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Age Differences in Reported Social Networks and Well-Being

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Social networks can consist of close friends, family members, and neighbors as well as peripheral others. Studies of social networks and associations with well-being have mostly focused on age-restricted samples of older adults or specific geographic areas, thus limiting their generalizability. We analyzed 2 online surveys conducted with RAND's American Life Panel, a national adult life span sample recruited through multiple probability-based approaches. In Survey 1, 496 participants assessed the sizes of their social networks, including the number of close friends, family members, neighbors, and peripheral others. Of those, 287 rated their social satisfaction and well-being on Survey 2. Older participants reported smaller social networks, largely because of reporting fewer peripheral others. Yet older age was associated with better well-being. Although the reported number of close friends was unrelated to age, it was the main driver of well-being across the life span—even after accounting for the number of family members, neighbors, and peripheral others. However, well-being was more strongly related to social satisfaction than to the reported number of close friends—suggesting that it is the perception of relationship quality rather than the perception of relationship quantity that is relevant to reporting better well-being. We discuss implications for social network interventions that aim to promote well-being.

Keywords: life span, social network size, friendship, social satisfaction, well-being

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Social networks can consist of different types of social contacts, including close friends, family members, and neighbors as well as peripheral others (Wrzus, Hänel, Wagner, & Neyer, 2013). The Convoy Model posits that older individuals will be followed by fewer fellow travelers on the road of life (Antonucci, Ajrouch, & Birditt, 2014). Whereas the core of close contacts may remain stable with age, the number of superficial contacts in the periphery of the convoy are expected to decrease as a result of personal and situational factors, including health and income (Antonucci et al., 2014). Socioemotional Selectivity Theory (Carstensen, 2006) has been incorporated into the Convoy Model (Antonucci et al., 2014) and posits that older adults may deliberately limit their social relationships to emotionally close social partners so as to benefit their well-being. Thus, this combined conceptual framework predicts that overall social network size will decrease with age without reducing emotionally close relationships that are relevant to well-being. Here we present secondary analyses of data collected with a national adult life span sample to examine age differences in reported social network size, including the number of close friends, as well as associations with social satisfaction and well-being across the life span—while accounting for age differences in health, income, and other demographic factors. We first review the existing literature on these topics.

Age Differences in Social Network Size

A 2012 review of 277 studies of social network size found that, across longitudinal and cross-sectional designs, reported social network sizes decreased with increasing adult age (Wrzus et al., 2013). Most of the reviewed studies were carried out among older adults (over age 60 years) or younger adults (under age 45 years) rather than among middle-aged adults (aged 45–60 years), with

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studies of younger adults having relatively small sample sizes (Wrzus et al., 2013). Initial studies that did recruit large national samples tended to focus on age-restricted samples of older adults aged 50^{+} years, and showed limited or no age differences in social network sizes (Antonucci & Akiyama, 1987; van Tilburg, 1998). The one national adult life span study on age differences in social network size that we did uncover is from 30 years ago (Morgan, 1988), which predates online social networking sites. It found that reported social network size was negatively associated with older adult age, independent of potential age differences in health, income, and demographic factors (Morgan, 1988). This general pattern supports predictions from the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory (Carstensen, 2006). However, the study could not provide insights about whether more emotionally close relationships were maintained with age because of lacking the relevant measures.

More recent studies about age differences in online rather than offline social networks did provide such insights (Chang, Choi, Bazarova, & Löckenhoff, 2015; Yu, Ellison, & Lampe, 2018). Older adult age was associated with reporting fewer Facebook friends (Chang et al., 2015), even when considering only an age-restricted sample of Facebook users aged 50 years and older (Yu et al., 2018). These findings held when accounting for health, income, and demographics (Chang et al., 2015; Yu et al., 2018), thus again suggesting that age differences in these factors may not account for older adults' smaller social networks. Perhaps more importantly, these studies were able to observe that older adult age was associated with reporting a greater proportion of actual friends among Facebook friends (Chang et al., 2015; Yu et al., 2018), with actual friends reflecting individuals with whom the user had a relatively stronger and offline connection (Ellison, Steinfield, & Lampe, 2007).

The Importance of Close Friends for Social Satisfaction and Well-Being

Generally, it has been found that well-being is at least as good or better for older adults relative to younger adults (Carstensen et al., 2011; Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Charles, Reynolds, & Gatz, 2001; Kessler & Staudinger, 2009). Thus, age-related declines in social network size do not appear to undermine well-being in later life.

The conceptual framework provided by the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory (Carstensen, 2006) posits that older adults have smaller but more emotionally meaningful social networks. Most evidence for these predictions comes from studies with age-restricted samples of older adults. For example, an early study of Berlin residents aged 70+ years found that feelings of social satisfaction (a component of overall life satisfaction; Pavot & Diener, 2008) showed stronger correlations to reporting a greater absolute number of emotionally close contacts than to overall social network size (Lang & Carstensen, 1994). Life satisfaction was also more strongly associated with the reported number of friendship ties than with the reported number of family relationships, in a study of the local community networks of Iowans aged 50–98 years (Goudy & Goudeau, 1982). Among U.S. residents aged 65 years and older, friendship-centered social networks were associated with better well-being than family-centered social networks (Litwin & Shiovitz-Ezra, 2011). Similar findings were reported for Israelis aged 60 years and older, such that individuals with neighbor-centered networks fell in between individuals with friendship-centered or family-centered networks in terms of their reported morale (Litwin, 2001).

Two studies did examine age differences in social network size and associations with well-being across the adult life span but used otherwise restricted samples. In the first study, participants were recruited only from communities in the San Francisco Bay area (Fung, Carstensen, & Lang, 2001). Social network size was found to be greatest in young adulthood, with older adults reporting lower absolute numbers of peripheral others—but the reported absolute number of close social partners was similar across age groups (Fung et al., 2001). Yet reporting a greater percentage of close social partners in the social network was related to lower levels of reported happiness in younger adults and unrelated to reported happiness in older adults (Fung et al., 2001). In a more recent follow-up study with the same sample, longitudinal analyses also found that older age was associated with smaller overall social network size and unrelated to the reported absolute number of social contacts in the inner circle (English & Carstensen, 2014). In an additional cross-sectional analysis, older age was associated with reporting less negative emotion and more positive emotion about social relationships as well as reporting greater well-being—but the number of close relationships played no role, and there were no age differences in the contribution of close relationships to well-being (English et al., 2014).

However, residents of San Francisco County and California are not necessarily representative of the U.S. population because of having much higher median household income ($96,000 and $67,000 respectively, vs. $57,000 in the United States) and much more population per square mile (17,179 and 239.1, respectively, vs. 87.4 in the United States; United States Census Bureau, 2019). In addition to better access to public transportation, these factors may contribute to why older San Franciscans are able to meet up with their friends more often than older adults in, for example, San Antonio, Texas (Carp, 1980, 1988).

The second study that examined age differences in social network size and well-being focused specifically on the online social networks of U.S. Facebook users (Chang et al., 2015). Those who were older (vs. younger) reported having a smaller absolute number of actual friends and overall friends on Facebook as well as a greater proportion of actual friends among their Facebook friends (Chang et al., 2015). Of these social network measures, only the proportion of actual friends among Facebook friends was correlated to better well-being (Chang et al., 2015). This relationship did not vary by age, suggesting that the proportion of actual friends among Facebook friends was important for well-being across the life span (Chang et al., 2015).

Although prior research recruited Facebook users through random digit dialing, one limitation is that Facebook users are not representative of the general population. In 2019, only 46% of adults aged 65+ years reported using Facebook, as compared with 79% of adults aged 18–29 years (Pew Research Center, 2019). Moreover, in two studies of older adults, conducted among Georgia residents aged 65+ years (Hutto et al., 2015) and U.S. residents aged 50+ years (Yu et al., 2018), relatively older users of online social networking sites were found to be especially different

from same-age nonusers in terms of reporting feelings of greater social connectedness.

Thus, we found no research with a national life span sample that examined both age differences in social network size and composition as well as its association with social satisfaction and well-being. Such data are needed to test predictions from the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory (Carstensen, 2006) about older adults having smaller social networks of more emotionally close contacts that benefit well-being.

The Importance of Social Satisfaction for Well-Being

Close relationships may promote well-being when they are a source of social satisfaction and social support, but they can also undermine well-being when they are emotionally draining and causing relational stress (Birditt et al., 2018; Hartup & Stevens, 1999). A meta-analysis of 286 studies with only older adult samples suggested that, for well-being in later life, the perceived quality of social interactions was more important than the reported social network sizes (Pinquart & Sörensen, 2000). Subsequent studies with older adult samples have shown similar patterns. For example, in a sample of Americans aged 57–85 years, the perceived quality of social contacts was more important than actual number of social contacts for promoting feelings of well-being (Cornwell & Waite, 2009). In a national adult life span sample of American adults aged 60 years and older, the association between reporting relatively frequent interactions with friends and less depressive symptomatology was reduced after considering the association between perceived quality of social contacts and less depressive symptomatology (Fiori, Antonucci, & Cortina, 2006). Among African Americans aged 55 years or older, perceived aspects of family and friend support networks such as reported closeness and negative interactions were more important than structural aspects of the social network (Nguyen, Chatters, Taylor, & Mouzon, 2016). In a sample of Los Angeles residents aged 60+ years, the number of close social contacts was less strongly associated with depressive symptoms and fatigue than was were their reports of feelings about their social contacts (Cho et al., 2018). In the one study that recruited a life span sample of San Francisco Bay Area residents, also referred to above, older age was associated with reporting more positive and less negative emotions about social networks, which, in turn, predicted well-being, whereas social network size did not (English et al., 2014). However, none of these studies included a nationally representative life span sample.

The Current Study

In a national adult life span sample, we examined the relationship between age and the size of social networks (including the number of close friends, family members, neighbors, and peripheral contacts from other social groups) as well as the importance of the number of close friends and social satisfaction for well-being across the life span. Our paper adds to the literature reviewed above, which, as noted, has tended to test predictions derived from the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory (Carstensen, 2006) in samples that were age restricted, geographically restricted, or focused on Facebook users only. The only study on age differences in social network size referred to above that did use a national life span sample of community-dwelling adults predates online social networking sites and could not test predictions about age differences in close relationships or associations with well-being or social satisfaction because of a lack of such measures (Morgan, 1988).

Here we therefore report secondary analyses of national surveys conducted with RAND's American Life Panel in 2011–2013, to test the following hypotheses:

1. (a) Reported social network size decreases with age, but (b) the reported number of close friends does not.
2. Older age is associated with greater (a) social satisfaction and (b) well-being.
3. Reporting more close friends is related to greater (a) social satisfaction and (b) well-being, especially in older age.
4. Well-being is associated with the reported number of close friends and social satisfaction, with the latter being a stronger predictor.

Method

Our secondary analysis used data from two online surveys that were independently launched by two separate research teams for different research purposes.[1] We analyzed age differences in social networks assessed in Survey 1 (Hypothesis 1) as well as their relationships to self-reports of social satisfaction and well-being from Survey 2 (Hypotheses 2–4). Table 1 clarifies which measures were collected in each survey.

Sample

Community-dwelling adults participated in online surveys through RAND's American Life Panel, which constitutes a national adult life span sample recruited through multiple probability-based approaches such as random digit dialing and address-based sampling (https://alpdata.rand.org/).[2] Interested individuals received equipment and Internet access, if needed. Subsets of panel members are invited to participate in regular online surveys for about $20 per 30 min.

Our Survey 1 sample included 496 participants who completed the social network questions in 2011–2013, of 581 invited panel

[1] Survey 1 was designed to examine the role of perceived social network vaccine coverage in vaccination decisions (Bruine de Bruin, Parker, Galesic, & Vardavas, 2019; Parker et al., 2013). Survey 2 was designed to track the effect of the financial crisis on finances and well-being (Hurd et al., 2015).

[2] Random digit dialing and address-based sampling methods tend to recruit community-dwelling adults and exclude individuals in nursing homes, dormitories, and prisons. The longitudinal nature of the panel does create the opportunity for a panel member to transition from independent living to other housing conditions. However, RAND's American Life Panel does not collect information about these housing conditions.

Table 1
Surveys and Relevant Measures

Measures	Survey 1 (N = 496)	Survey 2 (N = 287)
Social network size	X	
Number of close friends	X	
Number of family members	X	
Number of neighbors	X	
Number of peripheral others	X	
Social network satisfaction		X
Well-being		X

Note. Surveys 1 and 2 were completed between September 2011 and February 2013, with participants completing Survey 2 within 18 days after Survey 1. Age and demographic variables were reported by all participants in the 3 months before Survey 1.

members (85%).[3] They were on average 48.35 years old (SD = 15.41; MDN = 50, range = 19–85), and reported a median household income of $40,000–49,999. A total of 54% were women, 64% were married, 43% had a college degree, and 86% were White. By comparison, U.S. Census Bureau statistics (United States Census Bureau, 2012a, 2012b) estimated that the American adult population at that time had a median age of 45–49 years and a median household income of $35,000–49,999 while including 51% women, 53% married individuals, 30% holding a college degree, and 81% Whites.

Of the 581 Survey 1 invitees, 298 (51%) were separately invited to participate in the independently launched Survey 2, which included the social satisfaction and well-being questions. Of those 298 overlapping invitees, 287 (96%) ended up completing Survey 2, within 18 days after Survey 1 (M = 8.95, SD = 4.52; range = 0–18). Of the 496 participants who completed Survey 1, the 287 who overlapped with the Survey 2 sample did not significantly differ from the 209 who did not in terms of the social network characteristics they reported on Survey 1 ($p > .05$). There were also no significant differences between these groups in the percentage of women or means of self-rated health ($p > .05$). However, Survey 1 participants who also completed Survey 2 were significantly older (M = 51.40, SD = 14.92 vs. M = 44.16, SD = 15.11; $t[494] = -5.31$, $p < .001$), more likely to be married (66% vs. 58%; $\chi^2[1] = 3.97$, $p < .05$), more likely to have a college degree (51% vs. 32%; $\chi^2[1] = 19.04$, $p < .001$), more likely to be White (92% vs. 77%; $\chi^2[1] = 17.60$, $p < .001$), and less likely to report income below the Survey 1 median of $40,000–49,999 (45% vs. 55%, $\chi^2[1] = 4.46$, $p < .001$) than Survey 1 participants who did not complete Survey 2. These demographic variables were taken into account in the reported analyses.

Procedure

Questions about social networks were asked on Survey 1, and questions about social satisfaction and well-being were asked on Survey 2 (see Table 1). As noted, all data were collected between September 2011 and February 2013, with participants completing Survey 2 within 18 days after Survey 1 (M = 8.95, SD = 4.52; range = 0–18). Full surveys and data sets are available from the American Life Panel (surveys 216 and 219; https://alpdata.rand.org/). RAND's Human Subjects Protection Committee approved both surveys. Informed consent was obtained from all participants.

Social networks. Following the validated numerical estimation procedure for social network size (McCarty, Killworth, Bernard, Johnsen, & Shelley, 2001; Sudman, 1985), participants assessed the number of people from different social groups they had "regular contact with in the past 6 months" including "face-to-face, by phone or mail, or on the Internet." The social groups included close friends, family, and neighbors, which have been focal in previous research on social networks (Wrzus et al., 2013). The social groups additionally included coworkers, school or childhood relations, people who provide a service, and others, which, for the purpose of our analyses, were combined into one group representing "peripheral others." We also computed the overall social network size by taking the total number across all groups. Because these variables had high skewness and kurtosis, we applied log transformations, which did not affect our main conclusions.[4] We used these log-transformed variables in all statistical analyses, except for when graphically presenting age differences in social network size (see Figure 1).

Social satisfaction. Participants answered the question, "How satisfied are you with your social contacts and family life?" Responses were provided on a scale ranging from *1* (*very satisfied*) to *5* (*very dissatisfied*), which we reverse coded so that higher ratings reflected higher social satisfaction.

Well-being. Participants indicated how they felt over the past 30 days, in terms of being nervous, feeling calm and peaceful, having a lot of energy, feeling downhearted and blue, feeling worn out, feeling happy, and feeling tired (Ware & Sherbourne, 1992). Responses were provided on a scale ranging from *1* (*all the time*) to *5* (*none of the time*) and were scored so that higher ratings reflected better well-being. Cronbach's alpha was sufficient to warrant the computation of an average score of well-being (α = .89).

Age and demographic control variables. On a quarterly basis, members of the American Life Panel report on their age and other standard demographic variables, including their gender, marital status, educational attainment, ethnicity, and family income (Pollard & Baird, 2017). We also included self-rated health (1 = *very bad* to 5 = *very good*), which, like the other demographic

[3] Our sample of 496 Survey 1 participants excluded five invited panel members who had already completed Survey 2 on an earlier date and 80 who had missing responses to questions about their social networks or self-rated health. The 496 invited panel members who were included in our Survey 1 sample were similar to the 85 invited panel members who were not included in terms of the percent who were married, were women, and had a college degree ($p > .05$). However, those who participated were significantly older (M = 48.35, SD = 15.41 vs. M = 41.18, SD = 15.75; $t[579] = 4.06$, $p < .001$), more likely to be White (87% vs. 77%; $\chi^2[1] = 5.72$, $p = .02$), and less likely to have below-median income (49% vs. 62%; $\chi^2[1] = 4.79$, $p = .03$), as compared with those who did not participate.

[4] As in previous studies (e.g., Fung et al., 2001), high skewness and kurtosis were observed for social network size (skewness = 12.86; kurtosis = 181.61) as well as the reported number of close friends (skewness = 3.70; kurtosis = 19.03), family members (skewness = 5.67; kurtosis = 53.54), neighbors (skewness = 5.78; kurtosis = 48.57), and peripheral others (skewness = 12.93; kurtosis = 182.78). We applied log transformations after adding 1 to each observation to avoid having to log transform values of 0. After the log transformation, skewness and kurtosis were reduced for social network size (skewness = .79; kurtosis = 2.48) as well as number of close friends (skewness = .09; kurtosis = .15), family members (skewness = .10; kurtosis = .11), neighbors (skewness = .22; kurtosis = –.25), and peripheral others (skewness = .29; kurtosis = 1.06).

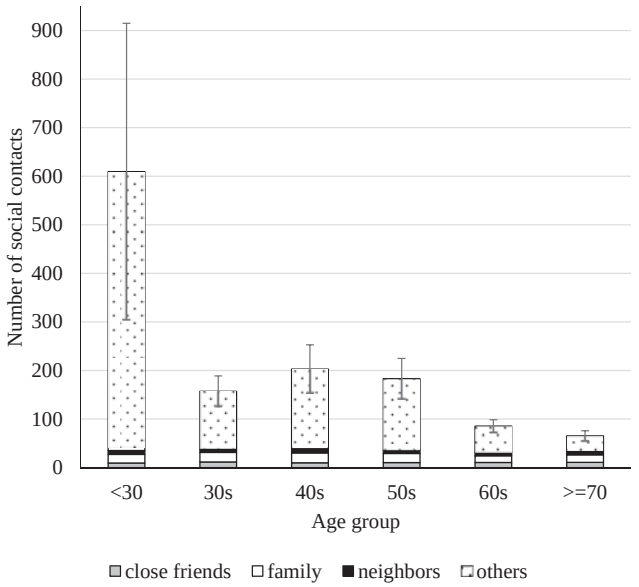


Figure 1. Mean reported social network size by age group. Age groups were computed for presentation purposes. $N = 496$ across age groups ($N = 77$ for <30, $N = 77$ for 30s; $N = 88$ for 40s; $N = 120$ for 50s; $N = 90$ for 60s; $N = 44$ for ≥ 70). All statistical analyses treated age as a continuous variable. Error bars reflect standard errors.

variables, was reported in the 3 months before Survey 1.[5] Self-rated health has been associated with actual health assessments and self-reported diagnoses of life-threatening diseases (Doiron, Fiebig, Johar, & Suziedelyte, 2014; Wennberg et al., 2013; Wu et al., 2013). These demographic control variables, including self-rated health, have been included in previous research on age differences in social networks (e.g., Chang et al., 2015; Lang et al., 1994; Morgan, 1988).

Results

Age Differences in Social Network Size, Number of Close Friends, and Other Social Contacts

To examine age differences in reported social network size (Hypothesis 1a), we computed linear regressions that predicted reported social network size from age (see Supplemental Table 1 for associated Pearson correlations). As in previous research, we took into account demographic variables for gender, marital status, educational attainment, ethnicity, and family income as well as self-rated health (e.g., Chang et al., 2015; Lang et al., 1994; Morgan, 1988). Age was treated as a continuous variable in all reported analyses, except for display purposes (see Figure 1). As expected, older age was associated with smaller social networks, despite taking into account other demographic variables (Model 1, Table 2). Visual inspection of Figure 1 suggests that the largest difference in average number of reported social contacts was seen between participants below age 30 years and participants who were older and appeared to be mainly driven by age differences in the reported number of peripheral others.

To examine age differences in the reported number of close friends (Hypothesis 1b), we computed a linear regression that predicted the reported number of close friends from age, both before and after taking into account the number of family members, neighbors, and peripheral others in the rest of the social network, while controlling for the same demographic variables. As expected, the reported number of close friends was unrelated to age, both before and after accounting for the sizes of the other groups in the rest of the social network (Model 2A vs. Model 3A, Table 2).

Linear regressions predicting the reported number of members in the other social groups revealed significant age-related declines in the reported number of family members and peripheral others in participants' social networks—despite an age-related increase in the reported number of neighbors (Model 2, B–D, Table 2). Each of these findings held after taking into account the sizes of other groups in the social network (Model 3, B–D, Table 2).

Age Differences in Social Satisfaction and Well-Being

To examine age differences in social satisfaction (Hypothesis 2a) and well-being (Hypothesis 2b), we computed linear regressions that predicted each variable from age (see Supplemental Table 1 for associated Pearson correlations). All models controlled for demographic characteristics. We found that older age was significantly associated with greater reported well-being (Model 2A, Table 3) but unrelated to reported social satisfaction (Model 1A, Table 3). Yet the measures of social satisfaction and well-being were highly correlated, $r = .48$, $p < .001$; Supplemental Table 1.

Association of Number of Close Friends With Social Satisfaction and Well-Being

To examine the association of the reported number of close friends with social satisfaction (Hypothesis 3a) and well-being (Hypothesis 3b), we computed linear regressions that predicted well-being from the reported number of close friends, before and after accounting for the reported number of family members, neighbors, and peripheral others (see Supplemental Table 1 for associated Pearson correlations). All models accounted for demographic characteristics. As expected, reporting more close friends was associated with greater social satisfaction and greater well-being, even when taking into account the reported number of family members, neighbors, and peripheral others as well as demographics (Model 1B and 2B, Table 3). The number of family members, neighbors, and peripheral others did not add to the prediction of social satisfaction or well-being, over and above the number of friends (Model 1B and 2B, Table 3). Adding the interaction term of age with number of close friends to Models 1, B–C, and 2, B–C in Table 3 suggested that the reported number of close friends was similarly relevant to social satisfaction and well-being across the adult life span.

[5] Self-rated health was reported on survey 195 of the American Life Panel (https://alpdata.rand.org/).

Table 2
Linear Regressions Predicting Reported Size of Social Network and Social Groups, Including Standardized β (and Unstandardized B, SE)

Predictor variable	Size of group in social network					Size of group in social network, controlling for other groups' sizes			
	1. Social network size	2A. Close friends	2B. Family members	2C. Neighbors	2D. Peripheral others	3A. Close friends	3B. Family members	3C. Neighbors	3D. Peripheral others
Age	−.14** (−.01, .00)	.02 (.00, .00)	−.09* (−.01, .00)	.14** (.01, .00)	−.15** (−.02, .01)	.00 (.00, .00)	−.09* (−.01, .00)	.19*** (.01, .00)	−.15*** (−.02, .00)

Note. $N = 496$. For each relationship, we report standardized β (and unstandardized *B*, *SE*). We used the log of social network size as well as the log of social group sizes. Models were controlled for demographic variables (see Supplemental Table 3). Controlling for the sizes of other groups did not create problems with multicollinearity across Models 3, A–D (variance inflation factor = ≤1.40; tolerance = ≥.72).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Relationship of Social Satisfaction With Well-Being

To examine whether reported well-being was more strongly associated with reported social satisfaction than with the reported number of close friends (Hypothesis 4), we added reported social satisfaction to the regression model that predicted well-being from the reported number of close friends, family members, neighbors, and peripheral others as well as demographic variables (Model 2D, Table 3). As expected, social satisfaction was a significant predictor of well-being (Model 2D, Table 3). Moreover, the reported number of close friends was no longer associated with well-being after taking into account social satisfaction (Model 2D, Table 3).

Discussion

In a national adult life span sample, we found support for four predictions from the conceptual framework provided by the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory (Carstensen, 2006), pertaining to age differences in social networks as well as associations with social satisfaction and well-being across the life span. First, we found that older adults had smaller social networks than younger adults but that the number of close friends was unrelated to adult age. Younger adults had especially large social networks consisting of mostly peripheral others, perhaps because online social networking sites have facilitated the maintenance of increasingly large and mostly impersonal social networks (Chang et al., 2015; Ellison et al., 2007; Manago, Taylor, & Greenfield, 2012; Valenzuela, Park, & Kee, 2009; Yu et al., 2018). Yet our findings from this national adult life span sample are consistent with previous observations in the offline social networks of San Francisco Bay area residents (English et al., 2014; Fung et al., 2001) and U.S. residents before the widespread use of the Internet (Morgan, 1988) as well as more recent observations in the online social networks of Facebook users (Chang et al., 2015; Yu et al., 2018). Additionally, older age in our national adult life span sample was associated with reporting social networks that included fewer family members and more neighbors. A review of studies with older adults suggested that friends and neighbors may be more important than family members in older adults' social networks for promoting well-being (Pinquart et al., 2000). In older West Berlin residents, close friends and neighbors were found to take over social and instrumental support functions to replace unavailable family members (Lang et al., 1994).

Second, older adults' smaller networks did not appear to undermine their social satisfaction or well-being. Although the two measures were highly correlated, reports of social satisfaction were unrelated to age, whereas reports of well-being increased with age. Other studies that have also suggested that life satisfaction and well-being tend to be preserved or improve with older age (Carstensen et al., 2000, 2011; Charles et al., 2001; Kessler et al., 2009).

Third, the reported number of close friends was associated with reported social satisfaction and reported well-being across the adult life span. The relationship between the number of close friends and well-being held, even after accounting for the number of family members, neighbors, and peripheral others—which were not additionally associated with well-being. The relationship of the reported number of close friends with greater social satisfaction and well-being did not vary with age, suggesting the importance of close friendships across the life span. This finding is consistent

Table 3
Linear Regressions Predicting Reported Social Satisfaction and Well-Being, Including Standardized β (and Unstandardized B, SE)

Predictor variable	Social satisfaction			Well-being			
	Model 1A	Model 1B	Model 1C	Model 2A	Model 2B	Model 2C	Model 2D
Number of close friends	—	.13* (.14, .06)	.12† (.12, .07)	—	.16** (.16, .05)	.12* (.12, .06)	.08 (.08, .06)
Number of family members	—	—	−.02 (.02, .07)	—	—	.03 (.03, .06)	.03 (.03, .06)
Number of neighbors	—	—	.00 (.00, .06)	—	—	.01 (.00, .05)	.00 (.00, .05)
Number of peripheral others	—	—	.06 (.03, .04)	—	—	.07 (.04, .03)	.05 (.03, .03)
Social satisfaction	—	—	—	—	—	—	.35*** (.36, .05)
Age	.05 (.00, .00)	.05 (.00, .00)	.05 (.00, .00)	.19*** (.01, .00)	.19*** (.01, .00)	.20*** (.01, .00)	.18*** (.01, .00)
Age × Number of Close Friends[a]	—	.40 (.01, .00)	.40 (.01, .00)	—	.07 (.00, .00)	.08 (.00, .00)	−.06 (.00, .00)

Note. $N = 287$. For each relationship, we report standardized β (and unstandardized *B, SE*). We used the log of the number of close friends and other social group members. Models controlled for demographic variables (see Supplemental Table 4). Controlling for the sizes of other groups did not create problems with multicollinearity in Models 1C and 2, C–D before adding the interaction between age and number of close friends (variance inflation factor = ≤1.51; tolerance = ≥.66).
[a] The interaction between age and number of close friends was added to each model in a separate analysis step.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

with observed patterns among Facebook users, who reported greater well-being if they perceived more actual friends in their online social networks (Chang et al., 2015). However, in the offline social networks of San Francisco Bay area residents (Fung et al., 2001), there was some evidence that reporting more close friendships was related to lower happiness among younger adults, in line with the idea that close relationships can also be emotionally taxing (Birditt et al., 2018; Hartup et al., 1999). Indeed, younger adults report more problems and negative interactions in their close social relationships as compared with older adults (Akiyama, Antonucci, Takahashi, & Langfahl, 2003; Birditt et al., 2018; Schlosnagle & Strough, 2017), which may partially explain why we found that younger adults reported lower well-being despite having similar numbers of close friends as older adults.

Our fourth main finding is that the reported number of close friends no longer predicted well-being after taking into account the significant relationship between social satisfaction and well-being. Thus, the quality of close friendships seems more important than their quantity for promoting well-being. Our analyses of a national adult life span sample confirmed patterns that had been observed in studies with age-restricted samples of older adults (Cornwell et al., 2009; Pinquart et al., 2000) and with a geographically restricted adult life span sample recruited from the San Francisco Bay area (Fung et al., 2001).

Our combined findings suggest support for a conceptual framework consisting of the Convoy Model (Antonucci et al., 2014) and Socioemotional Selectivity Theory, which predicts smaller social networks of emotionally close relationships in older age, with benefits to well-being. The Convoy Model posits that these age differences in social network size and composition may reflect age differences in personal and situational factors (Antonucci et al., 2014). However, all findings held despite taking into account potential age differences in self-reported health, income, and demographics. Possibly, age differences in other unmeasured factors may have played a role. Socioemotional Selectivity Theory suggests that older adults may make intentional choices about their social networks to optimize emotional experiences (English et al., 2014). Although our secondary analyses cannot provide direct insight into the deliberate nature of age-related changes in centering social networks more on emotionally gratifying close relationships, findings from the Berlin Aging Study have shown that the main reason for discontinuing relationships in older adulthood may be a lack of interest rather than lack of opportunity (Lang, 2000). Moreover, a survey of a national adult life span sample revealed that younger, not older, people reported wishing they had more friends (Lansford, Sherman, & Antonucci, 1998). Yet our findings also suggest that, as compared with younger adults, older adults count more neighbors among their social contacts, which was unrelated to their social satisfaction and well-being. Thus, not all of older adults' social contacts may be deliberately selected (or avoided) to promote better well-being.

One limitation of our research is its cross-sectional correlational nature, which precludes conclusions about causality or developmental changes with age. Additionally, we did not have access to participants' actual social networks. It is possible that younger adults exaggerated their reported social networks or that older adults underestimated theirs. However, our findings suggest that these perceptions of social networks are relevant to later reports of social satisfaction and well-being as provided on a separate survey. Another potential limitation is that, despite relatively good response rates, our national life span sample may have had limited representativeness because of selection effects. Although our demographic control variables were in line with those in the literature on age differences in social networks (e.g., Chang et al., 2015; Lang et al., 1994; Morgan, 1988), it is possible that unmeasured variables such as personality characteristics may have contributed to our findings.

Furthermore, the surveys we analyzed did not ask participants to distinguish between social contacts who were maintained online or face to face. There may have been age differences in the number of contacts maintained online or face to face, with younger adults maintaining especially large online social networks including many peripheral others (Chang et al., 2015; Ellison et al., 2007; Manago et al., 2012; Valenzuela et al., 2009; Yu et al., 2018). However, distinguishing between online and face-to-face contacts may not actually be possible because online communications are typically used to supplement face-to-face and telephone communications with existing social contacts (Bargh & McKenna, 2004; Wellman, Haase, Witte, & Hampton, 2001). Moreover, the importance of friendships for well-being has been reported in studies of

offline social networks and online social networks (e.g., Chang et al., 2015; Fung et al., 2001). Whereas the nature of friendships and time spent face to face may change over the life span, their social meaning and importance to well-being does not (Hartup et al., 1999).

Our findings suggest that interventions that aim to improve well-being may benefit from helping recipients to foster close social relationships. Such interventions may require different approaches among older adults, as compared with younger adults. Indeed, developing effective interventions requires a deeper understanding of those issues that audience members need and want to have addressed (Bruine de Bruin & Bostrom, 2013). For example, older adults may be most interested in interventions that help them to maintain their existing close friendships. As noted by Fung et al. (2001), older people may actively resist encouragements to increase their social networks through senior centers or visitation programs because meeting new people may no longer be as important to them. Rather, older adults may be better able to reduce feelings of loneliness when being provided with Internet and computer training (Choi, Kong, & Jung, 2012), perhaps because it helps them to stay in touch with those social contacts about which they care most (McAndrew & Jeong, 2012; Thayer & Ray, 2006).

Younger adults, on the other hand, may be most interested in growing their social networks but may benefit from learning how to do so while avoiding problems with their friendships and draining their emotional resources (Birditt et al., 2018; Hartup et al., 1999; Schlosnagle et al., 2017). Prosocial interventions may be able to help younger adults to grow their social networks in a positive manner: Preadolescents who were asked to engage in three acts of kindness (vs. to visit three places) increased their popularity among peers as well as their well-being (Layous, Nelson, Oberle, Schonert-Reichl, & Lyubomirsky, 2012).

Moreover, a review of interventions that targeted lonely adults of all ages suggested that providing cognitive-behavioral therapy that aimed to improve maladaptive social cognitions (or heightened negative attention to social threats, which exacerbate feelings of sadness and loneliness) may be more effective than social activity interventions (Masi, Chen, Hawkley, & Cacioppo, 2011). A review of interventions that promote the self-expression of gratitude has suggested a beneficial effect on feelings of social connectedness and well-being (Armenta, Fritz, & Lyubomirsky, 2017). Indeed, our findings suggest that, across the life span, satisfaction with social relationships may be more important than the quantity of close friends for promoting well-being.

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Correction to Huxhold (2019)

In the article "Gauging Effects of Historical Differences on Aging Trajectories: The Increasing Importance of Friendships," by Oliver Huxhold (*Psychology and Aging*, 2019, Vol. 34, No. 8, pp. 1170–1184, http://dx.doi.org/10.1037/pag0000390), an editorial production error resulted in the following incorrect sentence in the abstract: "The results indicated that older cohorts may be more engaged with friends than younger cohorts." The correct sentence is "The results indicated that later born cohorts may be more engaged with friends than earlier born cohorts." The online version of this article has been corrected.

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