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Loneliness and social isolation among young and late middle-age adults: Associations of personal networks and social participation

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Abstract

Objective—Associations between social networks and loneliness or social isolation are well established among older adults. Yet, limited research examines personal networks and participation on perceived loneliness and social isolation as distinct experiences among younger adults. Accordingly, we explore relationships among objective and subjective measures of personal networks with loneliness and isolation, comparing a younger and older cohort.

Methods—The UC Berkeley Social Network Study offers unique cohort data on young (21–30 years old, $n=472$) and late middle-age adults' (50–70 years old, $n=637$) personal network characteristics, social participation, network satisfaction, relationship status, and days lonely and isolated via online survey or in-person interview. Negative binomial regression models were used to examine associations between social network characteristics, loneliness, and isolation by age group.

Results—Young adults reported twice as many days lonely and isolated than late middle-age adults, despite, paradoxically, having larger networks. For young adults, informal social participation and weekly religious attendance were associated with fewer days isolated. Among late middle-age adults, number of close kin and relationship status were associated with loneliness. Network satisfaction was associated with fewer days lonely or isolated among both age groups.

Conclusion—Distinct network characteristics were associated with either loneliness or isolation for each cohort, suggesting network factors are independently associated with each outcome, and may fluctuate over time. Network satisfaction was associated with either loneliness or isolation among both cohorts, suggesting perceptions of social networks may be equally important as objective measures, and remain salient for loneliness and isolation throughout the life course.

Keywords

Personal networks; loneliness; social isolation; life course

Feelings of loneliness and social isolation are the evaluations of one's personal network – the availability of friends and family for social and instrumental support. These perceptions

are important predictors of mental health and well-being (Cacioppo & Hawkley, 2003), where loneliness and isolation may have negative influences on both physical and mental health due to prolonged stress, anxiety, and lack of perceived support (Cacioppo & Hawkley, 2003; Cornwell & Waite, 2009). Conversely, those who are more socially integrated have better health outcomes (Berkman & Glass, 2000; Umberson, 1987).

Researchers typically consider 'loneliness' to be defined as 'perceived social isolation' (Margetta, 2016), whereas 'social isolation' is the lack of people in one's life for social interaction. The genesis of this distinction emerges from the concern of that asking about loneliness explicitly in survey research would trigger social desirability responses due to the stigma inherent in the word loneliness. For this reason, the foundational surveys did not include any direct measurement of feelings of loneliness, including the Revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980), the DeJong Gierveld loneliness scale (De Jong Gierveld & van Tilburg, 1999), or the three-item loneliness scale (Cornwell & Waite, 2009), and instead ask about social isolation. While social isolation itself, like loneliness, has a subjective perception, it is also an objective reality, as measured by the quality and/or quantity of social interactions and social support. Pinquart and Sorensen (2001) observed that emotional aspects of social contacts are distinct from the feelings of loneliness measured by the indirect scales. Therefore, it may be a cognitive leap to assume that respondents answering questions about isolation really mean their loneliness (Gawronski, LeBel, & Peters, 2007). Moreover, there is evidence that they don't: Shiovitz-Ezra & Ayalon (2012) examined direct measures of loneliness and found they provide different results than social isolation scales, while Russell et al. (1980) observed that the UCLA loneliness scale "might be a function of mood and personality variables" (p.477) rather than the respondents' evaluation of their social circumstance.

The initial objection to including the word loneliness may no longer be relevant. The initial UCLA scale was developed in the 1970s during the golden era of telephone survey research and when face-to-face interviewing was still economically viable, so that social desirability was an effect to be addressed in survey design. Now, with CASI (computer-assisted self-interviewing) technologies on the web or laptop, experimental design research has found that items with stigmatizing content can be asked without sacrificing accuracy (Kreuter, Presser, & Tourangeau, 2008). Single items of loneliness have been critiqued (Hughes, Waite, Hawkley, & Cacioppo, 2004; Perissinotto, Cenzer, & Covinsky, 2012), but it is appropriate to revisit the distinction between even subjective feelings of social isolation and loneliness. In addition, because survey length in the internet age of survey research is a salient factor in obtaining high quality data, single measures of loneliness and social isolation are reliable for establishing prevalence of loneliness within a population, and are valued in research and clinical settings for their ease of administration (Luanaigh & Lawlor, 2008).

Understanding the distinction between loneliness and social isolation is important because evidence suggests these conditions are uniquely related to health (Victor, Scambler, Bond, & Bowling, 2000). While loneliness affects health via psychosomatic pathways, including a lack of self-esteem and mastery, depression and hopelessness, or perceived social support (Cacioppo & Hawkley, 2003; Lin, Ensel, Simeone, & Kuo, 1979), social isolation may

influence health via lack of support for or control of health promoting behaviors (Umberson, 1987). Emerging evidence suggests that social isolation is itself a direct stressor, causing elevated stress-response systems in the brain (Cacioppo & Hawkey, 2003).

In addition to their distinct health pathways, theoretical arguments exist for justifying the separate examination of loneliness and social isolation. Some research suggests that loneliness is at least in part an innate psychological disposition (De Jong Gierveld, Van Tilburg, & Dykstra, 2016; Mund & Neyer, 2016), rather than being solely the result of an evaluation of one's situation. Regardless, the conclusions reached in a large body of research find loneliness to be the *subjective* evaluation of the network, and specifically, the feeling of not having people with whom to connect, whereas isolation is the *objective* experience of having insufficient networks, whether measured by network size, diversity, or frequency of contact (De Jong Gierveld & Havens, 2004). Indeed, previous studies find a weak to moderate correlation between loneliness and isolation (Shankar, McMunn, Banks, & Steptoe, 2011), and suggest the relationship between the two may weaken based on changes to social networks over time (Cornwell & Waite, 2009). How these conditions are associated with social network characteristics, then, may be distinct over the life course. For example, an older adult with few, but strong family ties may be content with the type and level of support their network provides despite living alone. Just as likely, a young adult with hundreds of acquaintances and who is involved in multiple social organizations may report feeling lonely due to a lack of people with whom they can confide in. Thus, it is unclear whether social network characteristics and participation are associated with these outcomes independently.

The majority of studies on loneliness and social isolation examine adult populations ages 60 and above, despite evidence to suggest that only 5–15% of older adults report loneliness (Pinquart & Sorensen, 2001), while roughly 10–40% experience isolation (Nicholson, 2012). Previous studies suggest important life transitions may undermine the ability of older adults to maintain their social networks, including declining engagement in social participation, resulting in isolation and loneliness (Cornwell & Waite, 2009). Feelings of loneliness, however, fluctuate throughout adulthood. Indeed, some data highlight a U- or J-shaped loneliness curve across the lifespan, such that younger and older adults experience more loneliness than do mid-to-late age adults (Nicolaisen & Thorsen, 2014; Pinquart & Sorensen, 2001), while other data suggest that loneliness is positively and linearly associated with age starting from 45 years (Wilson & Moulton, 2010). We are unaware of research on whether social isolation fluctuates in a similar manner across the life course.

Much like older adults, young and late middle-age adults also experience important life transitions (i.e., college, marriage/divorce, retirement) that may affect social relationships (Wrzus, Hänel, Wagner, & Neyer, 2013), and subsequently, experiences of loneliness and isolation. Yet, despite data to suggest young adults experience relatively high rates of loneliness, and that both young and late middle-age adults experience important life transitions that may affect their social networks, little research has examined whether social networks and social participation are associated with loneliness and isolation among adults during these critical phases. As such, this study provides an unusual opportunity to assess

and compare the social correlates of loneliness and isolation at two distinct parts of the life cycle.

Social Networks and Participation

Multiple studies have found larger social networks are associated with lower reported loneliness (Berscheid & Reis, 1998; Cacioppo, Fowler, & Christakis, 2009). Less research considers the importance or quality of these relationships as perceived by the ego. Thus, despite having dozens of acquaintances, there may be relatively few people with whom to confide. Furthermore, few studies distinguish between strong and weak ties within a social network, despite evidence to suggest that networks comprised of both types of ties are associated with lower levels of loneliness (van Tilburg, 1990). Additionally, some data suggest loneliness may differ depending on kinship status among network members (Dykstra, 1990; Pinquart, 2003). However, since these early studies little research has focused on the role of strong ties, or people whom an ego would consider close, and further, whether kinship status factors into the relationship between strong ties and loneliness or isolation. The present study offers the opportunity to disaggregate the size of respondents' social network in terms of both kinship and closeness.

Participation in social organizations is also associated with less loneliness and isolation (Niedzwiedz et al., 2016), something infrequently studied among younger and late middle-age adult populations. Participation in social organizations may not only increase an ego's network size, but may also foster a sense of community and offer potential sources of support (Talò, Mannarini, & Rochira, 2014), both of which have been associated with reduced loneliness (Prezza, Amici, Roberti, & Tedeschi, 2001). While some research suggests that rates of loneliness among young adults have increased due to a lack of social participation (Putnam, 2000), other data highlight a dichotomy between declining rates of formal participation, yet steady, or increasing rates of informal participation (Fischer, 2011; Wuthnow, 2002). Religious affiliation is one such formal organization that has shown a particular decline in participation since peaking in the 1950s and '60s (Schwadel, 2013). In particular, religious affiliation has been associated with feelings of belongingness and reduced feelings of social isolation (Rote, Hill, & Ellison, 2013). Yet, among those who are affiliated with religious organizations, few studies have examined how rates of participation may be associated with feelings of loneliness and isolation. In the current study, we examine both formal and informal participation with social organizations, as well as rates of religious attendance to shed light on these various factors.

Network Satisfaction and Personality

Debate within the literature asks whether network size and social participation are valid indicators of social integration and importantly, satisfaction with the level of integration. Peplau and colleagues (1982) refer to this scenario as cognitive discrepancy, whereby the perception of one's social relationships fails to measure up to some internal reference. Thus, feelings of loneliness can be exacerbated or mitigated by a person's own subjective standards for social relationships. In the current study, we explore the notion of cognitive discrepancy by examining whether young and late middle-age adults feel satisfied by their

current networks. To be clear, respondents in our study who reported five or fewer total contacts ($N=135$, 11.7% of the total sample), were no more likely to express a desire for more people to get together with than respondents who reported six or more social contacts. This result suggests that the desire for more social interaction is independent of approximate network size, and remains an important factor in assessing feelings of loneliness and isolation. Additionally, the correlations between network satisfaction, and perceptions of loneliness and social isolation were relatively weak ($r=0.25-0.29$) to indicate these measures were not assessing the same construct. Research that uses a measure of loneliness as a component of social isolation, and vice versa, may conflate the contribution of each to a person's well-being and mask the independent effects.

Additionally, as alluded to earlier, research suggests personality characteristics may be associated with loneliness in particular. Indeed, these studies have found certain personality traits, such as neuroticism and extraversion, associated with loneliness among adolescents and centenarians, alike (Hensley et al., 2012; Vanhalst et al., 2012). Personality characteristics are also shown associated with network characteristics (Kalish & Robins, 2006), offering the potential for personality traits to confound associations seen between network characteristics and loneliness in the current analysis. As such, we have included the Big Five personality traits as covariates in this study.

A Comment on Relationship Status

Finally, studies examining relationship status find that, in general, marriage and romantic partnerships are associated with decreased feelings of loneliness across much of the life course. Marriage and romantic partnerships are a core, if not unique, social network component and should be explicitly examined within the network literature. However, few studies examine associations between relationship status and loneliness and social isolation among young adults (Adamczyk, 2016). This may be due to the relative lack of association between relationship status and loneliness at this life stage (Qualter et al., 2015; Roekel, Ha, Scholte, Engels, & Verhagen, 2016). Nevertheless, the current study capitalizes on the availability of data from both young and late middle-age adults, and explores associations between relationship status and loneliness and isolation among these distinct groups.

In culmination, the current study explores the extent to which social network characteristics, social participation, network satisfaction, and relationship status are associated with loneliness and social isolation among young and late middle-age adults. Similar to previous research among older adults¹, we hypothesize that network characteristics, including network size, and number of close kin and non-kin members will be inversely associated with days lonely and isolated among both young and late middle-age adults. Social participation will also be inversely associated with days lonely and isolated, though these relationships will differ across the two cohorts. Specifically, informal participation will be important for young adults, while formal participation will be more salient for late middle-age adults. Finally, we hypothesize that subjective measures of the network (i.e., network

¹It is worth noting that the UCLA scale was developed using college students, whereas most other tests involve only older populations. This investigation compares both younger and older persons.

satisfaction) will be associated with perceptions of loneliness, but not with isolation among both cohorts.

DATA AND METHODS

Sample

Data for this study comprised the first wave of interviews from the UC Berkeley Social Networks Study (UCNets). UCNets is an ongoing longitudinal panel study aiming to assess the impact of major life events and transitions (e.g., exiting college, retirement) on social networks over time. Respondents were sampled from two distinct age cohorts (21–30 year olds, $n=469$; 50–70 year olds, $n=690$) to maximize the number of key transitions and life events respondents had already and would likely experience between waves of the survey. Stratified address-based sampling across six Bay Area counties sufficed to draw the older sample. However, the response rate for 21–30-year-olds using this method was too low ($n=203$), and was supplemented with a small snowball sample ($n=32$) and a large Facebook ad campaign ($n=234$). The screening procedure randomly assigned respondents from the household-address and snowball sample to either a face-to-face interview (75 percent of cases) or a web survey (25 percent). Facebook-recruited respondents were all directed to the web-based survey. The in-person and web instruments were essentially identical. Post-stratification weights were calculated for each cohort separately and used to approximate population distributions for the greater Bay Area. After case-wise deletion of missing data there was an analytical sample of 1,109 respondents ($n=472$ 21–30 year olds; $n=637$ 50–70 year olds).

Measures

Dependent Variables—Perceived *loneliness* was assessed with the question: “How many days during the past 7 days have you felt lonely?” (range: 0–7 days). Perceived *social isolation* was also assessed with a single question: “How many days during the past 7 days have you felt isolated from other people?” (range: 0–7 days). The Spearman correlation between the two items is .72 for young adults and .70 among late middle-age adults. While explicit or direct measures of loneliness have been avoided because of concerns of stigma and social desirability effects in telephone and face-to-face surveys, respondents in the UCNets survey either took the survey on the web, or, in the face-to-face surveys, were handed the laptop, that is, a CASI method, to enter in answers on sensitive questions, including these items.

Independent Variables

Network Characteristics: The key part of the UCNets survey instrument is a battery of nine name eliciting questions, a familiar technique in the networks literature (Laumann, 1973; Fischer, 1982; Marsden, 2005). These include a variety of capacities through which to assess a respondent’s (ego) social network, including with whom respondents confide, get together with socially, and so on. For each of the name-eliciting questions, respondents could give up to six names. The *total number of names* (alters) generated throughout this battery was summarized to represent the relative size of the ego’s network. Additionally, for each alter, respondents were asked to describe their relationship to the participant (e.g.,

spouse, brother, mother, etc.). Next, the survey asks with whom of each of these alters does the respondent feel particularly close, allowing us to calculate the *number of kin and non-kin* that the participant reported feeling close to. These values ranged from 0–12 for kin and 0–15 for non-kin. The distributions of these variables were heavily positively skewed. For both the number of kin and nonkin, we truncated values larger than five, such that each response ranged from 0 to ‘five or more’. Spearman correlations between these three variables ranged from $r=0.10$ to $r=0.49$. To examine potential effects of multicollinearity between these three variables, separate full models were used to examine each of *total number of names* (generated by survey), *number of close kin*, and *number of close non-kin*, excluding the other two network variables (not shown). No significant associations were observed.

Social Participation: Respondents were asked to indicate whether they actively participated in any social organizations, such as a neighborhood association, a professional association, and so on. The survey offered six different types of formal organizations, and also gave respondents the opportunity to list other organizations. *Formal participation* was assessed as whether or not a respondent participated in at least one or more formal organizations. *Informal participation* was assessed by asking if participants were involved in any informal group(s) that meet regularly and provided some examples (e.g. getting together to discuss books, play cards, bible study). Respondents were limited to ‘yes’ or ‘no’ responses. The *frequency of religious participation* was also examined by asking how often respondents attended services over the past year. These ranged on a five-point scale from 0=‘Not at all’, to 4=‘About every week or more’.

Network Satisfaction: Respondents were asked three separate questions about whether they wished they had more people to 1) get together with socially, 2) talk with about personal concerns, and 3) ask for practical help. Response options for each item were either “yes” or “no,” and each variable was treated as a dichotomous predictor.

Relationship Status: A series of questions was used to categorize current marital or romantic relationship status. First, respondents reported if they were married, divorced, widowed, separated, or never married. Respondents who were not married, including from divorce, etc. were then asked whether they had a partner or were in a romantic relationship. The household census allowed us to identify which of these were also cohabitants. Subsequently, relationship status was parsed into five categories: married, cohabiting (living with romantic partner), dating (in a romantic relationship but not living together), divorced or widowed or separated, and never married. Among younger adults, only two respondents were divorced or separated; these respondents were dropped from the regression analyses.

Covariates: The analyses controlled for several sociodemographic characteristics, including gender (male or female), race/ethnicity (white, black, Latino/a, Asian, or other), educational attainment (less than a Bachelor’s degree, Bachelor’s degree, or more than a Bachelor’s degree), employment status, and income category. The models further adjusted for household composition by including the number of children living at home (any age) and the number of other (non-spouse) adults living in the home.

The models also accounted for the Big Five personality traits: Neuroticism, Agreeableness, Extraversion, Openness, and Conscientiousness, by including an age-standardized summary z-score for each of the five measures (John, Robins, & Pervin, 2008; Rammstedt & John, 2007). Participants completed a total of 12 survey items adapted from the General Social Survey, and summary scores for each index were pooled across two to three items. The use of a standardized z-score adjusts for age differences across the two cohorts, (though not relevant for the current stratified analyses), and also accounted for differences across the two cohorts in the items used to create the summary scores, based on a previous factor analysis. Finally, because of the various sampling methods used to recruit participants, as well as the survey methodology, each model included dummy variables for recruitment method and survey mode.

Analytic Plan

First, we present weighted descriptive statistics (Table 1), where we report the average number of days lonely and socially isolated for each cohort. T-tests were used to compare means across the two cohorts. Because days reported lonely and socially isolated were negatively skewed for both cohorts, we used negative binomial regression to model over-dispersed count outcome variables (Hilbe, 2011), employing post-stratification sampling weights to examine the association of network characteristics, social participation, network satisfaction, and relationship status with reported number of days lonely (Table 2) and reported number of days socially isolated (Table 3). Incidence rate ratios and 95% confidence intervals are reported. All analyses were performed in STATA v. 14.1.

RESULTS

As seen in Table 1, young adults on average reported just over 2 days lonely; twice as many as late middle-age adults. Similarly, young adults also reported nearly twice as many days isolated as late middle-age adults (2.04 days versus 1.08 days, respectively). The older adults had slightly more kin than non-kin whom they considered close, while among young adults, this number did not differ substantially.

Because isolation and loneliness should be reflected in social connections reported, we examined participation in organized and informal networks. Older adults reported more participation in formal organizations (71.6% vs. 53.0%), and roughly the same amount of participation in informal organizations (54.7% vs 59.8%) as young adults. As expected, older adults reported slightly more weekly attendance in religious activities (19.4%) than young adults (12.7%). In regards to network satisfaction, young adults were slightly more likely to wish they had more people in their lives than did their late middle-age counterparts. Both groups were more likely to report a desire for “more people to get together with” than “to talk to” or “get help from.”

Loneliness

Negative binomial regression models and incident rate ratios (IRR) predicting associations between network characteristics, social participation, network expectations, relationship status, and days lonely for both cohorts are presented in Table 2. Similar to risk ratios, IRR’s

calculate the odds of a given outcome based on exposure, and can be interpreted as the predicted rate of an outcome for those exposed compared to those who were not. First, models 1 and 3 present the associations between network characteristics, social participation, and relationship status on number of days lonely for young and late middle-age adults, respectively. Among late middle-age adults, those with a greater number of close kin had fewer lonely days (IRR= 0.83, 95% CI: 0.73, 0.95; $p<0.01$). Additionally, compared to those who were married, late middle-age adults not living with a romantic partner had a greater number of lonely days (Partnered: IRR=2.76, 95% CI: 1.27, 6.01; Divorced/ Widowed/ Separated: IRR=2.81, 95% CI: 1.68, 4.69; Never Married: IRR=2.61, 95% CI: 1.43, 4.79; all $p<0.01$). Models 2 and 4 add in network satisfaction measures to Models 1 and 3, respectively. Among young adults, those who reported a desire for more people to get together with had a higher rate of days lonely (IRR=2.09, 95% CI: 1.49, 2.92; $p<0.01$) than those who did not. This association was mirrored among late middle-age adults (IRR=2.69, 95% CI: 1.74, 4.17; $p<0.01$). The addition of network satisfaction measures in Model 4 uniformly reduced the strength and magnitude of the associations between close kin and relationship status with days lonely among late middle-age adults.

Social Isolation

Negative binomial regression models and incident rate ratios (IRR) predicting associations between network characteristics, social participation, network expectations, relationship status, and days socially isolated for both cohorts are presented in Table 3. Models 1 and 3 present the associations between network characteristics, social participation, and relationship status on number of days socially isolated for young and late middle-age adults, respectively. Among young adults, those who participated in informal organizations had a lower rate of days socially isolated (IRR= 0.72, 95% CI: 0.54, 0.96; $p<0.05$) than those who did not. Weekly religious attendance was also associated with a lower rate of days isolated (IRR= 0.39, 95% CI: 0.20, 0.74; $p<0.01$). Among late middle-age adults, not being in a current romantic relationship was associated with a greater rate of days isolated (Divorced/ Widowed/ Separated: IRR=1.97, 95% CI: 1.23, 3.16; $p<0.01$; Never Married: IRR=1.73, 95% CI: 1.01, 2.95; $p<0.05$) compared to those who were married. Models 2 and 4 add in network satisfaction to Models 1 and 3, respectively. Controlling for network size, young adults who reported a desire for more people to talk to (IRR=1.53, 95% CI: 1.19, 1.96; $p<0.01$), get together with (IRR=1.82, 95% CI: 1.35, 2.45; $p<0.01$), or get help from (IRR=1.32, 95% CI: 1.04, 1.67; $p<0.05$) had a greater rate of days socially isolated than those who did not report such desires. Among late middle-age adults, only those who reported a desire for more people to get together with (IRR=2.41, 95% CI: 0.47, 1.28; $p<0.01$) had a greater rate of days isolated than those who did not.

DISCUSSION

In the current study, personal network and social participation measures were associated with either isolation or loneliness, but rarely both, suggesting a division between these two outcomes. Moreover, loneliness among the younger cohort was more sensitive to connectedness of the social network, whereas the older cohort responded more to close network ties. These distinctions between cohorts may reflect differences in the types of

relationships that are important to an individual across the life course. For example, young adults are likely at different positions in their family and work trajectories, and may have different network needs than older adults do, who are largely past their family and career-building phase. However, perceptions of one's own network, and particularly satisfaction with the number of ties available for social activities, was strongly associated with days lonely and isolated among both age groups, suggesting that this may be a consistent predictor of loneliness throughout the life course. The results support our hypothesis that feelings of loneliness and isolation be treated separately, because they operate independently, and do so differently as expectations change given one's position in life.

Network size was not associated with loneliness or social isolation among either cohort, in contrast with previous literature (Berscheid & Reis, 1998; Cacioppo et al., 2009). Indeed, while the younger cohort reports a greater number of network members on average, they also report a greater number of both days lonely and isolated than their older counterparts. After disaggregating the network into close relationships among kin or non-kin, in partial support of our hypotheses, the results indicate close kin relationships may be important for reported number of days lonely, at least among late middleage adults. As such, the data suggest that rather than having a large network, strong relationships among family members may be protective of mental health for aging adults.

Relationship status was associated with loneliness and social isolation, but only among late middle-age adults in this study. The results indicate that similar to marriage (Marcussen, 2005; Waite, 1995), both cohabitation and simply being partnered, are beneficial for feelings of loneliness and isolation among older adults. Consistent with prior research, relationship status was not associated with number of days lonely or isolated among young adults, possibly because younger adults may have fewer expectations about their romantic partnerships as sources of companionship (Qualter et al., 2015). This contrast between age groups may reflect differences in their social needs and expectations. Qualter and colleagues (2015, p. 251) indicate that a shift occurs in early adulthood "from simply wanting a romantic partner to wanting a committed, high-quality romantic relationship," suggesting that feelings of perceived loneliness may manifest given expectations about where one should be in the life course. Conversely, there may be cohort effects in reasons for romantic partnerships among millennials, and perhaps trends in independence, particularly among women.

Both formal and informal social participation were important for young adults in ways that are distinct from the older cohort. Consistent with recent data to suggest that younger groups are interested in more informal types of social participation (Fischer, 2011; Wuthnow, 2002), younger adults in the current study were less likely to attend religious services than late middle-age adults, yet were equally as involved in informal groups. Furthermore, the negative association between informal participation and isolation among younger adults may be partially explained by motivation for involvement in informal social groups. While late middle-age adults may join informal groups for enrichment, or to fulfill a sense of engagement or productivity, young adults may join these groups specifically for networking opportunities to meet and socialize with peers. We caution that these results may be region-specific. Rates of participation in formal organizations or religious affiliation in the Bay

Area may be distinct from other regions of the U.S., and may be differentially associated with rates of loneliness and isolation than other geographic locations.

In our examination of the role of network satisfaction given network size on perceptions of loneliness and isolation, we found both young and late middle-age adults who reported a desire for more people in the network to “get together with” were more likely to report more lonely and isolated days. Quality is not quantity in network composition, such that people may have their needs met by few but close ties. Additionally, perceptions of loneliness and isolation might stem from a lack of ties with whom to do social activities with rather than a lack of ties for confidants or help. This distinction has important ramifications for interventions aimed at reducing feelings of loneliness, and mirrors research on the importance of social engagement for mental health (Glass, De Leon, Bassuk, & Berkman, 2006; Zunzunegui, Alvarado, Del Ser, & Otero, 2003).

Finally, the addition of network satisfaction measures to the models resulted in a consistent reduction in both the magnitude and strength of the association between objective measures of network size and participation and days lonely and isolated. This finding has important implications for social network research. Particularly, it suggests that the objective network characteristics typically used to describe and examine networks, including size or participation rates, may be less important for loneliness and isolation outcomes than has previously been reported. Instead, evaluations about one’s own social network, including whether someone feels satisfied in the number or quality of connections they have to call on for social engagement or support, may be a more meaningful precursor of loneliness.

Limitations

Although this study has several strengths, the findings should be interpreted in light of several limitations. First, all measures included in this study were self-reported, which may be subject to various sources of bias, including recall, temporal situations, and social desirability. Second, the cross-sectional nature of the data means we cannot comment on the direction of these relationships. Similar to the ways in which social networks change over the life course in response to major events (i.e., entering college, a new job, retirement), a growing body of evidence suggests personal networks may also respond to more acute events, such as stressors or loneliness (Lin et al., 1979; van Tilburg, 1990; Wrzus et al., 2013). For example, individuals who are lonely may seek to mobilize their social resources, and as a result may have larger networks, momentarily. These relationships, particularly with close ties, may ebb and flow over time as a result of fluctuations in feelings of loneliness, or other potential stressors. Because UCNets is a longitudinal panel study with three waves of data, subsequent analyses will help address these limitations. Additionally, the UCNets survey does not directly assess relationship satisfaction among those who were married or partnered. There is some evidence to indicate that individuals in romantic relationships where the partner is not particularly supportive and who are dissatisfied their relationship tend to report high levels of loneliness (De Jong Gierveld, Broese van Groenou, Hoogendoorn, & Smit, 2009; Hawkey et al., 2008). This lack of information about romantic relationship quality limits the ability to detect associations between relationship status and loneliness, and may partially explain why relationship status was not associated with days

lonely or isolated, particularly among partnered younger adults. Finally, while we have distinguished between perceptions of loneliness and social isolation, we recognize that we are continuing a discussion (e.g., De Jong Gierveld, Van Tilburg, & Dykstra, 2016; Jylha & Saarenheimo, 2010) about the use of indirect scales versus direct measures and expect to see further research in this area.

Given these limitations, the current study contributes to the growing literature on social networks and influences of mental health among young and late-middle age adults by examining how social network characteristics and participation are differentially associated with loneliness and isolation across the life course. Further, the current study was able to incorporate important factors not usually examined in loneliness research, including personality traits and subjective measures of the personal network.

Conclusions

The current study suggests that specific network characteristics, including the number of close kin, social participation behavior, and relationship status were distinctly associated with either loneliness or social isolation, at different points in the life course. Furthermore, network dissatisfaction was strongly associated with greater loneliness and isolation in both age groups, indicating that perceptions of ego networks may be more salient than the objective measures previously used to describe social networks. The data underscore the notion that while specific characteristics of the social network are associated with either loneliness or isolation at distinct points across the life span, network satisfaction may be continuously associated with feelings of loneliness and perceived isolation. Future studies may seek to further explore network characteristics associated with network satisfaction. For instance, the current results suggest that having enough people to get together with was more important than having enough people to confide in for feelings of loneliness. Understanding these relationships is an important first step in reducing rates of loneliness and isolation across the lifespan to promote healthy aging.

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Table 1

Weighted Descriptive Statistics (UCNETs, Wave I, 2016)

	Young Adults (n=472)	Late Middle-Age Adults (n=637)
	Percentage (%) or Mean (SD)	
Days Lonely **	2.05 (2.29)	1.08 (1.98)
Days Isolated **	2.04 (2.30)	1.08 (1.92)
Network Characteristics		
Network Size **	10.24 (4.21)	9.99 (4.52)
Number of Close Kin **	2.34 (1.96)	2.76 (2.25)
Number of Close Non-Kin	2.13 (2.30)	1.88 (2.03)
Social Participation		
Participates in Formal Organizations **	53.0	71.6
Participates in Informal Organizations	59.8	54.7
Frequency of Religious Attendance **		
Never	42.7	40.6
Few times a year	29.1	23.6
Several times a year	9.0	8.1
Couple times a month	6.4	8.3
Every week or more	12.7	19.4
Network Satisfaction		
Wishes more people to talk to **	30.5	25.8
Wishes more people to get together with **	64.0	45.7
Wishes more people to get help from *	31.5	26.4
Relationship Status**		
Married	23.1	59.1
Cohabiting	19.4	5.3
Dating	22.5	6.2
Divorced/Widowed/Separated	0.7a	18.5
Never Married	34.3	10.9
Demographics		
Female	51.2	53.1
Race/Ethnicity **		
White	40.4	58.3
Black	9.2	8.5
Latino/a	22.6	12.4
Asian	27.7	20.7
Education		
Less than Bachelor's	57.0	54.2
Bachelor's Degree	30.0	26.1

	Young Adults (<i>n</i> =472)	Late Middle-Age Adults (<i>n</i> =637)
	Percentage (%) or Mean (SD)	
More than Bachelor's	13.0	19.7
Income **		
Under \$15,000	40.1	18.7
\$15,000–\$44,999	31.7	27.2
\$45,000–\$74,999	14.0	22.4
\$75,000+	14.2	31.6
Employed **	67.2	48.4

^aTwo participants from the younger cohort who were divorced were dropped from subsequent analyses

T-test of means between age groups:

*
p<0.05,

**
p<0.01

Table 2

Negative Binomial Regression Estimates of Days Lonely (UCNETs, Wave I, 2016)

	Young Adults (n=470)		Late Middle-Age Adults (n=637)	
	IRR (95% CI)		IRR (95% CI)	
	Model 1	Model 2	Model 3	Model 4
Network Characteristics				
Network Size	1.02 (0.98, 1.06)	1.03 (0.99, 1.07)	1.01 (0.96, 1.06)	1.03 (0.97, 1.08)
Close Kin (range: 0–5 ⁺)	0.95 (0.86, 1.06)	0.93 (0.84, 1.02)	0.83 ^{**} (0.73, 0.95)	0.87 [*] (0.76, 0.99)
Close Non-Kin (range: 0–5 ⁺)	0.91 (0.83, 1.01)	0.92 (0.83, 1.02)	0.98 (0.85, 1.14)	1.02 (0.88, 1.18)
Social Participation				
Formal Participation	1.16 (0.87, 1.54)	1.22 (0.94, 1.60)	0.69 (0.45, 1.03)	0.71 (0.47, 1.06)
Informal Participation	0.77 (0.58, 1.03)	0.80 (0.61, 1.05)	1.14 (0.75, 1.73)	1.07 (0.72, 1.60)
Religious Attendance Frequency				
Never	--	--	--	--
A few times a year or less	1.07 (0.78, 1.46)	0.99 (0.73, 1.33)	1.14 (0.64, 2.03)	1.29 (0.74, 2.23)
Several times a year	0.80 (0.48, 1.34)	0.78 (0.47, 1.28)	0.61 (0.32, 1.16)	0.72 (0.38, 1.39)
A couple times a month	1.23 (0.66, 2.32)	1.18 (0.69, 2.00)	1.25 (0.57, 2.78)	0.99 (0.47, 2.08)
About every week	0.65 (0.36, 1.16)	0.79 (0.42, 1.50)	0.80 (0.47, 1.35)	0.78 (0.46, 1.32)
Relationship Status				
Married	--	--	--	--
Cohabiting	0.75 (0.46, 1.24)	0.77 (0.47, 1.28)	1.87 (0.82, 4.25)	2.21 (0.95, 5.13)
Partnered	0.77 (0.47, 1.27)	0.74 (0.46, 1.19)	2.76 ^{**} (1.27, 6.01)	2.49 [*] (1.17, 5.27)
Divorced/Widowed/Separated	--	--	2.81 ^{**} (1.68, 4.69)	2.60 ^{**} (1.58, 4.28)
Never Married	1.44 (0.89, 2.31)	1.37 (0.85, 2.21)	2.61 ^{**} (1.43, 4.79)	2.34 ^{**} (1.31, 4.18)
Network Satisfaction				
Wishes more people to talk to		1.25 (0.92, 1.70)		1.26 (0.87, 1.84)
Wishes more people to get together with		2.09 ^{**} (1.49, 2.92)		2.69 ^{**} (1.74, 4.17)
Wishes more people to get help from		1.21 (0.91, 1.61)		1.17 (0.75, 1.84)
Constant	2.76 [*] (1.17, 6.51)	1.20 (0.50, 2.88)	1.08 (0.45, 2.60)	0.65 (0.26, 1.59)
alpha	0.61 (0.40, 0.93)	0.44 (0.26, 0.74)	2.30 (1.64, 3.23)	1.93 (1.37, 2.71)

*
p<0.05,**
p<0.01

All models controlled for gender, race/ethnicity, educational attainment, income, employment status, household composition, the Big 5 Personality traits, and both survey and recruitment methodology.

Table 3

Negative Binomial Regression Estimates of Days Socially Isolated (UCNETs, Wave I, 2016)

	Young Adults (n=470)		Late Middle-Age Adults (n=637)	
	IRR (95% CI)		IRR (95% CI)	
	Model 1	Model 2	Model 3	Model 4
Network Characteristics				
Network Size	1.01 (0.96, 1.05)	1.01 (0.97, 1.04)	0.98 (0.94, 1.06)	1.01 (0.95, 1.06)
Close Kin (range: 0-5 ⁺)	0.95 (0.87, 1.05)	0.92 (0.84, 1.00)	0.91 (0.79, 1.05)	0.95 (0.81, 1.11)
Close Non-Kin (range: 0-5 ⁺)	1.00 (0.91, 1.10)	1.02 (0.94, 1.12)	0.96 (0.84, 1.09)	0.97 (0.85, 1.11)
Social Participation				
Formal Participation	0.92 (0.71, 1.19)	0.96 (0.77, 1.21)	0.71 (0.49, 1.03)	0.80 (0.56, 1.16)
Informal Participation	0.72 [*] (0.54, 0.96)	0.73 [*] (0.57, 0.93)	0.88 (0.59, 1.31)	0.84 (0.57, 1.24)
Religious Attendance Frequency				
Never	--	--	--	--
A few times a year or less	1.26 (0.95, 1.68)	1.09 (0.85, 1.42)	0.98 (0.59, 1.61)	1.13 (0.71, 1.81)
Several times a year	0.86 (0.52, 1.41)	0.83 (0.54, 1.28)	0.65 (0.37, 1.13)	0.85 (0.49, 1.47)
A couple times a month	1.04 (0.58, 1.87)	1.02 (0.63, 1.67)	1.53 (0.70, 3.33)	1.53 (0.71, 3.32)
About every week	0.39 ^{**} (0.20, 0.74)	0.43 ^{**} (0.22, 0.81)	0.99 (0.56, 1.77)	1.05 (0.58, 1.90)
Relationship Status				
Married	--	--	--	--
Cohabiting	0.84 (0.50, 1.43)	0.88 (0.54, 1.44)	0.98 (0.47, 2.06)	1.12 (0.54, 2.35)
Partnered	1.08 (0.66, 1.78)	0.98 (0.62, 1.54)	1.83 (0.89, 3.76)	1.47 (0.76, 2.84)
Divorced/Widowed/Separated	--	--	1.97 ^{**} (1.23, 3.16)	1.91 ^{**} (1.20, 3.05)
Never Married	1.39 (0.84, 2.31)	1.17 (0.74, 1.83)	1.73 [*] (1.01, 2.95)	1.71 [*] (1.02, 2.88)
Network Satisfaction				
Wishes more people to talk to		1.53 ^{**} (1.19, 1.96)		1.20 (0.81, 1.77)
Wishes more people to get together with		1.82 ^{**} (1.35, 2.45)		2.41 ^{**} (1.60, 3.61)
Wishes more people to get help from		1.32 [*] (1.04, 1.67)		1.11 (0.75, 1.64)
Constant	3.48 ^{**} (1.51, 8.03)	1.70 (0.77, 3.76)	3.37 ^{**} (1.41, 8.07)	2.07 (0.88, 4.86)
alpha	0.54 (0.33, 0.87)	0.29 (0.14, 0.59)	2.06 (1.44, 2.94)	1.81 (1.26, 2.59)

*
p<0.05,**
p<0.01

All models controlled for gender, race/ethnicity, educational attainment, income, employment status, household composition, the Big 5 Personality traits, and both survey and recruitment methodology.