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Selective Narrowing of Social Networks Across Adulthood is Associated With Improved Emotional Experience in Daily Life

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Abstract

Past research has documented age differences in the size and composition of social networks that suggest that networks grow smaller with age and include an increasingly greater proportion of well-known social partners. According to socioemotional selectivity theory, such changes in social network composition serve an antecedent emotion regulatory function that supports an age-related increase in the priority that people place on emotional well-being. The present study employed a longitudinal design with a sample that spanned the full adult age range to examine whether there is evidence of within-individual (developmental) change in social networks and whether the characteristics of relationships predict emotional experiences in daily life. Using growth curve analyses, social networks were found to increase in size in young adulthood and then decline steadily throughout later life. As postulated by socioemotional selectivity theory, reductions were observed primarily in the number of peripheral partners; the number of close partners was relatively stable over time. In addition, cross-sectional analyses revealed that older adults reported that social network members elicited less negative emotion and more positive emotion. The emotional tone of social networks, particularly when negative emotions were associated with network members, also predicted experienced emotion of participants. Overall, findings were robust after taking into account demographic variables and physical health. The implications of these findings are discussed in the context of socioemotional selectivity theory and related theoretical models.

Keywords

Social networks; affect; emotional experience; emotion regulation; aging; socioemotional selectivity theory

Aging is associated with reliable gains in emotional well-being (Scheibe & Carstensen, 2010) and social functioning (Luong, Charles, and Fingerman, 2011). Because most emotions occur in social contexts, social networks offer not only an important source of support at critical times (Kahn & Antonucci, 1980), they likely contribute to the positive and

negative emotional experiences individuals have in daily life (Ingersoll-Dayton, Morgan & Antonucci, 1997).

According to socioemotional selectivity theory (Carstensen, 2006), the selective pruning of social networks that occurs across adulthood operates in the service of emotion regulation; thus, selectivity in network composition can be considered a form of antecedent emotion regulation (Carstensen, Gross & Fung, 1997). In the present study, we examine in a longitudinal data set age-related changes in the size and composition of social networks and associated changes in emotional experience in daily life.

Emotion and Emotion Regulation Across Adulthood

There is growing evidence that, on balance, emotional experience grows more positive with age (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Carstensen, et al., 2011; Charles, Reynolds, & Gatz, 2001; Mroczek & Kolarz, 1998; Riediger, Schmiedek, Wagner, & Lindenberger, 2009), reflecting steady and relatively steep reductions in the frequency of negative emotional experience coupled with preserved or increased (Mroczek & Kolarz, 1998) levels of positive experience (see also Stone, et al., 2010). Evidence based on experience sampling suggests that older adults as compared to their younger counterparts also show fewer fluctuations in emotional states (Carstensen, et al., 2000, 2011; Rocke, Li, & Smith, 2009). Older adults report they can better control emotion, especially the inner experiences of emotion (Birditt & Fingerman, 2005; Gross et al., 1997; Kessler & Staudinger, 2009; Lawton, Kleban, Rajagopal, & Dean, 1992). Older adults also appear to employ response-focused regulatory strategies more efficiently (Emery & Hess, 2011; Scheibe & Blanchard-Fields, 2009) and to use more effective emotion regulation strategies in daily life (Blanchard-Fields, Stein, & Watson, 2004; John & Gross, 2004).

According to socioemotional selectivity theory (SST; Carstensen, 2006), older adults not only are better *able* to regulate their emotions but they are also more *motivated* to do so. SST maintains that the perception of time influences the selection and pursuit of goals, such that as individuals age and perceive time as increasingly limited they come to place greater priority on goals related to emotional meaning and satisfaction and lesser priority on seeking information and expanding horizons. A key postulate in SST is that people actively construct social environments that are emotionally satisfying (Carstensen et al., 1997). Emotions are often elicited during interactions with others so one highly effective way to regulate emotion is by selectively choosing to interact with partners who are expected to be emotionally satisfying and avoiding partners who are expected to not be emotionally satisfying (Gross, 1998). Antecedent-focused emotion regulation is widely viewed as the most efficient way to manage emotions because unwanted emotions are avoided altogether.

Age Differences in Social Networks

A recent meta-analysis (Wrzus, Hanel, Wagner, & Neyer, 2013) suggested that there is evidence of age differences in the size and composition of social networks consistent with SST (Carstensen, 1992) as well as the social convoy model (Kahn & Antonucci, 1980). Specifically, the overall size of social networks increases during adolescence and young adulthood then steadily declines later in life. Theoretically, emotional aspects of

relationships become more important with age because emotional goals are increasingly prioritized; relatedly, older adults spend time with close social partners because they provide emotionally meaningful interactions (Carstensen, Isaacowitz & Charles, 1999).

To explicitly test the idea that older adults proactively prune their social networks, Lang (2000) interviewed elderly participants in a large German study (Berlin Aging Study; BASE, Baltes & Mayer, 1999) on two occasions four years apart. On the first occasion, participants completed Kahn and Antonucci's (1980) measure of social networks. On the second occasion, participants were asked again to describe people in their social networks. Next, they were asked about network members who had been included on the first occasion but were no longer mentioned during the five year follow-up. Lang found that the primary reason relationships were discontinued was that participants were no longer interested in them. That is, they were actively eliminated. Thus, social networks do not appear to grow smaller over time as a default but rather by shaping networks to meet emotional needs. Consistent with these findings, Lang and colleagues recently observed that emotion plays an increasingly central role in determining which relationships individuals invest in later in life (Lang, Wagner, Wrzus, & Neyer, 2013).

However, to the best of our knowledge, no prior studies have examined longitudinal changes in networks across adulthood along with concomitant emotional experience. Presumably, close relationships better meet emotional goals but this hypothesis has not been tested. Moreover, most of the existing longitudinal studies focus either on adolescence and young adulthood or old age---that is, they do not span adulthood (Wrzus et al., 2013).

The Present Study

The present research aimed to address these gaps in the literature by modeling life course trajectories using data from a 10-year longitudinal study of adults originally aged 18 to 93 (Carstensen et al., 2011). Social networks were assessed on three occasions and experience sampling was used to assess emotional well-being at each of these assessment points. We hypothesized that, consistent with prior research, overall social network size would decline with age and that the decline would be driven primarily by reductions in the number of peripheral social partners as opposed to more intimate partners. In addition to this anticipated replication of previous findings, we expected that older adults' social networks would have a higher quality emotional tone. That is, older adults would report that they perceive relatively more positivity and less negativity associated with network members. Finally, we tested whether emotional tone and network size were associated with daily emotional experiences. We hypothesized that the emotional tone of networks would better predict emotional experience than network size. Specifically, we hypothesized that higher quality of emotional tone of social networks would correlate with positive emotional experience in day-to-day life.

Method

Participants

The initial sample consisted of 184 participants (54% female) ranging in age from 18 to 94 years ($M = 55$, $SD = 20.6$) who were recruited from a survey research firm in the San Francisco Bay area. Sixty-six percent of the participants were European American, 29% were African American, and 5% self-identified as multiple ethnicities. In terms of socioeconomic status (SES), 42% of participants were blue-collar workers and 58% were white-collar workers. Gender, ethnicity, and socioeconomic status were stratified across age.

Two additional waves of data collection occurred after this initial wave at 5-year intervals (i.e., the study employed a burst design in that emotions were sampled intensively for one week periods (“bursts”) at five year intervals (Nesselroade, 1991). Additional participants were recruited at each subsequent wave to replace those lost to attrition and those who had aged out of the youngest age group (for additional details about sample attrition, see Carstensen et al., 2011). Newly recruited participants were carefully matched on demographic characteristics of participants lost from previous waves so that the sociodemographic composition of the sample did not differ across the three waves of data collection. Sixty participants completed all three waves of data collection. Social network data were missing for one participant at wave 1, 1 participant at wave 2, and two participants at wave 3. Detailed demographic information for the participants with social network data at each wave is provided in Table 1. Overall, the sample was relatively healthy both cognitively and physically.

Procedure

After obtaining informed consent, participants were informed of the purpose of the larger study, asked to provide background information, complete cognitive tests and questionnaires that tapped personality, physical health and social networks. They were then provided an electronic pager, trained in its use and instructed to complete an emotion response sheet each time they were paged. Over the next week, participants were randomly paged 5 times a day within a 12-hour waking window. Completed emotion response sheets were returned by mail at the end of each day in order to monitor compliance. Participants were paid for their participation at the end of the week of experience sampling (for a more detailed description of the procedure, see Carstensen et al., 2011). The same procedures were followed five and ten years later.

Materials

Social network assessment

Participants' social networks were assessed with the Social Convoy Questionnaire (Kahn & Antonucci, 1980). Participants report the names of network members in three concentric circles grouped around a small circle with the word “Me” written in the center. In the inner circle, participants were asked to list “people you feel very close to, so close that it would be hard to imagine life without them”. In the middle circle, they were asked to list “people you don't feel quite so close to as those in circle one, but who are still very important to you”.

For the outer circle, they were asked to list “people you feel less close to, but who are still important to you”.

During the second wave of data collection, participants were asked to indicate how much positive emotion and negative emotion they associated with each of their network members, using 7-point scales that ranged from *none* to *extremely positive/negative*. The participants were told, “Keep in mind that the emotions are not necessarily directed at the person. For example, if someone you cared about was seriously ill, this person might be associated with high negative emotion, scoring a 6 or 7, although you would not be angry or upset with them”. Thus, these ratings were focused on the emotions elicited by the relationship, not necessarily the quality of the relationship itself.

Emotional experience—Each time participants were paged they rated the degree to which they were feeling each of 19 emotions on a 7-point scale that ranged from *not at all* to *extremely*. The list of emotions included 8 positive (happiness, joy, contentment, excitement, pride, accomplishment, interest, and amusement) and 11 negative emotions (anger, sadness, fear, disgust, guilt, embarrassment, shame, anxiety, irritation, frustration, and boredom).

Physical health—The Cornell Medical Index (CMI; Brodman, Erdmann, & Wolff, 1956), a 195-item index of physical and mental health problems, was used to assess overall health. This questionnaire includes a checklist of symptoms for various specific health subsystems (e.g., vision, allergies, cardiovascular, neurological). An index of general health was computed by summing the total number of symptoms that were endorsed across the 143 physical health items.

Results

Data Reduction and Preliminary Analyses

Size and emotional tone of the social network—We computed the size and emotional quality (positivity and negativity) of each of the three circles of the social network (with the inner circle representing the closest relationships and the outer circle representing the least close relationships), as well as for the total social network (i.e., across the three circles). The size of each of the three circles was computed by summing the number of individuals listed within each circle. Total network size was computed by summing the number of individuals listed across all three circles. Descriptive statistics, as well as information about the relationship types contained within the network, are provided in Table 2. The inner circle was primarily composed of kin relationships (biological family members and romantic partners), whereas the outer two circles were primarily composed of friends. Within the inner circle, older adults had a relative greater proportion of non-biological family members (e.g. step-children, in-laws) represented than did younger adults ($\gamma = .0008$, $p < .01$). Within the outer circle, older adults had a relatively lower proportion of kin ($\gamma = -.0017$, $p < .05$) and greater proportion of friends ($\gamma = .0018$, $p < .05$).

Positivity of the social network was computed by averaging the rating of positive emotion associated with each of the network members within in each circle and across all three circles. Similarly, negativity of the social network was computed by averaging the negative

emotion ratings within and across the three circles. There was a small, but significant negative correlation between positivity and negativity ratings of network members (inner circle: $r = -.20, p < .01$; middle circle: $r = -.22, p < .01$; outer circle: $r = -.19, p < .01$). Descriptive statistics are provided in Table 3.

Emotional well-being: Positive emotionality and negative emotionality—

Following the data reduction procedures used in Carstensen et al. (2000), we created emotional well-being indices for each person to summarize their emotion experience across the week. Specifically, we calculated the percentage of occasions across the week for which the participant indicated that they felt each of the 19 emotions (i.e., it was rated higher than a 1 on the 7-point intensity scale). Then we averaged across the emotions within each valence category to create two indices of emotional well-being, namely, negative emotionality ($\alpha = .96$) and positive emotionality ($\alpha = .93$).¹ We focused on the frequency with which emotions were experienced, rather than mean ratings of emotion, given past work suggesting that there are age differences in frequency but not intensity of emotional experience (Carstensen et al., 2000, 2011).²

Longitudinal Analysis of Age Differences in Social Network Size

To test whether the size of social networks change as individuals grow older, we conducted multilevel modeling using the linear MIXED MODELS function in SPSS. We used a two-level model, in which persons were nested within waves, using maximum likelihood (ML) estimation to account for missing data. Age effects were tested with linear and quadratic age terms. We also tested models that included time-varying control variables (physical health) as within personal predictors (Level 1), and time-invariant control variables (gender, ethnicity, and socio-economic status) as between person predictors (Level 2). Results are reported as unstandardized HLM coefficients in Table 4.

First, we fit a model with random intercept, linear age, and quadratic age components to social network size (total size across all three circles, as well as separately for each circle). For total network size, there were significant fixed effects of linear age ($\gamma = -.0758, p < .05$) and quadratic age ($\gamma = -.0038, p < .05$). As expected, social network size increased during young adulthood then steadily declined into old age. This trajectory is depicted in Figure 1. When examining each circle of the social network separately, there were significant effects for linear age (Middle: $\gamma = -.0446, p < .01$; Outer: $\gamma = -.0302, p < .05$) and quadratic age (Middle: $\gamma = -.0017, p < .05$; Outer: $\gamma = -.0012, p = .07$) for the size of the outer circles, but only a quadratic age effect for the inner circle (age $\gamma = -.0039, p = .70$; age² $\gamma = -.0013, p < .05$). As participants aged, there was a decline in the number of peripheral partners (which accelerated at advanced ages), but great stability in the number of close social partners into late life (see Figure 1).

¹Given the high intercorrelations among the same valence emotion terms, we focused on these positive and negative emotionality composites and do not report effects for discrete emotions.

²The effects remained virtually unchanged when average emotional experience was used instead of frequency of emotional experience. For instance, the negativity associated with social networks still significantly predicted daily negative emotion (and the positivity associated with networks did not predict daily emotion).

These age effects were largely robust when taking into account physical health and demographic control variables. There were also significant effects of sex, ethnicity, and physical health (but not SES). Specifically, social networks were larger for females, European Americans, and individuals in relatively good health.³

Cross-sectional Analysis of Age Differences in Emotional Tone of Social Network

Next, we examined whether there were age differences in the emotional tone of networks (i.e., the emotions participants associated with members of their networks). Ratings of positivity and negativity of network members were available only at the second assessment point so we conducted regression analysis, instead of multi-level modeling. Emotion ratings of network members were predicted from age (linear and quadratic) and network size. We also ran a model with ethnicity, sex, SES, and physical health entered as covariates.

There were linear effects of age for the ratings of positive tone ($\beta = .18, p < .05$; quadratic age, $\beta = .04, p = .54$) and negative tone ($\beta = -.26, p < .01$; quadratic age, $\beta = -.01, p = .87$) associated with members of the network overall. A similar pattern was found within each of the circles of the network. The only exception was that there was not a significant effect of age for ratings of positivity of network members in the inner circle (linear age, $\beta = .02, p = .83$). There were linear age effects for positive tone associated with members of the middle circle ($\beta = -.19, p < .05$) and outer circle ($\beta = -.16, p < .05$), as well as the negative emotion associated with members of each circle (inner: $\beta = -.19, p < .05$; middle: $\beta = -.30, p < .001$; outer circle: $\beta = -.22, p < .01$). Compared to younger adults, older adults reported that their network members elicited less negative tone and more positive tone (although this later finding was more robust for peripheral relationship partners). Age differences are depicted in Figure 2.

The effects of age on emotion associated with network members held when covariates were included in the model. Results are shown in Table 5. There was also a significant effect of physical health on the negativity (but not positivity) of network members. Individuals who reported more symptoms described their network members in more negative terms.

Cross-sectional Analysis of the Link Between Social Networks and Emotional Well-being

Finally, we examined the effects of two aspects of social networks (size and emotional quality) on daily emotional well-being. The number of network members and emotional tone (i.e., positivity or negativity) of networks were entered simultaneously as predictors of frequency of positive emotional experience and negative emotional experience. Age (centered and squared), the demographic covariates (gender, ethnicity, and SES), and physical health were also entered into the regression model. Results are reported in Table 6.

The emotional tone of social networks predicted emotional well-being. Specifically, there were significant effects of the negativity associated with social networks on daily negative

³As expected, age was significantly associated with verbal fluency ($r = -.31, p < .001$). The linear effect of age on overall network size was no longer significant when verbal fluency was also included in the model with the other covariates; however, there was still a significant quadratic effect of age ($\gamma = -.0033, p < .05$). The age effects for the emotional impact of network members remained virtually unchanged when taking into account verbal fluency (only the effects of age on positive emotion associated with total network and middle circle members dropped to marginal levels of significance; total: $\beta = .14, p = .08$; middle: $\beta = .14, p = .073$).

emotionality (except for the middle circle). In contrast, the size of social networks did not significantly predict daily emotional experience. Age was the only significant predictor of daily positive emotionality; physical health was also associated with daily negative emotionality.

Discussion

Modeling social networks across the full adult life-span, we found evidence that social networks grow smaller across adulthood, and these changes are associated primarily with the reduction in the number of peripheral partners rather than close partners. In cross-sectional comparisons, older adults described their network members more positively and less negatively than younger adults (i.e., there was an age difference in the emotional tone of social networks). In addition, we found that individuals whose networks were associated with more negative tone had more negative emotional experiences in daily life (an effect that was robust even when controlling for age). Overall, the pattern of results is consistent with the contention that people strategically shape their social environments as they grow older, such that they interact with close partners (e.g., family and good friends) who are more emotionally satisfying and spend less time interacting with peripheral partners who are less emotionally satisfying.

Arguably, among the best ways individuals can regulate their emotions is through strategic efforts to surround themselves with emotional meaningful and satisfying social partners. Aging is associated with a greater likelihood of having satisfying networks. We maintain that this apparent pruning process operates as antecedent emotion regulation. The idea that network pruning contributes to emotional experience is also consistent with findings from Carstensen et al., (2011) in that antecedent strategies would affect frequency more than intensity of experienced emotion. Indeed, older people experience negative emotions less frequently than younger people, although when they do experience negative emotions they are just as intense as younger peoples' emotions.

Findings from the present study cohere with past work that has found age-related declines in the size of social networks, particularly among less close social partners (Wrzus et al., 2013). As shown in past research, although family and friends comprise the mix of social network members in early adulthood, the stable core that persists throughout adulthood is more heavily weighted with close relationships (Neyer & Lang, 2013). Notably, the vast majority of past research has relied on cross-sectional designs and the few longitudinal studies of social networks that do exist have focused on either young adults or older adults. Thus, the current work advances our understanding of age-related changes in relationships by providing longitudinal evidence of age differences in social networks in a sample that spans adulthood. Our findings suggest that the size of social networks increases until middle age, then grows gradually smaller throughout late middle and old age as peripheral partners are excluded from the network.

Another novel aspect of the present study is that findings showed there was a better emotional tone associated with the social networks of older adults, with network members eliciting less negative emotion and more positive emotion. Notably, the emotional tone of

social networks predicted the daily emotional experience of participants, but social network size did not. Specifically, our results suggest that having a social network that elicits negative emotion detracts from overall emotional well-being yet, notably, surrounding oneself with network members who elicit positive emotions does not influence overall emotional well-being. This pattern is consistent with a classic article by Karen Rook (1984) where she found that negative social support was deleterious for well-being, but positive support was unrelated. Together, these findings may suggest that stress, conflict, or other negative aspects of relationships may be more influential to well-being than positive features of relationships. As our measure of the emotional tone of network members was available at only one wave of data collection, longitudinal study is needed still to determine whether the tone elicited by network members indeed becomes generally more positive (and less negative) as people age. Given the cross-sectional nature of this variable, it is unclear whether the same partners become more emotionally satisfying or whether social networks become more emotionally satisfying because of active pruning, that is, removing peripheral partners with whom interactions are less emotionally meaningful.

A prominent development theory, selective optimization with compensation (SOC; Baltes & Baltes, 1990), suggests that as people grow older they selectively invest in goals and draw on their accumulated expertise to optimize performance in certain domains and compensate for limitations associated with aging. Baltes and Carstensen (1996) proposed that SST offers a theoretical illustration of the SOC model. That is, selection of social partners helps to optimize socioemotional functioning.

It is worth noting that there were still age differences in daily positive emotional experience even after taking into account the size and emotional quality of social networks. These findings suggest that age-related changes in social networks do not fully explain emotional improvements across adulthood. Past research suggests that older adults may be more skillful at regulating emotions through a variety of different means, such as adopting a more positive perspective (Shiota & Levenson, 2009) and strategically shifting their attention to positive features in the environment (Mather & Carstensen, 2005; Carstensen & Mikels, 2005). More research is needed to directly tie regulation processes to emotional experience.

In sum, the present research provides further evidence of developmental shifts in social networks across adulthood. The emotions aroused by network members likely play an important role in maintaining well-being across adulthood. However, as individuals age and emotion-related goals become more salient, they seem to invest more in maintaining closer, more satisfying relationships.

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Figure 1.
Age differences in social network size, overall and broken down by circle.

Figure 2.
Age differences in emotion elicited by members of the social network, overall and broken down by circle.

Table 1**Background Characteristics for the Sample**

Characteristic	Wave 1 (n = 183)	Wave 2 (n = 190)	Wave 3 (n = 176)
Mean age (SD)	54.65 (20.55)	55.31 (22.07)	56.74 (21.33)
Mean years of education (SD)	14.85 (2.64)	15.18 (2.63)	15.29 (2.27)
Sex	54% women, 46% men	52% women, 48% men	52% women, 48% men
Ethnicity	29% African American, 66% European American	29% African American, 66% European American	28% African American, 67% European American
Socioeconomic status	42% blue-collar; 58% white-collar	37% blue-collar, 63% white-collar	39% blue-collar, 61% white-collar
Marital status	46% married, 24% single, 19% widowed, 12% divorced or separated	46% married, 29% single, 17% widowed, 9% divorced or separated	49% married, 25% single, 16% widowed, 10% divorced or separated
Mean number of children (SD)	1.61 (1.61)	1.56 (1.49)	1.61 (1.37)
Mean verbal fluency (SD)	23.95 (9.35)	25.29 (9.00)	26.14 (8.83)
Mean physical health symptoms (SD)	15.79 (10.92)	17.63 (11.37)	15.73 (11.66)
Positive emotionality	.80 (.21)	.75 (.22)	.82 (.19)
Negative emotionality	.26 (.24)	.28 (.23)	.27 (.21)

Note. Verbal fluency was assessed by asking participants to name as many different types of animals as possible within 90 seconds. This is a widely used measure that has been shown to be strongly associated with general intellectual ability (Lindenberger, Mayr, & Kliegl, 1993). Physical health symptoms were assessed with the Cornell Medical Index.

Table 2

Descriptive Statistics for Social Network Size and Relationship Types

	Wave 1 (n = 183)	Wave 2 (n = 190)	Wave 3 (n = 176)
	Mean (SD)	Mean (SD)	Mean (SD)
Inner Circle			
Size	6.21 (4.01)	6.76 (4.65)	7.75 (5.03)
Kin	0.74 (0.28)	0.74 (0.29)	0.73 (0.27)
Non-biological family	0.05 (0.11)	0.05 (0.10)	0.08 (0.13)
Friends	0.20 (0.27)	0.19 (0.27)	0.18 (0.25)
Other non-kin	0.01 (0.06)	0.02 (0.07)	0.01 (0.06)
Middle Circle			
Size	7.54 (5.88)	7.96 (6.87)	8.87 (6.20)
Kin	0.37 (0.33)	0.33 (0.32)	0.32 (0.30)
Non-biological family	0.11 (0.18)	0.10 (0.18)	0.11 (0.17)
Friends	0.47 (0.36)	0.49 (0.36)	0.52 (0.34)
Other non-kin	0.05 (0.15)	0.07 (0.19)	0.05 (0.13)
Outer Circle			
Size	7.35 (5.78)	7.59 (6.31)	7.06 (5.23)
Kin	0.21 (0.31)	0.21 (0.30)	0.24 (0.30)
Non-biological family	0.06 (0.14)	0.08 (0.17)	0.07 (0.15)
Friends	0.65 (0.36)	0.55 (0.38)	0.57 (0.38)
Other non-kin	0.08 (0.20)	0.14 (0.27)	0.11 (0.24)
Total Network			
Size	20.66 (12.62)	21.95 (14.98)	22.98 (12.87)
Kin	0.46 (0.22)	0.43 (0.21)	0.44 (0.20)
Non-biological family	0.08 (0.10)	0.08 (0.10)	0.09 (0.11)
Friends	0.42 (0.24)	0.41 (0.25)	0.42 (0.23)
Other non-kin	0.04 (0.10)	0.08 (0.13)	0.05 (0.10)

Note. Relationship type indicates the proportion of network members within a circle (or across the total network) that fall within each category. Kin includes biological family members (e.g., parents, children, siblings) and spouse or romantic partner. Non-biological family includes step-children and in-laws. Friends includes friendships with non-family members. Other non-kin includes any relationships that do not fall within the other three categories (e.g., co-workers).

Table 3

Descriptive Statistics for Emotional Tone of Social Network

	Associated Positive Emotion	Associated Negative Emotion
	Mean (SD)	Mean (SD)
Total network	5.89 (.74)	2.45 (1.08)
Inner circle	6.35 (.69)	2.42 (1.29)
Middle circle	5.84 (.91)	2.42 (1.21)
Outer circle	5.46 (1.13)	2.49 (1.19)

Table 4

Longitudinal Results of Multilevel Growth Curve Analyses Testing the Effect of Age on Social Network Size

Fixed effects estimates	Size of Total Network	Size of Inner Circle	Size of Middle Circle	Size of Outer Circle
Intercept	23.9619 (.5136) ***	6.6121 (.5420) ***	9.1296 (.7121) ***	8.3820 (.6366) ***
Age	-.0768 (.0303) *	-.0058 (.0109)	-.0454 (.0143) **	-.0280 (.0128) *
Age ²	-.0037 (.0015) *	-.0013 (.0005) *	-.0017 (.0007) *	-.0009 (.0006)
Sex	5.7907 (1.3363) ***	2.1183 (.4767) ***	2.1706 (.6246) ***	1.6066 (.5588) **
Ethnicity	-3.5932 (1.4264) *	-.0603 (.5095)	-1.5012 (.6691) *	-2.0628 (.5981) ***
SES	-1.4131 (1.2887)	-.0914 (.4648)	-.7794 (.6174)	-.7356 (.5497)
Physical Health	-.1261 (.0590) *	-.0152 (.0213)	-.0482 (.0283) ⁺	-.0596 (.0252) *

Note. Unstandardized estimates are presented with standard errors in parentheses. Intercept is centered at age 56 years; Ethnicity, sex, and SES are categorical variables coded 0 for European American, male, and white-collar, and 1 for ethnic minority, female, and blue-collar; physical health uncentered (0 indicates that no symptoms were endorsed).

⁺ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5
Cross-Sectional Results of Regression Analyses Testing the Effect of Age on Emotional Tone of Social Network

	Total network		Inner circle		Middle circle		Outer circle	
	<i>Associated Positive Emotion</i>	<i>Associated Negative Emotion</i>	<i>Associated Positive Emotion</i>	<i>Associated Negative Emotion</i>	<i>Associated Positive Emotion</i>	<i>Associated Negative Emotion</i>	<i>Associated Positive Emotion</i>	<i>Associated Negative Emotion</i>
Age	.18*	-.28**	.02	-.22**	.18*	-.30**	.15 ⁺	-.27**
Age ²	.02	.004	-.05	.01	.08	.02	-.02	-.004
Network Size	.12	-.08	-.28*	-.08	.20**	-.10	.10	.06
Sex	.12	.07	.14 ⁺	.05	.11	.05	.11	.01
Ethnicity	.07	.05	.07	.02	.09	.04	.03	.01
SES	.13	-.08	.02	-.08	.15*	-.07	.18*	.02
Physical Health	-.07	.17*	-.04	.21*	-.02	.08	-.10	.22**

Note. Standardized beta coefficients are presented. Ethnicity, sex, and SES are categorical variables coded 0 for European American, male, and white-collar, and 1 for ethnic minority, female, and blue-collar.

*** $p < .001$.

⁺ $p < .10$.

* $p < .05$.

** $p < .01$.

Cross-Sectional Results of Regression Analyses Testing the Effect of Emotional Tone of Social Network on Daily Emotional Experience

Table 6

	Total network		Inner circle		Middle circle		Outer circle	
	Daily positive emotion	Daily negative emotion	Daily positive emotion	Daily negative emotion	Daily positive emotion	Daily negative emotion	Daily positive emotion	Daily negative emotion
Network positivity	−0.03	0.04	0.03	0.12	0.01	−0.02	−0.08	−0.02
Network negativity	0.06	0.16*	0.09	0.24**	−0.05	0.03	0.10	0.17*
Age	0.26**	−0.11	0.24**	−0.08	0.21**	−0.14	0.28**	−0.05
Age ²	−0.13	−0.01	0.12	−0.01	−0.12	0.01	−0.12	−0.01
Network Size	0.15	−0.03	−0.14	−0.10	0.09	−0.01	0.08	−0.01
Sex	−0.11	−0.10	−0.11	−0.08	−0.09	−0.08	−0.08	−0.05
Ethnicity	0.09	0.02	0.07	0.03	0.09	0.04	0.07	0.07
SES	−0.02	−0.04	−0.04	−0.03	−0.03	−0.03	−0.01	−0.04
Physical Health	−0.13	0.16*	−0.14	0.13	−0.13	0.19*	−0.15	0.12

Note. Standardized beta coefficients are presented. Ethnicity, sex, and SES are categorical variables coded 0 for European American, male, and white-collar, and 1 for ethnic minority, female, and blue-collar.

*** $p < .001$.

* $p < .05$.

** $p < .01$.