus, there was no evidence of socioemotional selectivity occurring to increase or retain emotional support in networks as age increased.

In models stratified by whether the alter was kin or not, men had relatively stable numbers of kin relationships across age. Older women had fewer kin contacts than younger women, due largely to lower marriage rates (Table 5). Both older men and women had fewer nonkin alters than younger respondents, and these differences were not explained by differences in respondent characteristics; women had consistently fewer nonkin alters than men. Thus, there was some evidence of potentially socioemotional selectivity in retention of kin at older ages for women.

In our sample, tie multiplexity was high (respondents had a mean of 3.1 types of support provided by each alter, and 36% of respondents with any alters reported that all alters provided all four types of support at least monthly). However, there was no evidence of functional selectivity at older ages as multiplexity was not significantly different in older age groups (Table 3).

To evaluate whether marriage and employment represented structural constraints, we ran two additional adjusted analyses, replacing marital or employment status as binary variables interacted with gender. We saw a substantial benefit to being married for men (IRR 1.39, 95% CI: 1.31–1.48) and for women (IRR 1.31, 95% CI: 1.25–1.38). Employment status was not associated with social support level for men or women (full results in Supplementary Table 3).

Discussion

In this article, we described the social networks of 5,059 adults aged more than 40 in rural South Africa, and the extent to which age and gender differences in these networks aligned with theories of choice and constraint developed for higher-income populations. These older South Africans reported small, dense networks of important people in their lives, in many cases kin from the same household or living geographically close to them, and with whom they mostly communicated daily. We found little evidence for these adults' social networks being driven by socioemotional or functional selectivity. Rather, marital status—specifically not having a current spouse—was associated with substantially reduced social support. The effect of this association is that older women have constrained social networks.

In line with evidence from higher-income countries (Cornwell et al., 2008), older adults named fewer important alters than middle-aged adults. In-person contact formed a larger proportion of all communication for older

Table 2. Respondent Characteristics Associated With Number of Unique At Least Monthly Alters

	Model 1		Model 2		Model 3	
Male 40–49	1.00		1.00		1.00	
Male 50–59	1.01	[0.94–1.09]	1.03	[0.95–1.11]	0.97	[0.90–1.05]
Male 60–69	1.04	[0.96–1.12]	1.07	[0.99–1.16]	0.99	[0.92–1.07]
Male 70–79	0.94	[0.87–1.02]	0.99	[0.91–1.08]	0.92	[0.85–1.01]
Male 80+	0.89	[0.81–0.98]	0.96	[0.86–1.06]	0.89	[0.80–0.98]
Female 40–49	1.00	[0.93–1.08]	0.98	[0.91–1.06]	0.98	[0.90–1.06]
Female 50–59	1.00	[0.93–1.07]	1.00	[0.93–1.08]	1.01	[0.94–1.09]
Female 60–69	0.94	[0.88–1.02]	0.97	[0.90–1.05]	1.01	[0.93–1.10]
Female 70–79	0.84	[0.77–0.91]	0.89	[0.82–0.98]	0.96	[0.87–1.05]
Female 80+	0.74	[0.68–0.82]	0.80	[0.73–0.89]	0.90	[0.81–0.99]
No formal education			1.00		1.00	
Some primary (1–7 years)			1.06	[1.02–1.10]	1.05	[1.01–1.10]
Some secondary (8–11 years)			1.10	[1.04–1.17]	1.10	[1.03–1.17]
Secondary or more (12+ years)			1.13	[1.05–1.22]	1.11	[1.03–1.20]
South Africa			1.00	[1.00–1.00]	1.00	[1.00–1.00]
Mozambique/other			1.02	[0.98–1.06]	1.00	[0.96–1.05]
Not working			1.00		1.00	
Employed (part or full time)			1.06	[1.01–1.12]	1.05	[1.00–1.10]
Homemaker			1.16	[1.08–1.24]	1.16	[1.08–1.24]
Living alone			1.00		1.00	
Living with one other person			1.17	[1.08–1.26]	1.05	[0.97–1.13]
Living in 3–6 person household			1.20	[1.13–1.28]	1.05	[0.98–1.12]
Living in 7+ person household			1.26	[1.18–1.34]	1.07	[1.00–1.15]
Least wealthy quintile			1.00		1.00	
Quintile 2			1.04	[0.99–1.10]	1.04	[0.98–1.09]
Quintile 3			1.07	[1.02–1.13]	1.05	[1.00–1.11]
Quintile 4			1.05	[0.99–1.10]	1.02	[0.96–1.08]
Most wealthy quintile			1.10	[1.04–1.17]	1.06	[1.00–1.12]
Currently married					1.00	
Never married					0.65	[0.60–0.71]
Separated/divorced					0.77	[0.73–0.81]
Widowed					0.76	[0.72–0.79]
Gender differences $(\chi^2_1)^a$						
40–49	0.0	0.99	0.3	0.57	0.4	0.54
50–59	0.2	0.63	0.6	0.42	1.4	0.24
60–69	9.2	0.002	9.7	0.002	0.4	0.52
70–79	8.4	0.004	7.1	0.008	0.9	0.35
80+	11.0	0.001	10.6	0.001	0.0	0.85
Age differences $(\chi^2_4)^b$						
Male	15.8	0.003	9.2	0.055	9.3	0.054
Female	72.3	<0.001	32.7	<0.001	10.5	0.033

Note: Results are from two-level Poisson regression models also containing indicator variables for month of interview. All coefficients are incidence rate ratios and 95% confidence intervals, except for superscripts a and b, which are *Z*-scores and *p*-values. Tests of difference for age by gender interaction terms: [a]across gender (e.g., Male 50–59 vs Female 50–59); and [b]across age (i.e., are all five Male coefficients equal to one another). *N* = 5,059 model 1; *N* = 5,025 for models 2 and 3.

individuals compared to middle-aged ones. This difference might be due to limited digital technology access or digital literacy among older rural South Africans, despite mobile phone availability in South Africa being high.

In contrast to higher-income countries, women had smaller networks and the gap between older and younger women was larger than that for men. Far higher levels of marriage largely explained this gender difference. Men over age 80 were over 60 percentage points more likely both to be married/cohabiting and to not be widowed. Both men and women who were currently married had consistently higher levels of support across age than people who were not. Adjusting for marital status greatly reduced differences in social network levels with age, and equalized levels and trends across gender. These results suggest a structural impact of ended marriage in this setting. This result combined with much lower nonkin contact levels for older women means older women have significantly less support than younger women and men of any age.

We did not find support for retirement acting as a structural constraint: the only drop in contact levels for men and women around age 60 was of men's kin rather than nonkin contacts. Similarly, being employed was not associated with substantially more social support in any analysis. These findings suggest that important relationships for middle-aged and older rural South Africans arise from beyond the workplace. This interpretation seems plausible given the low levels of labor force participation and high labor mobility rates in South Africa. It may also reflect low salience for the idea of sudden and final retirement in these areas.

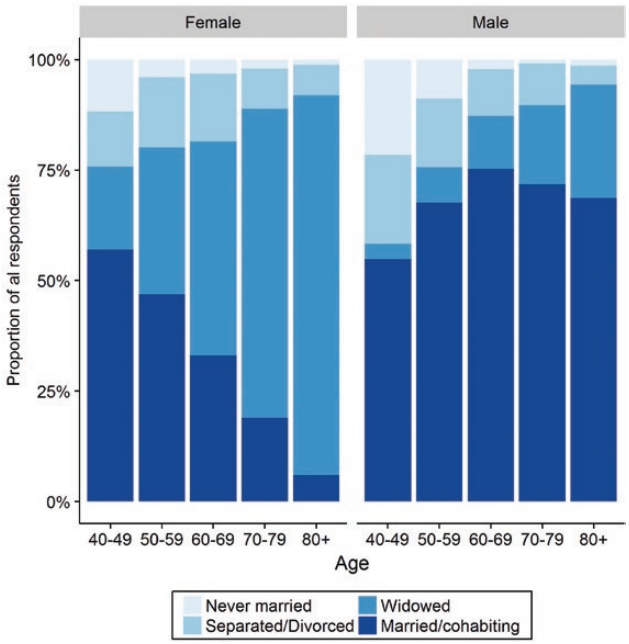

Figure 2. Marital status of HAALSI sample by age and gender. Proportion of respondents each age by gender category with their respective current marital status.

We found little evidence of social network patterns across age that would be predicted by SST or FST. Perceived personal network density or multiplexity did not rise with respondent age, although these measures may have been affected by ceiling effects: both density and multiplexity were high even among 40–49 year olds. Similarly, ties providing emotional support were not more frequent in older ages; indeed emotional support levels dropped more with increasing respondent age than any other support type. The number of kin relationships was stable with age while nonkin ties fell rapidly for both men and women. This lower level of nonkin alters was the only variation in social support not explicable via respondent sociodemographic characteristics, suggesting that these declines may be due to other respondent constraints (e.g., decreased mobility or poorer health) or contextual factors. This question is an important area for future investigation.

In combination, our findings suggest that SST and FST do not sufficiently explain how the social networks of rural South African women change with age. The association of social network characteristics with being married suggests that this structural constraint may play an important role in determining how much social support older women receive. Although close family contributed substantial social support in this setting for both men and women, the absence of a partner among oldest women led to significantly smaller social networks. In this context, socioemotional selectivity may even act as a constraint on women who have lost key network members to early mortality, and who are not able to reach out beyond their shrinking core network.

These findings suggest that, unlike in higher-income countries where social network contraction may represent an active choice by older adults, smaller social networks, and lower levels of social support in rural South Africa may reflect external constraints. Many older women in particular may face an unmet need for social support, notably when

Table 3. Alter and Tie Characteristics Associated With Number of Unique At Least Monthly Alters

	Density[a]				Multiplexity			
	Unadjusted		Adjusted[b]		Unadjusted		Adjusted[b]	
Male 40–49	1.00		1.00		1.00		1.00	
Male 50–59	0.98	[0.95–1.02]	0.98	[0.94–1.02]	1.00	[0.92–1.09]	0.99	[0.90–1.08]
Male 60–69	0.99	[0.95–1.03]	0.98	[0.94–1.02]	0.92	[0.84–1.01]	0.91	[0.83–1.00]
Male 70–79	1.03	[0.99–1.07]	1.01	[0.96–1.05]	1.02	[0.92–1.12]	1.02	[0.92–1.13]
Male 80+	1.04	[0.99–1.10]	1.02	[0.96–1.07]	0.93	[0.82–1.05]	0.95	[0.84–1.08]
Female 40–49	0.95	[0.91–0.99]	0.95	[0.91–0.99]	1.00	[0.91–1.10]	1.00	[0.91–1.09]
Female 50–59	0.98	[0.95–1.02]	0.97	[0.94–1.01]	1.02	[0.94–1.11]	1.04	[0.95–1.13]
Female 60–69	1.01	[0.97–1.05]	1.00	[0.96–1.04]	0.95	[0.87–1.05]	0.99	[0.90–1.09]
Female 70–79	1.01	[0.97–1.06]	1.00	[0.96–1.05]	0.95	[0.86–1.05]	1.02	[0.91–1.14]
Female 80+	1.01	[0.96–1.06]	1.00	[0.95–1.05]	1.02	[0.92–1.14]	1.13	[1.00–1.28]
N		4,098		4,075		4,792		4,765

Note: Results are from two-level linear regression models also containing indicator variables for month of interview.

[a]All density models also include indicator variables for network size and only include respondents reporting >1 alter. [b]Adjusted models also include respondent education, country of birth, employment status, household size and wealth quintile; full models provided as Supplementary Table 4.

Table 4. Association Between Age and Gender and Number of Unique At Least Monthly Alters by Support Type

	Informational		Emotional		Financial		Physical	
Male 40–49	1.00		1.00		1.00		1.00	
Male 50–59	1.00	[0.93–1.08]	0.98	[0.91–1.06]	1.02	[0.92–1.12]	1.01	[0.93–1.10]
Male 60–69	1.02	[0.94–1.10]	1.03	[0.95–1.11]	0.96	[0.87–1.06]	1.02	[0.94–1.11]
Male 70–79	0.94	[0.86–1.02]	0.92	[0.84–1.00]	0.93	[0.84–1.03]	0.96	[0.88–1.06]
Male 80+	0.85	[0.77–0.95]	0.85	[0.76–0.94]	0.86	[0.76–0.98]	0.87	[0.77–0.97]
Female 40–49	0.98	[0.90–1.06]	0.99	[0.91–1.08]	0.98	[0.88–1.08]	0.98	[0.89–1.07]
Female 50–59	0.99	[0.92–1.07]	1.00	[0.93–1.08]	1.06	[0.97–1.16]	0.97	[0.89–1.05]
Female 60–69	0.93	[0.86–1.01]	0.92	[0.85–1.00]	0.90	[0.82–1.00]	0.89	[0.81–0.97]
Female 70–79	0.82	[0.75–0.90]	0.82	[0.75–0.89]	0.83	[0.74–0.92]	0.80	[0.73–0.88]
Female 80+	0.74	[0.67–0.82]	0.74	[0.67–0.81]	0.76	[0.68–0.86]	0.72	[0.65–0.81]
Age differences (χ^2_4)[a]								
Male	15.5	0.004	19.5	0.001	9.0	0.06	10.7	0.03
Female	61.3	<0.001	69.6	<0.001	54.8	<0.001	54.2	<0.001

Note. Results are from two-level Poisson regression models also containing indicator variables for month of interview. All coefficients are incidence rate ratios and 95% confidence intervals, except for superscript a which are *Z*-scores and *p*-values. Tests of difference for age by gender interaction terms: [a]across age (i.e., are all five male coefficients equal to one another). *N* = 5,059.

Table 5. Association Between Age and Gender and Number of Unique At Least Monthly Alters by Alter Kinship Status

	Kin alters				Nonkin alters			
	Unadjusted		Adjusted[a]		Unadjusted		Adjusted[a]	
Male 40–49	1.00		1.00		1.00		1.00	
Male 50–59	1.08	[0.99–1.18]	1.02	[0.93–1.12]	0.86	[0.72–1.03]	0.88	[0.73–1.06]
Male 60–69	1.17	[1.07–1.27]	1.07	[0.98–1.18]	0.73	[0.61–0.88]	0.78	[0.64–0.96]
Male 70–79	1.04	[0.95–1.14]	0.98	[0.89–1.09]	0.71	[0.58–0.86]	0.77	[0.62–0.96]
Male 80+	1.03	[0.92–1.15]	0.99	[0.88–1.11]	0.53	[0.41–0.70]	0.59	[0.45–0.79]
Female 40–49	1.09	[1.00–1.20]	1.06	[0.97–1.16]	0.77	[0.64–0.94]	0.77	[0.64–0.94]
Female 50–59	1.10	[1.01–1.19]	1.10	[1.01–1.20]	0.76	[0.64–0.91]	0.80	[0.66–0.96]
Female 60–69	1.08	[0.99–1.17]	1.15	[1.04–1.26]	0.61	[0.50–0.73]	0.66	[0.54–0.82]
Female 70–79	0.99	[0.90–1.09]	1.14	[1.02–1.26]	0.44	[0.35–0.55]	0.49	[0.38–0.62]
Female 80+	0.92	[0.83–1.01]	1.12	[1.00–1.26]	0.32	[0.24–0.41]	0.35	[0.26–0.47]
Currently married			1.00				1.00	
Never married			0.57	[0.51–0.63]			0.95	[0.78–1.15]
Separated/divorced			0.71	[0.67–0.76]			1.01	[0.88–1.18]
Widowed			0.70	[0.67–0.74]			1.01	[0.90–1.14]
Gender differences (χ^2_1)[b]								
40–49	3.8	0.052	1.4	0.23	6.8	0.009	6.8	0.009
50–59	0.2	0.68	4.2	0.041	2.2	0.14	1.4	0.23
60–69	5.3	0.021	3.0	0.083	4.4	0.036	3.4	0.065
70–79	1.3	0.26	10.1	0.001	16.5	<0.001	15.0	<0.001
80+	4.0	0.045	4.2	0.039	10.7	0.001	10.3	0.001
Age differences (χ^2_4)[c]								
Male	17.2	0.002	6.5	0.16	27.6	<0.001	14.6	0.006
Female	23.3	<0.001	4.2	0.38	74.8	<0.001	49.8	<0.001

Notes: Results are from two-level Poisson regression models also containing indicator variables for month of interview. All coefficients are incidence rate ratios and 95% confidence intervals, except for Age and Gender differences, which are *Z*-scores and *p*-values. Tests of difference for age by gender interaction terms: [b]across gender (e.g., male 50–59 vs female 50–59); and [c]across age (i.e., are all five male coefficients equal to one-another). *N* = 5,059 for unadjusted and *N* = 5,025 for adjusted models.
[a]All adjusted models also include respondent education, country of birth, employment status, household size and wealth quintile. Full adjusted models provided as Supplementary Table 7.

they face numerous demands in the provision of care and support to younger family members (Schatz & Seeley, 2015). This shortfall may lead them to invest considerable efforts in strategizing to increase their social support (Cliggett, 2003).

Strengths and Limitations

Although the HAALSI sample consists of a very large random sample of older South Africans across a wide age range with a high response rate, our study has several potential

limitations. First, this data set covers a single study location, a poor and rural area in northeast South Africa. While the area is quite typical of other rural parts of South Africa, studies in other settings, particularly in urban areas, will help us to understand the generalizability of these findings. These findings will likely be replicable in many SSA settings where women often marry older men; since female life expectancy exceeds that of males, widowhood is common and social constraints on such older women limit their ability to form new social ties.

Second, our data are cross-sectional, and cross-age comparisons potentially conflate age and cohort effects. Although the whole study sample grew up under Apartheid, the impact of its end in the mid-1990s may have been felt differently across cohorts. Further, the heavy burden of HIV in this community, and rapid changes in family composition and gender relations, will have differentially affected cohorts. The patterns we report may reflect selection effects arising from differential mortality by level of social support; for example, if older adults with smaller social networks die sooner, we may only see the most socially connected individuals at the older end of our age range. This situation, however, would result in an underestimate of the true longitudinal effects. Follow-up studies within the HAALSI cohort should allow us to disentangle such effects and to make within-individual comparisons. Although we can show associations with our cross-sectional data, we are unable to examine causal pathways leading from other factors to high or low social connectedness. We therefore cannot yet fully evaluate theories of choice and constraint as applied in this setting.

Third, the patterns of behavior predicted by SST (selective retention of emotional and kin ties) may also reflect network retrenchment due to biological or cognitive necessity, rather than an entirely personal choice. Nevertheless, contraction due to health decline still leaves some agency with the individual in terms of which ties to shed, and reflects personal circumstances rather than structural forces. Finally, survey name generators such as those in HAALSI do not capture the full range of network contacts, and may not be fully comparable cross-nationally.

Conclusion

In this study, we described the personal networks and social support of middle-aged and older men and women living in rural South Africa to better understand the social and household dynamics of an aging population. We find support for structural constraints on their social networks, notably for women, arising from spousal loss. As populations age, this constraint may become less important if older men survive longer, or shift to affect older ages if women continue to outlive their spouses by as long as they do now. If the latter is the case, population dynamics will mean a larger number of, often poor, women in need of additional support from beyond the kin network.

Supplementary Material

Supplementary data is available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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Conflict of Interest

The authors declared that they had no conflicts of interest.

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