HHS Public Access

Author manuscript

Psychol Aging. Author manuscript; available in PMC 2020 December 01.

Published in final edited form as:

Psychol Aging. 2019 December ; 34(8): 1158–1169. doi:10.1037/pag0000375.

Convoys of Social Relations: Cohort Similarities and Differences over 25 years

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Abstract

Longer life expectancies and declining fertility rates suggest changes in connectedness among older adults. This study examines cohort patterns in the links between age and social relations by testing the Convoy Model of Social Relations among two adult cohorts in 1980 and 2005. We hypothesize that despite societal changes, connectedness remains fundamental in later life. The data are drawn from a regionally representative sample (N=543) aged 50 to 100 collected in 2005 and a nationally representative sample (N=718) aged 50 to 95 collected in 1980. We use Multi-Level-Modeling to update the preliminary examination of how network characteristics vary by age and emotional closeness (Antonucci & Akiyama, 1987a) with data collected 25 years later. Findings indicate that network size, gender composition and years known were similar in both cohorts. Changes are also evident. In 2005, network members were older, had more frequent contact and lived closer to their network members than in 1980. There was one cohort difference in network composition, the proportion of other family was smaller in 2005 compared to 1980. Finally, cohorts differed in the effects of age (e.g. on contact frequency), closeness (e.g. on network size) and age x closeness interactions (e.g. on sibling composition). In sum, overall patterns of network structure and composition are largely similar in the two cohorts. The effects of age and emotional closeness were largely consistent over 25 years. Although caution is warranted, these findings provide continued support for the importance of close relations in later life across historical periods.

Keywords

convoys; social networks; replication

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Social networks are known to have an important influence on health and well-being in later life (Antonucci, 2001; Antonucci, Ajrouch & Birditt, 2014; Berkman, Glass, Brissette, & Seeman, 2000; Krause, 2001; Holt-Lunstad, Robles & Sbarra, 2017). Theoretical perspectives continue to offer insight concerning social relations while empirical studies of network characteristics over the last decades illustrate dynamic and diverse forms of connectedness among older adults (Ajrouch, Antonucci & Janevic, 2001; Cornwell, Laumann & Schumm, 2008; Shaw, Krause, Liang & Bennett, 2007; Rook & Charles, 2017). It has been argued that social relations are changing; that the modern world is stressful, that changing family norms and marital patterns, longer life expectancies and decreased fertility, geographic mobility, technology, and an overall emphasis on self rather than others, all alter the type and amount of social connectedness people feel (Adams & Allan, 1998; Ajrouch, Akiyama, & Antonucci, 2007; Connidis & McMullin, 2002; Coontz, 2010; Goldstein & Kenney, 2001; Wang & Wellman, 2010). Technology offers unique promise in that, although older adults lag behind youth, mobile phones and personal computers with Internet access are nevertheless the most popular digital devices used by older adults (Marston, Kroll, Fink, De Rosario & Gschwind, 2016). According to the Pew Research Center, more than two thirds of adults 65 plus owned a cell phone in 2012, up from 57% in 2010 (Zickuhr & Madden, 2012). The present study examines cohort differences in social connectedness as assessed by social network structure and composition among adults fifty years of age and older. Specifically, we identify age and emotional closeness effects on network structure and composition twenty-five years after Antonucci and Akiyama's (1987a) preliminary examination of the Convoy Model of Social Relations.

The Convoy Model and Cohort Related Changes in Social Relations

The Convoy Model of Social Relations proposes a unifying framework for understanding social relations over time, incorporating both a life span or individual perspective and a life course or situational perspective (Antonucci, 2001, Antonucci, Ajrouch & Birditt, 2014; Antonucci, Ajrouch & Manalel, 2017; Fuller-Iglesias, Smith, & Antonucci, 2009; Kahn & Antonucci, 1980). A major tenet that the Convoy Model advanced is the now widely accepted notion that social relations represent an umbrella term that is both multidimensional and complex. Social relations include social network or structural characteristics such as size, contact frequency, geographic proximity, years network members known and composition, i.e. the spouse, child, siblings, other family and friends. Additionally, the Convoy Model describes social support characteristics, that is, the specific types of support exchanged such as aid, affect and affirmation; as well as support quality or satisfaction with support, i.e., how each individual evaluates the support provided or received. Personal and situational characteristics are hypothesized to uniquely and in combination influence social relations which, in turn, influence health and well-being. The study of social networks also involves the extent to which those who comprise a network are emotionally close. Using the hierarchical mapping technique (Antonucci, 1986), the Convoy Model captures multiple levels of emotional closeness.

While the Convoy Model infers the importance of close relations in later life, this theoretical framework also posits the dynamic nature of networks. In particular, the form and function of social networks are likely shaped by changes in the historical context (Antonucci,

Ajrouch & Manalel, 2017). One key context that is widely recognized as changing is the basic demographic structure of the family and society. Traditional forms of marriage are less common and life expectancy is increasing, while the average number of children in each family is decreasing (Broese van Groenou, Hoogendijk, & van Tilburg, 2012; Connidis & Barnett, 2019; Coontz, 2010; Goldstein & Kenney, 2001; Stacey, 1998). Though there are likely to be core elements of close relations (e.g. the spousal relationship; parent-child bond) that change very little, socio-historical shifts in population and family demography are likely to fundamentally influence social networks due to the unique situational characteristics they produce. Thus, later cohorts will likely have parents in their networks for much longer due to increased life expectancy but perhaps fewer children and fewer siblings in their networks. Periods of rapid demographic and historical change may have important implications for some aspects of social relations, but not others, and this may be especially true for the social relations of older people. Unfortunately, there is little empirical evidence that examines how changing demographics affect social network structure and composition. It is likely that trends in population demography will be reflected in individual convoys. The Convoy Model posits that the ways in which people connect to others is dynamic, with network structure and composition potentially fluctuating as personal and situational characteristics change across the lifespan, but also across historical contexts.

Predicting Cohort Patterns in Convoy Structure and Composition

A critical area in need of better understanding is the extent to which family demographic and societal changes have influenced the structure and composition of older adults' social networks. In response to historical changes, we expect some characteristics to differ from one cohort to the next, and others to remain consistent across historical period. Below we predict patterns in convoy structure first, followed by composition.

Convoy Structure

Network Size: Given that the central function of networks is, and has been, to facilitate social engagement, we expect the number of people that older adults feel close and important to (i.e., their convoy members) will be consistent across cohorts (2005 and 1980). *Network Member Age*: We expect older adults in both cohorts will have older network members. However, given increases in life expectancies we expect that older adult networks will on average be older in 2005 compared to 1980. *Gender Composition:* Networks have traditionally consisted of more women, who are said to be easier to connect with socially and emotionally (Antonucci & Akiyama, 1987a). We expect this to continue to be the case in the more recent cohort. *Years Known:* We expect that the amount of time that people age 50 and older have known their network members will be consistent or increase across cohorts. *Geographic Proximity:* Given reduced geographic mobility (US Census Bureau, 2016) we hypothesize that geographic proximity, i.e. people living geographically close to their network members, will be more evident in 2005 than 1980. Finally, with respect to *Contact Frequency,* given the many forms of maintaining connectivity such as texting, skype, facebook (Antonucci et al., 2017), we expect that communication technologies will affect contact frequency and that the later, 2005, cohort will be in more frequent contact with their network members than was the case in 1980.

Convoy Composition

Though marriage patterns have changed over time, we expect that spouses/partners will be equally prevalent and be among the closest network members in both cohorts, but that there will be fewer children and siblings in the more recent cohort. Further, as a result of changes in family structure, e.g. reduced number of children, siblings, we expect that new cohorts of older people might develop more friendships to offset the reality of smaller families (Connidis & Barnett, 2019).

Cohort Patterns in Convoy Structure and Composition: Age and Closeness

A key objective of this study is to revisit the preliminary examination of the Convoy Model (Antonucci & Akiyama, 1987a). As such, we examine whether convoy structure and composition vary by age and closeness in the same ways across both cohorts.

Age effects:

We generally expect that the association between age and convoy structure will be the same for both cohorts, yet composition patterns may vary by age from one cohort to the next. Longitudinal data from the Netherlands, for example, suggest cohort differences in the associations between age and network composition, specifically the finding among early cohorts of more family members among older than younger people, is no longer evident with recent cohorts (Bernard, Phillipson, Phillips, & Ogg, 2001; Stevens & van Tilburg, 2011; Suanet & Antonucci 2016; Suanet & Huxhold, 2018). Thus, we hypothesize that the more recent cohort will exhibit fewer age differences in network composition, i.e. distribution of family and friend network members. Further, we hypothesize that the composition of networks may change with respondents in the 1980 cohort more likely to have family dominated convoys, i.e. with both children and siblings more prevalent in their convoys than in 2005 when people of all ages are more likely to include friends in their convoy.

Emotional closeness effects:

Antonucci and Akiyama's (1987a) examination of social networks among older adults systematically studied the ways in which emotional closeness linked to network structure. Network members with whom respondents felt closest were more numerous than those with whom they felt less close. Respondents in 1980 reported feeling closest to those they knew longer, who lived in closer geographic proximity and with whom they had more frequent contact. Similarly, people reported different levels of closeness with children, siblings, other family and friends, though the spousal relationship was uniformly reported the closest. We hypothesize that closeness patterns will be similar across both cohorts given that the fundamental function of social relations is to promote connections between one another (Antonucci, 2001). The extent to which feelings of closeness are similar or different over twenty- five years will provide valuable insights into changing preferences and connections that older adults have with others, a better understanding of similarities and differences in the experience of isolation, as well as documentation of the ways in which networks continue (or not) to serve as a resource in times of need (McPherson, Smith-Lovin & Brashears, 2006).

Age and closeness interaction effects:

Whether due to shifts in roles and responsibilities (Antonucci, 2001) or selectivity (English & Carstensen, 2014), it may be that closeness to network members varies by age in later life. Such developmental patterns may arise in unique ways when considering various network characteristics. Antonucci and Akiyama (1987a) found that the oldest old reported the same number of closest network members as their younger counterparts but contact frequency with closest network members was lower among the oldest old compared to the young old. Age differences in contact frequency dissipated among those who were less close. We explore whether those patterns are replicated 25 years later. Documenting whether and how closeness varies among those in later life may identify risk factors in more recent cohorts that demand attention before leading to precipitous declines in health and well-being.

The Present Study

Based on the historical changes discussed above, e.g., family structure, technology, and recent findings, we hypothesize that network structure and composition may have changed over 25 years from 1980 to 2005, but that the importance or effects that age and emotional closeness have on people's networks largely has remained the same. We investigate if changes in family demography and increased relationship options are reflected in cohort patterns of the social connections that older people report. However, we hypothesize that the social connections of older people are so fundamental that many aspects of convoy structure and composition will remain the same despite significant societal changes and will remain relatively similar during later life in both cohorts despite considerable societal change over 25 years.

Methods

Sample

The data used in the current study are from the Social Relations Study (Antonucci, Ajrouch, & Manalel, 2017). We draw from Wave 2 data, collected in 2005 through telephone interviews lasting an average of one hour, with a response rate of 78%. A sub-sample of respondents age 50 and older was selected for the current study, resulting in a sample size of 543 that ranged in age from 50 to 100, including 215 men, 328 women (ages 50–64: 91 men, 159 women; ages 65–74: 55 men, 80 women; ages 75–100: 69 men, 89 women). We noted during data collection that men in the 50 – 64 age group were least likely to be home when our interviewers called. Interviewers were most often told that men in this age group were not available because they were employed outside the home. Although the original examination of the convoy model was based on a nationally representative sample (see Antonucci & Akiyama, 1987a for sample details) and the original Social Relations Study on a regionally representative sample, the availability of comparable measures 25 years apart provides a unique opportunity to examine whether the basic characteristics of the convoy model transcend time and place. While not national data, comparison of the Detroit area with American Community Survey data indicates that the Detroit metropolitan area is a reasonable approximation of the U.S. population. (U.S. Census Bureau, 2005–2009 American Community Survey). To determine this we compared American Community

Survey data from 2005–2009 5-year estimates for the U.S. population and the Detroit metropolitan age 60 and older to the demographic characteristics (gender, race, marital status, and education) of Social Relations Study sample who were age 50 and older in 2005 (presented in Table 1). Generally, all three were similar (within 8.5% on all variables), with the largest difference being in percent with less than a high school degree (U.S. age 60+: 22.9%; Detroit area age 60+: 22.5; SRS (2005) sample age 50+: 14.4.

Measures.

Network Characteristics: Network structure in both samples was established by using the hierarchical mapping technique (Antonucci, 1986). Respondents were presented with a set of three concentric circles with a smaller fourth circle in the center in which the word "you" was written. They were told that the outer three circles should be thought of as including "people who are important in your life right now" but who are not equally close. Respondents were then asked to think about "people to whom you feel so close that it is hard to imagine life without them." Such persons were entered in the innermost circle of the network diagram. The same procedure was followed for the next circle, described as including "people to whom you may not feel quite that close but who are still very important to you," and for the outer circle, described as including "people whom you haven't already mentioned but who are close enough and important enough in your life that they should be placed in your personal network."

Network size was measured in two ways. The first measure documented the total number of network members age 18 and older nominated by each respondent up to 10. This measure was used for descriptive purposes only. The second measure of network size documented the number of network members nominated by respondents in each of the three circles (inner, middle, and outer) as well as the total of these three circles. The total of these network members across all respondents was 6,159 in 2005. This measure of size by circle placement and the total were used in the testing of associations with respondent age, circle placement, and the interaction between the two.

Respondents were asked a series of questions concerning structural characteristics of people listed in their network, including network members age (in years), gender (male=1; female=2), number of years known, geographic proximity (live more than 1-hour drive from respondent=1; within 1-hour drive=2), and frequency of contact (1=irregularly; 2=once a year or more often; 3=once a month or more often; 4=once a week or more often; 5=daily; 6=live together). Also collected were data indicating the relationship of the identified network member to the focal person (i.e., spouse, children, siblings, other family members, or friends). Analyses of all network characteristics, except size, were conducted with the first 10 network members age 18 and older nominated by each respondent as the unit of analysis (2005: N=4,031). In other words, a dataset was created in which each line or case in the dataset was represented by network members with separate variables documenting the characteristics mentioned above (i.e., gender, relationship to respondent, etc.).

Age was measured by asking date of birth. *Closeness* was measured by the circle placement of each network member (inner=1, middle=2, and outer=3).

Covariates: Four demographic characteristics were used to compare the two samples and included as covariates in the statistical models. *Gender* was coded as male (1) and female (2). *Marital status* was assessed as a three-category variable documenting if respondents were married/living with a partner (1), widowed, (2), or any other status, divorced, separated, and never married (3). Widowed was used as the reference group for statistical modeling. *Education* was measured as the highest grade of school or year of college completed (0–17+). *Race/ethnicity* was assessed via self-report and categorized into two groups, white and all other (non-white).

Data Analytic Strategy.

In light of advances in analytic strategies, we re-analyzed the previously published (Antonucci & Akiyama, 1987) data. Multi-level modeling was conducted using SAS Version 9.4 to examine respondent age and emotional closeness differences in social network structure and key relationships in both the 1980 and 2005 data. This analytic approach accommodates the non-independence of observations (i.e., network members nested within respondent networks) inherent in ego-centric network data. A multi-level-model was conducted for each outcome, i.e., each aspect of network structure and each of the key relationships. Network size, network member age, years known, and contact frequency were modeled as continuous outcomes using SAS Proc Mixed, whereas the binary outcomes (i.e., gender composition, proximity and all relationships) were modeled as logits using SAS Proc Glimmix. For some outcomes, the fixed effects model was better fitting, but for consistency of analytic technique across outcomes, the random intercept was still included. In these logit analyses, the outcome documented the characteristic of each network member in a binary variable, e.g., whether they were female or male, geographically proximate or not, and were a specific relationship (e.g., spouse/partner v. not). An example main effect equation is provided below:

$$\text{Network characteristic}_{ij} = \gamma_{00} + \text{Respondent Age}_j + \text{Emotional Closeness}_{ij} + \mu_{0j} + e_{ij}$$

An example interaction effect equation is provided below:

$$\text{Network characteristic}_{ij} = \gamma_{00} + \text{Respondent Age}_j + \text{Emotional Closeness}_{ij} + (\text{Respondent Age}_j * \text{Emotional Closeness}_{ij}) + \mu_{0j} + e_{ij}$$

In these models, respondent age, gender, marital status (widowed as reference), education, and race/ethnicity were included as upper (respondent) level covariates. At the lower (network member) level was the circle placement of each network member nominated, included as a covariate, and the network outcomes. Circle placement was modeled with inner circle as the reference group by including dummy variables for middle and outer circle. To model network size, the only respondent level outcome, a multi-level model was still conducted. However, in these models the lower level outcome was size of each circle as opposed to a network member specific characteristic.

We considered combining the two samples to test statistically for cohort effects (SSE-1980 v. SR-2005). However, differences in the samples' geographic areas of focus and design created cause for concern in light of issues raised when combining data across surveys

(Schenker & Raghunathan, 2007). The requirement of equivalent variance/covariance matrices could not be assumed. The SSE was a U.S. nationally representative sample in 1980, whereas SR was regionally representative of the Detroit Metropolitan area in 1992. We statistically compared the two samples descriptively by conducting t-tests and chi-squares as well as Levene's test for equality of variance and found many differences (see Table 1) further suggesting we should analyze the two samples separately.

To compare findings across the two datasets (SSE and SR), we used the significance criterion. If an effect (e.g., age on contact frequency) was significant at p-value <.05 in one versus the other dataset, the finding was determined to be different. If an effect was significant in both datasets, then the finding was determined to be similar. This is possible due to the similar sample sizes and smallest detectable effects. To determine the smallest detectable effect in each of the samples we conducted power analysis using GPower (Faul, Erdfelder, Lang, & Buchner, 2007). SSE (N=718) and SR (N=543) analyses including ten independent variables (and the two interaction terms), with power of .80 can detect effect sizes as small as .02. and .03 respectively.

To examine age by emotional closeness interactions we created two product terms, multiplying mean centered age by each of the three circle placement dummy variables. Significant interactions were determined by a significant effect as well as a significant improvement in the −2 Log Likelihood when compared to the main effect model. Significant interactions were explored using an online interactive calculation tool for probing interactions from multi-level models and establishing simple intercepts and simple slopes (Preacher et al., 2006). Regression coefficients, coefficient variances and covariances, and conditional values of the predictor (age) and moderator (circle placement) were entered into the tool. The tool then provided simple intercepts and slopes with significance test results. Using the provided simple intercepts and slopes, graphs of significant interactions were created using the line chart function in Excel 2016.

Results

We begin with a description and comparison of convoy structure and composition in the 2005 and 1980 samples. This is followed by a detailed examination of age and emotional closeness effects on convoy characteristics in 2005 and 1980.

Sample Descriptions.

There were 543 respondents in the 2005 sample and 718 people in the 1980 sample, with a mean age of 67 in 2005 and 66 in 1980 (see Table 1). Respondents in the 2005 sample were born between 1905 and 1955 and respondents in the 1980 sample were born between 1885 and 1930. In both years, there were more people in the youngest category, aged 50–64 than in the older categories, 65–74 and 75+; that is, 46.0% versus 24.9% and 29.1% in 2005, and 46.4% versus 31.6% and 22.0% in 1980. The 2005 sample had an age range from 50 to100 compared to 50 to 95 in the 1980 sample. There were slightly more females in both samples: 60.4% and 58.5%. Most people in both samples were married (2005: 61.0%; 1980: 58.5%). However, significantly fewer respondents in 2005 were widowed (2005: 18.6%; 1980: 29.4%) and significantly more were in other marital statuses, i.e. other than married,

compared to 1980 (2005: 20.4%; 1980: 12.1%). The average number of years of education was significantly greater (13.3 years) in 2005 than 1980 (10.5 years). Race/ethnicity was found to significantly differ across the two samples as well, with racial and ethnic minorities comprising a greater proportion of the 2005 sample (22.6%) compared to the 1980 sample (10.8%).

Cohort Patterns in Convoy Structure and Composition:

To examine the differences in the two samples we combined them in one analysis to assess how different they actually were descriptively. On average, people in 2005 nominated 7.4 network members and people in 1980 nominated an average of 7.2 convoy members, a difference that was not statistically significant. The average age of network members in 2005 was significantly older than in 1980 (51.8 v. 49.7). There were no differences in the gender composition of networks (i.e., percentage of networks comprised of women) between the 2005 and 1980 samples (58.2% v. 56.6%), years network members were known (38.3 v. 37.9). The samples did significantly differ in network proportion that lives within an hour's drive, more people lived closer in 2005 (2005: 71.2%; 1980: 66.5%) and frequency of contact, people were in more frequent contact in 2005 (2005: 4.0; 1980: 3.8).

There were no significant differences in the network proportion comprised of spouse/partner (2005: 10.0; 1980: 8.7), children (2005: 34.4; 1980: 31.8), siblings (2005: 18.2; 1980: 15.3), or friends (2005: 19.2; 1980: 18.1). In contrast, the average proportion of network consisting of other family members was significantly different, with networks being comprised of a higher proportion of other family in 1980 (24.6%) compared to 2005 (18.2%).

Cohort Patterns in Convoy Structure and Composition: Age and Closeness

Convoy Structure.—Table 2 presents results examining age and closeness effects on convoy structure. Generally, when significant interactions are present, main effects are not discussed.

Network Size.: We examined age differences in inner circle size compared with middle and outer circle size. Significant age by closeness interactions predicted network size in both 2005 and 1980 (see Table 2 and Figure 1). In both cohorts, 2005 and 1980, the association between respondent age and middle circle size was significantly different than the association between age and inner circle size. In both cohorts, older age was associated with decreased middle circle size (SSE inner circle size $b = -.01$, $p = .612$; SSE middle circle size $b = -.04$, $p < .001$; SR inner circle size $b = -.03$, $p = .017$; SR middle circle size $b = -.07$, $p < .001$). Furthermore, there was no difference by age when comparing the inner and outer circles for both cohorts. Overall, findings support our hypothesis that closeness in relationships varies by age, though increasing age has the smallest effect on the size of the closest (inner circle) relationships. Furthermore, the nature of the age by closeness interactions are largely similar across cohorts.

Network Age.: We also found significant age by closeness interactions predicting network age in both 2005 and 1980 (see Table 2 and Figure 2). In terms of consistency, both 2005 and 1980 indicate that the association between respondent age and the age of network

members in the inner circle was greater than the association for the middle circle (SSE inner circle b = .63, p < .001; SSE middle circle b = .13, p = .005; SR inner circle b = .42, p < .001; SR middle circle b = .15, p = .001) . In terms of cohort differences, only in 1980 was the association between respondent age and the age of network members in the inner circle significantly greater compared to the association in the outer circle (SSE outer circle b = .26, p < .001). Overall, findings support our hypothesis that older age is consistently linked with older network members, and the patterns of closeness are for the most part similar across cohorts.

Gender Composition.: There were no age effects in the likelihood of network members being female in both 2005 and 1980 indicating consistency in the two cohorts (see Table 2). In 2005 the likelihood of a network member being female in the middle circle was greater than the likelihood of a network member being female in the inner circle, a finding that was not evident in 1980. In both 2005 and 1980 the likelihood of a network member being female did not differ between the inner and outer circle. Also, no age by closeness interactions were found predicting network gender composition in either 2005 or 1980. Overall, results for gender composition were largely consistent across cohorts.

Years Known.: We found significant age by closeness interactions predicting years known (see Table 2 and Figure 3) in both 2005 and 1980, indicating consistency in the two cohorts. For both cohorts the association between older age and having known people nominated in inner circle for more years was greater than the association for the middle and outer circles (SSE inner circle b = .69, p < .001; SSE middle circle b = .28, p < .001; SSE outer circle b = .31, p < .001; SR inner circle b = .55, p < .001; SR middle circle b = .21, p < .001; SR outer circle b = .24, p < .001). Overall there were no detected cohort differences in the average number of years known; older age was associated with more years known and this association was greater among closer relationships.

Geographic Proximity.: There was some consistency and some differences with regard to geographic proximity. In both 2005 and 1980, older age was associated with a lower likelihood of network members being geographically proximate (see Table 2). Moreover, for both cohorts, network members nominated in the inner circle were significantly more likely to be geographically proximate compared to middle circle network members. However, there was a cohort difference detected in that 2005 inner circle network members were significantly more likely to be geographically proximate compared to outer circle members but this was not the case in 1980.

Frequency of Contact.: There were several noteworthy differences across cohorts concerning contact frequency. Whereas age had a main effect in 1980, older age was associated with less frequent contact, the effect of age in 2005 arose only in the context of (i.e., interaction with) closeness (see Table 2 and Figure 4). In 2005, the association between respondent age and contact frequency with the inner circle was significantly different from the middle circle. Simple slopes analyses indicate that older age was associated with decreased contact frequency with the inner circle (SR inner circle b = −.01, p = .011; SR middle circle b = .00, p = .308). There were, moreover, significant closeness main effects for

both cohorts, although the interaction of age and closeness in the 2005 sample reduces the importance of the main effect in that cohort. Respondents reported more frequent contact with inner circle members compared to both middle and outer circle members in both cohorts.

Convoy Composition.—Table 3 presents details concerning age and closeness effects on relationship composition of respondents' networks. We examine similarities and differences in network composition across two cohorts, specifically with regard to five types of relationships: spouse/partner, children, siblings, other family, and friends.

Spouse/Partner.: Age and closeness associations with spouse/partner in networks were identical in both 2005 and 1980, indicating consistency across cohorts (see Table 3). Older age was associated with not having a spouse/partner, and respondents were significantly more likely to place their spouse in their inner circle compared to both the middle and outer circles.

Children.: Significant age by closeness interactions predicting the likelihood of nominating children in networks (see Table 3 and Figure 5) indicate differences in the two cohorts. Simple slopes analyses indicate that in 2005, the association between older age and a greater likelihood of nominating a child in the middle circle was stronger compared to the small association found for the inner circle (SR inner circle $b = .01$, $p = .021$; SR middle circle $b = .04$, $p < .001$). There were no significant differences in the association when comparing the inner versus outer. By contrast, in 1980, there was no interaction between age and likelihood of nominating a child in the inner versus middle circle. However, there were differences found when comparing the inner versus outer circles. Specifically, older age was associated with a slightly lower likelihood of nominating a child in the inner circle in 1980. Simple slopes analyses indicate that there was little to no age effect on the likelihood of a child being nominated in the middle circle, and older age was associated with a greater likelihood of a child being placed in the outer circle when compared to the inner circle (SSE inner circle $b = -.01$, $p = .135$; SSE outer circle $b = .05$, $p = .029$). Overall, despite significant age by closeness interactions among both cohorts, differences exist, indicating a more complex association between age and feelings of relative closeness towards children across cohorts.

Siblings.: There are also differences across the two cohorts in predicting the likelihood of nominating siblings in networks. In 2005, there were only age and closeness main effects (see Table 3). Older age was associated with a lower likelihood of nominating siblings in the network, and siblings were more likely to be nominated in the middle and outer circles compared to the inner circle. There were age and closeness effects in 1980 that were not present in 2005 (see Figure 6). In 1980 the effect of age on the likelihood of nominating a sibling differed when comparing the inner versus middle and inner versus outer circles. Age was found to have little to no effect on the likelihood of nominating a sibling in the inner circle. In contrast, in the middle and outer circle, older age was associated with a decreased likelihood of nominating a sibling in these circles when compared to the inner circle (SSE

inner circle b = −.01, p = .488; SSE middle circle b = −.04, p < .001; SSE outer circle b = −.04, p = .003).

Other Family.: There were similar associations between age, closeness and the nomination of other family members in social networks in both 2005 and 1980 (see Table 3). Other family members consisted of extended family such as grandchildren, in-laws, and cousins. In both 2005 and 1980, there was a significant main effect for age in that older age was associated with a greater likelihood of nominating other family members in the network. Comparable closeness main effects were also found in 2005 and 1980. Nomination of other family was associated with likelihood of placement in the middle and outer circles compared to the inner. No age by closeness interactions predicting the presence of other family in networks were found in 2005 or 1980.

Friends.: There were similar associations between age, closeness and the nomination of friends in social networks during both 2005 and 1980 (see Table 3), indicating consistency across cohorts. Both in 2005 and 1980, there were no age effects predicting the likelihood of nominating friends in the network. Furthermore, respondents were more likely to nominate friends in the middle and outer circles compared to the inner. No age by closeness interactions predicting the nomination of friends in the network were found in either 2005 or 1980.

Discussion

Using the Convoy Model of Social Relations as a guiding framework, this study examined patterns in social relations in 1980 and 2005. These two unique datasets allowed an investigation of cohort differences and similarities in convoy structure and composition among adults fifty years of age and older. We hypothesized that age effects on network size and composition may have changed but that the closeness people feel to their networks has remained the same. Results showed considerable consistency across the two cohorts, although some differences were also evident. These findings are discussed below.

Consistency in Social Network Structure and Composition Across the Two Cohorts

While much has been written about the changing nature of the family and the overall decrease in social connectedness, the current findings suggest that there are consistent and enduring basic aspects of close social relations. There was a great deal of consistency in the convoys of the two cohorts, in both structure and composition. As hypothesized there were no cohort differences in network size, i.e. number of people named in the network; gender composition, i.e. more women in all networks; or in years network members were known. There were also no cohort differences in network composition, i.e. in proportion of the network that included spouse, children, siblings, and friends, although fewer people mentioned other family members in 2005. These findings suggest that despite known changes in population demographics some fundamental elements of social connectedness as embodied in the Convoy Model of Social Relations (c.f. Antonucci, 2001; Antonucci, Birditt & Ajrouch, 2011) are maintained across historical time.

Differences in Social Network Structure and Composition Across the Two Cohorts

There were notable differences in convoys as well. In 2005, network members were older than in 1980 by about two years. This is consistent with the changing demographics discussed above, i.e., people are living longer. People also had more frequent contact with their network members in 2005 than in 1980. This may be related to the availability of increased methods of communication, e.g. cell phone, social media, skype, etc. It may also reflect changing norms that accompanied increased communication access. Whereas keeping in touch might have been limited to a weekly phone call in 1980, people of all ages are now in more regular contact with others, e.g., multiple texts or emails throughout the day rather than weekly phone calls or in-person visits (Antonucci, Ajrouch & Manalel, 2017). Another difference predicted is that people would report living in closer proximity to their network members in 2005 than in 1980, perhaps reflecting reduced geographic mobility in more recent times (US Census Bureau, 2016). These findings run counter to the common claim that people are less connected and, therefore, more isolated than had been the case previously. One might be tempted to argue that this is a reflection of selection bias. Respondents may now be more likely to consider people in their network because they live close by. However, since, in general, the same people were named in the network in 1980 and 2005, i.e. spouse, children, parents, etc., this seems not likely to be the case. Overall, these findings may bode well for the connectedness of more recent cohorts despite the demographic changes described above which could have led to increased isolation.

Age and Closeness.

We next consider age x closeness interactions and then main effects if there are no interactions. We focus on cohort patterns, i.e. whether the findings are consistent or different in the two samples. We consider convoy structure first.

Convoy Structure.

There was an age by closeness interaction in both 1980 and 2005 for network size indicating that increasing age has the smallest effect on the number of people identified as closest. This finding suggests that the number of close relationships has remained relatively constant across cohorts. Though a recent study suggests that emotionally close relationships are less common among older adults (Cornwell et al., 2008), our findings reveal that the number of close and important others identified is not greatly affected by age among older adults, and has remained relatively consistent across cohorts. This difference may reflect the way in which close network members were identified. Whereas the hierarchical mapping technique elicits a list of people that the individual feels so close to they cannot imagine living life without them, Cornwell and colleagues measured change between cohorts by asking for the number of people with whom the individual most often discussed things that were important to him/her over the last 12 months. How close social relationships are identified may yield different understandings of social connectedness and therefore, how they vary by age and across time. Nevertheless, these findings suggest that taking closeness and age into account provides important insights into the number of close and important others in social networks.

There was an age x closeness interaction with respect to age of network members in both 1980 and 2005. However, there was a slight difference in the nature of the interaction. In

1980, the age of inner circle members was greater when compared to both middle and outer circle members, whereas in 2005 inner circle members were only significantly older compared to middle circle members. These findings indicate relative consistency in average age of network members in the inner circle, i.e. among closest network members. Given the fact that close network members tend to be family, these relationships are less likely to be lost with age. This is clearly not as true among middle circle members in both cohorts and outer circle members in 2005 who may be co-workers, neighbors or distant relatives.

Network gender composition is similar in both cohorts. Generally, there were no age or closeness differences. There was one exception in that respondents reported more women in their middle versus inner circles in 2005, likely due to the fact that more people were married in 2005 than 1980. Women have long been known to be more prevalent in the social networks of both men and women (Antonucci, Blieszner & Denmark, 2009). Our findings suggest that this has not changed very much over twenty-five years and that this difference is generally not influenced by age or emotional closeness.

The associations between years network members are known with both age and closeness is remarkably similar in both cohorts. There was an interaction indicating that age of respondent by circle placement is associated with how long the respondent knew the network member. The interactions are identical in the two cohorts. Years known increases with age for inner circle members to a greater extent than is evident for both middle and outer circle members. We suggest that this relates to the composition of the inner circle more than the other two circles. Inner circle members are generally the closest relationships an individual has in life, i.e. spouse, children, siblings. These network members are usually a constant presence in adult networks and therefore increase in age as the individual does.

Age and closeness did predict proximity in both cohorts. The fact that there was little difference in the two cohorts is important. Despite reduced geographic mobility in recent times, there were no differences in how age and closeness predicted proximity. Older people maintain or develop close relations despite differences in geographic mobility in the two cohorts. With increasing age people are as likely as younger people to live with or near the people who are most important to them. This finding is consistent across all comparisons and cohorts.

Finally, there was a great deal of similarity but some interesting differences between the two cohorts in how frequently they are in contact with network members. Although it is noteworthy that there is an age-related decline in contact frequency that is evident in 1980 but not in 2005, inner circle compared with outer circle contact frequency was the same in both cohorts. Inner circle members were in more frequent contact with their network members than people in their outer circles. Further, although there were no main effects of age in 2005, an age by closeness interaction emerged indicating that older people are in less frequent contact with members of their inner circle, a difference not evident in the middle circle. While this is a decline, it is worth noting that even the least frequent contact with inner circle members among the oldest group is still considerably more frequent than the frequency of contact with middle and outer circle members across ages. The lack of a main effect of age on contact frequency in 2005 is likely a consequence of the increased methods

of communication available to people of all ages and socio-economic status (Hargittai, 2010; Zickuhr & Madden, 2012, e.g. email, cell phones and texting, reduced long distance telephone rates, Skype, Face Time, and other electronic social networking options.

Next, we consider cohort differences in network composition.

Composition.

Perhaps the most remarkable finding is the general lack of differences in network composition in the two cohorts, i.e., the degree to which people nominated spouse, children, siblings, other family and friends into their network. Nevertheless, there were some differences, which we discuss below.

There were very few differences across cohorts in placement of a spouse, who was virtually always placed in the inner circle. Also, in both cohorts increasing age was associated with not having a spouse/partner. While children were usually in the inner circle, there were some noteworthy cohort differences in circle placement or feelings of closeness towards children with age. In 1980 there were few differences with age, especially in the likelihood of nominating a child to the inner circle. However, there was an interaction in that with age there was an increase in the probability of a child being in the outer circle compared with being nominated in the inner or middle circles. On the other hand, in 2005 the likelihood of being in the middle circle compared with the inner circle increased with age, a finding not evident in comparison with inner and outer circle placement. The fact that children in both cohorts are most likely to be in the respondent's inner circle at all ages, and that there was very little difference among parents who placed their children in their inner circle, i.e. who felt very close to their children, suggests that overall children remain important and close in both cohorts.

Relationships with siblings are generally quite similar in the two cohorts, but findings also suggest some differences. In 1980 there was an age by closeness interaction indicating a decrease with age of the likelihood of siblings being nominated in the middle or outer circles in comparison to inner circle placement. In 2005, older people were more likely to place their siblings in middle or outer circles compared with inner circle. Further, people reported being less close to their siblings when comparing both inner vs middle and inner vs outer circle placement. These findings suggest significant differences in the role of siblings across the two cohorts, which may be the result of smaller families and thus fewer siblings available to be nominated. It may also reflect higher divorce rates in 2005 which may be accompanied by more family separation and conflict and thus less sibling bonding in childhood and adulthood (Connidis & Barnett, 2019).

Findings were identical across cohorts for other family members and friends, contrary to our prediction that there would be more other family members and friends in the 2005 cohort. Nevertheless, more other family members were nominated in the network as age increased, but there was no effect of age on the nomination of friends in the network for either cohort. There were similar effects of circle placement comparisons, i.e., inner v middle and inner v outer for both other family members and friends. There were no age by circle placement

interactions in either cohort. These findings suggest remarkable consistency in the presence of other family members and friends in networks across historical contexts.

Limitations.

As with many studies there are limitations that should be noted. In this study we compared a national sample from 1980 with a Detroit metropolitan area regional sample in 2005. While Census data suggest that the Detroit metropolitan area is relatively similar to other urban and suburban areas, the sample clearly is not national, includes a higher proportion of racial minorities, and does not include any rural respondents. Similarly, the present 2005 regional sample is unable to capture any geographical differences in social relations by US geographic region, e.g. the North, South, East and West. These are important limitations that should be considered when interpreting the present findings. In addition, while the present comparison does benefit from the use of the same relatively extensive social relations measures in the two samples, more in-depth assessments of other aspects of social relations, e.g. type of support exchanged, quality of relationship, would clearly provide additional insight into the nature of social relations and how they may be different in the two cohorts, i.e. across historical period. Despite these limitations, the study does offer a unique opportunity to compare social relations using identical measures over twenty-five years.

Conclusions

This study examined the structure and composition of social convoys among adults 50 years of age and older in two cohorts twenty-five years apart. Generally speaking, there was substantial consistency in convoy structure i.e. network size, age of network members, gender composition, years network members were known, and proximity of network members. There was also substantial consistency in network composition, i.e. presence of spouse, other family members and friends. On the other hand, there were noticeable differences in one convoy structure characteristic i.e. contact frequency among network members, and two convoy composition characteristics, i.e. relationship with children and siblings.

This overall assessment provides support for consistency in convoy structure and composition across historical contexts, but also demonstrates variation reflecting the changing times, e.g., increased modes of communication and decreased numbers of children and siblings. Findings support the tenets of the Convoy Model, and show how it provides a valuable framework for approaching the study of social relations. In particular, the framework suggests and the findings indicate that it is critically important to take characteristics such as age and closeness into account in order to capture both the consistent and dynamic aspects of social relations By documenting that there are consistent and reliable age and closeness differences in the structural and compositional characteristics of older adults' convoys at two different points in history separated by 25 years, findings illustrate the fundamental role of social relations regardless of how socio-historical contexts change. The fact that people continue to report support convoys that indicate close ties to family is especially noteworthy because these findings contradict the popular view of the declining importance of family and overall social connectedness. In sum, despite some changes in

convoy structure and composition, overall, the 2005 findings corroborate the earlier 1980 findings, lending additional support to the Convoy Model twenty-five years after the preliminary examination of the model.

Acknowledgments:

This study was supported by grants from the National Institute of Mental Health (MH46549 and MH066876) and the National Institute on Aging (AG13490, AG030569, AG045423), Social Relations Study Waves 1–3 (Toni C. Antonucci, Principal investigator). We gratefully acknowledge Angela Turkelson's assistance with the analyses and manuscript preparation.

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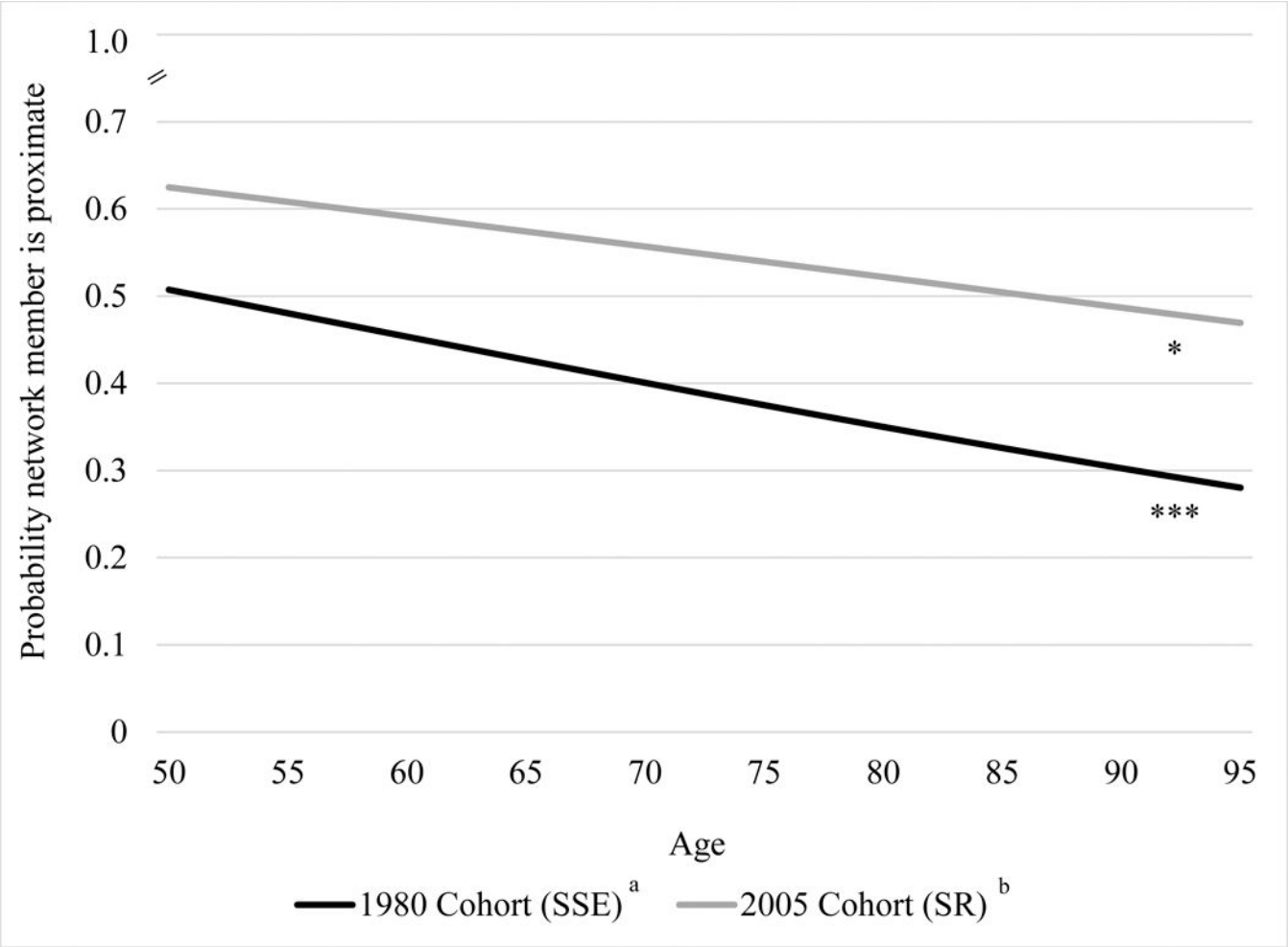

Figure 1.

Historical stability: Effect of respondent age on network geographic proximity across cohorts

***$p < .001$, *$p < .05$

[a] SSE: Social Supports of the Elderly

[b] SR: Social Relations Study

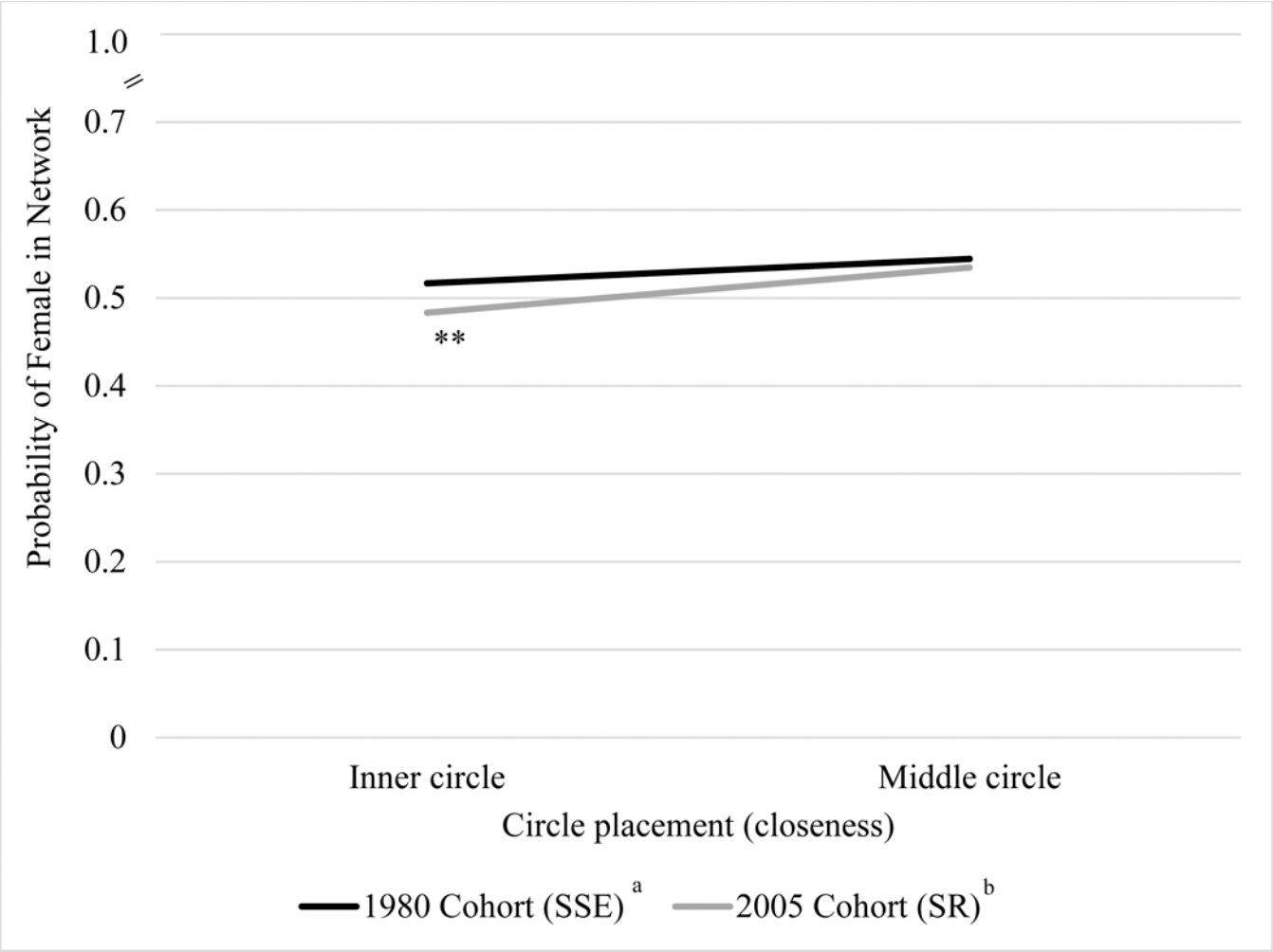

Figure 2.

Historical change: Effect of closeness on network gender composition across cohorts

**$p < .01$

[a] SSE: Social Supports of the Elderly

[b] SR: Social Relations Study

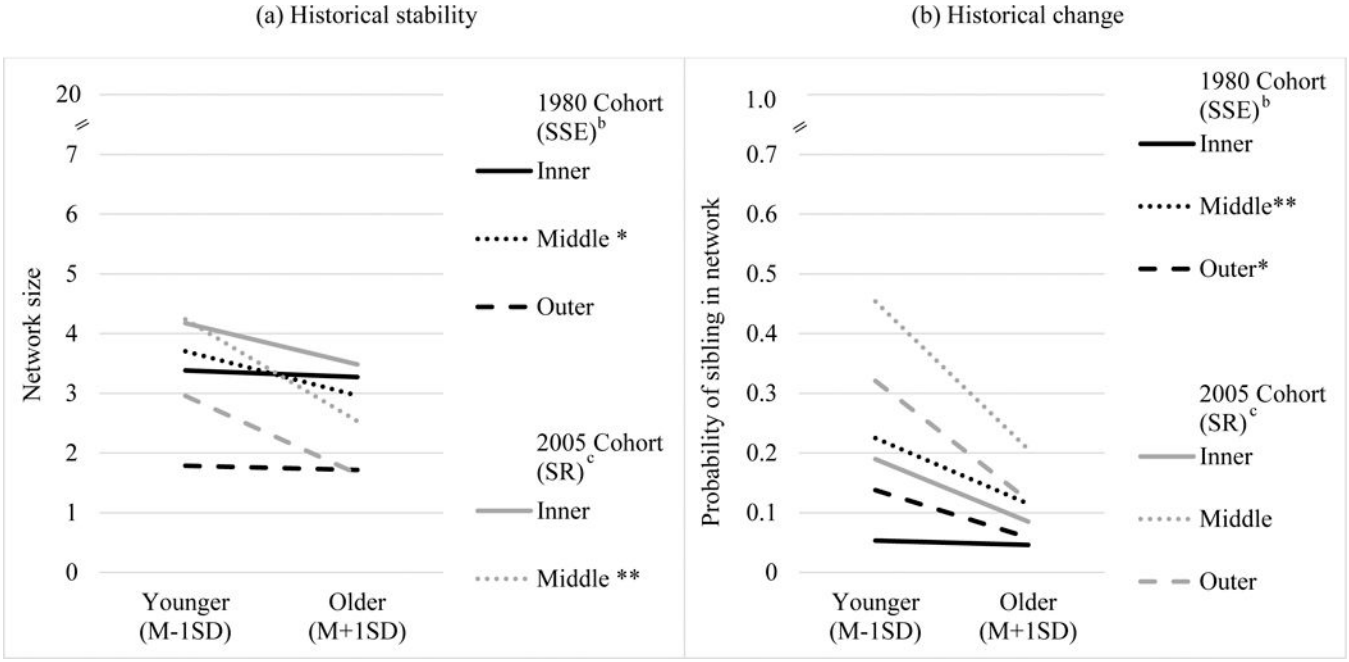

Figure 3.

Historical stability and change: Effect of respondent age on network structure and composition by closeness [a]

**$p < .01$, *$p < .05$

[a] Stars denote significant differences in the age by closeness interaction within a cohort. Inner circle by age is the reference group.

[b] SSE: Social Supports of the Elderly

[c] SR: Social Relations Study

Table 1:

Sample Characteristics

	Social Supports of the Elderly 1980 (N=718)			Social Relations 2005 (N=543)			Sample Differences (p<.01)	Levene Statistic (p<.01)
	Mean (SD)	Range	% (N)	Mean (SD)	Range	% (N)		
Age	66.1 (10.0)	50–95		67.0 (11.8)	50–100		F(1, 1,259)=2.23	28.32**
50–64			46.4 (333)			46.0 (250)		
65–74			31.6 (227)			24.9 (135)		
75+			22.0 (158)			29.1 (158)		
Gender (% Female)			58.5 (420)			60.4 (328)	F(1, 1,259)=0.47	1.90
Marital Status								
% Married			58.5 (420)			61.0 (331)	F(1, 1259)=0.78	3.18
% Widowed			29.4 (211)			18.6 (101)	F(1, 1259)=19.59**	84.88**
% Other			12.1 (87)			20.4 (111)	F(1, 1259)=16.37**	65.66**
Years of Education	10.5 (3.7)	0–17		13.3 (2.8)	1–17		F(1, 1,255)=212.15**	46.08**
Race/Ethnicity (% non-white)			10.8 (77)			22.6(122)	F(1, 1252)=32.59**	133.67**
Network Size	7.2 (2.7)	0–10		7.4 (2.7)	0–10		F(1, 1,259)=1.45	0.73
Network Member Age	49.7 (10.2)	22–83		51.8 (9.3)	26–85		F(1, 1,241)=14.04**	8.83**
Gender Composition	56.6 (21.3)	0–100		58.2 (19.5)	0–100		F(1, 1,252)=2.01	5.46
Years Known	37.9 (10.8)	6–83		38.3 (10.6)	4–85		F(1, 1,240)=0.29	1.03
Proximity	66.5 (28.5)	0–100		71.2 (25.9)	0–100		F(1, 1,252)=8.91**	9.40**
Contact Frequency	3.8 (0.8)	1–6		4.0 (0.6)	2–6		F(1, 1,241)=33.08**	31.73**
% Spouse/Partner	8.7 (10.5)	0–100		10.0 (13.6)	0–100		F(1, 1,252)=3.80	0.05
% Children	31.8 (24.8)	0–100		34.4 (25.4)	0–100		F(1, 1,252)=3.40	0.73
% Siblings	15.3 (20.3)	0–100		18.2 (20.4)	0–100		F(1, 1,252)=6.12	0.35
% Other Family	24.6 (23.9)	0–100		18.2 (21.0)	0–100		F(1, 1,252)=24.52**	17.10**
% Friends	18.1 (23.4)	0–100		19.2 (24.1)	0–100		F(1, 1,252)=0.69	0.78
Network Members Nominated	5,199			4,031				

** p<.01 or greater

Table 2:

Multi-level models: Age and closeness predicting network structure [a]

	Network Size		Network Member Age		Gender Composition		Years Known		Proximity		Contact Frequency	
	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005
	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)
Main Effects												
Age	−0.02	−0.05	0.38	0.31	0.00	−0.00	0.47	0.38	−0.02	−0.01	−0.01	−0.00
	(0.01)	(0.01)	(0.04)	(0.03)	(0.00)	(0.00)	(0.04)	(0.04)	(0.01)	(0.01)	(0.00)	(0.00)
p-value	.036	.000	.000	.000	.420	.501	.000	.000	.000	.028	.000	.220
Inner (0) v Middle (1) [b]	0.01 (0.14)	−0.44 (0.17)	3.94 (0.54)	6.53 (0.59)	0.11 (0.06)	0.21 (0.07)	−0.58 (0.51)	−1.52 (0.59)	−0.35 (0.08)	−0.54 (0.09)	−0.88 (0.04)	−0.89 (0.04)
p-value	.951	.007	.000	.000	.074	.004	.257	.010	.000	.000	.000	.000
Inner (0) v Outer (1) [b]	−1.58 (0.14)	−1.53 (0.17)	8.87 (0.76)	6.31 (0.81)	0.01 (0.09)	0.06 (0.10)	−3.71 (0.73)	−7.70 (0.82)	−0.19 (0.11)	−0.37 (0.13)	−0.96 (0.06)	−1.18 (0.05)
p-value	.000	.000	.000	.000	.882	.534	.000	.000	.103	.004	.000	.000
-2 Log Likelihood	10340.3	8223.8	43241.3	33986.7	6982.6	5416.8	42323.8	33954.5	5943.6	4499.8	16903.9	11674.0
Interaction Effects												
Inner (0) v Middle (1) x Age [b]	−0.03	−0.04	−0.50	−0.27	0.00	−0.01	−0.41	−0.34	−0.01	0.00	0.00	0.01
	(0.01)	(0.01)	(0.05)	(0.05)	(0.01)	(0.01)	(0.05)	(0.05)	(0.01)	(0.01)	(0.00)	(0.00)
p-value	.023	.002	.000	.000	.491	.088	.000	.000	.511	.677	.749	.001
Inner (0) v Outer (1) x Age [b]	0.00	−0.03	−0.38	−0.09	−0.01	−0.01	−0.38	−0.31	0.02	−0.00	0.01	0.00
	(0.01)	(0.01)	(0.08)	(0.07)	(0.01)	(0.01)	(0.07)	(0.07)	(0.01)	(0.01)	(0.01)	(0.00)
p-value	.886	.062	.000	.208	.486	.165	.000	.000	.092	.863	.053	.409
-2 Log Likelihood	10333.0	8214.2	43152.3	33958.0	6981.1	5413.0	42253.0	33904.2	5938.9	4499.5	16900.0	11663.7
Δ -2 Log Likelihood	7.3*	9.6**	89.0***	28.7***	1.5	3.8	70.8***	50.3***	4.7	0.3	3.9	10.3**

*p<.05

**p<.01

*** $p<.001$

[a] Models include controls for gender, marital status, education, and race/ethnicity

[b] Inner circle is reference

[c] Middle circle is reference

[d] Social Supports of the Elderly

[e] Social Relations

Table 3:

Multi-level models: Age and closeness predicting network composition [a]

	Spouse/Partner		Children		Siblings		Other Family		Friends	
	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005	SSE[d] 1980	SR[e] 2005
	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)
Main Effects										
Age	−0.01	−0.01	−0.01	0.02	−0.03	−0.05	0.03	0.02	−0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
p-value	.024	.010	.121	.000	.000	.000	.000	.024	.548	.940
Inner (0) v Middle (1) [b]	−3.78 (0.32)	−2.76 (0.24)	−2.04 (0.10)	−2.02 (0.10)	1.35 (0.11)	1.18 (0.11)	1.36 (0.09)	1.15 (0.11)	2.47 (0.15)	2.91 (0.17)
p-value	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Inner (0) v Outer (1) [b]	−4.44 (0.71)	−4.04 (0.71)	−4.00 (0.22)	−3.21 (0.19)	0.68 (0.15)	0.57 (0.15)	1.19 (0.13)	1.27 (0.15)	4.85 (0.22)	4.29 (0.21)
p-value	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
-2 Log Likelihood	2132.8	1893.6	5181.6	4050.4	3973.5	3480.8	5273.2	3503.6	3486.07	2729.9
Interaction Effects										
Inner (0) v Middle (1) x Age [b]	−0.04 (0.04)	−0.01 (0.02)	−0.00 (0.01)	0.03 (0.01)	−0.03 (0.01)	−0.01 (0.01)	0.00 (0.01)	−0.00 (0.01)	−0.01 (0.01)	0.02 (0.01)
p-value	.325	.594	.593	.003	.005	.270	.604	.785	.693	.126
Inner (0) v Outer (1) x Age [b]	−0.63 (0.47)	−0.04 (0.07)	0.06 (0.02)	−0.00 (0.02)	−0.04 (0.02)	−0.01 (0.01)	−0.01 (0.01)	0.02 (0.01)	−0.00 (0.02)	0.03 (0.02)
p-value	.179	.552	.008	.958	.021	.327	.508	.206	.850	.056
-2 Log Likelihood	2125.2	1893.0	5173.2	4040.9	3964.3	3479.2	5271.9	3501.2	3485.91	2726.0
Δ −2 Log Likelihood	7.5 *	0.6	8.4 *	9.5 **	9 2 **	1.6	1.3	2.4	0.16	3.9

* p<.05

** p<.01

*** p<.001

[a]All models except spouse/partner include controls for gender, marital status, education, and race/ethnicity. Spouse/partner models include controls for gender, education, and race/ethnicity only due to marital status being a perfect predictor of spouse/partner.

[b]Inner circle is reference

[c]Middle circle is reference

[d]Social Supports of the Elderly

[e]Social Relations Study

Psychol Aging. Author manuscript; available in PMC 2020 December 01.