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The Longitudinal Influences of Social Network Characteristics on Subjective Well-Being of Older Adults: Findings From the ELSA Study

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Abstract

Objective: To investigate the influence of social network characteristics on subjective well-being over 6 years in a population sample of older adults. **Method:** A total of 4,116 participants in the English Longitudinal Study of Aging provided baseline data on social network characteristics and potential confounding factors, and complete follow-up data on 2 measures of subjective well-being. **Results:** Social network size and network contact frequency were positively and independently associated with future life satisfaction and quality of life after controlling for confounding factors, including demographic characteristics, socioeconomic factors, and long-standing illness. In contrast, social network diversity was not independently related to future subjective well-being. **Conclusion:** Different aspects of people's social networks may help sustain levels of subjective well-being in older age. The role of close relationships and frequent contact in later life may be particularly important. These results highlight the need for examining different aspects of social networks for promoting well-being of older people.

Keywords

social networks, subjective well-being, quality of life, English Longitudinal Study of Aging

Introduction

Successful aging is increasingly viewed as the maintenance of well-being across multiple physical and psychosocial domains. There is growing interest in the promotion of *subjective well-being*, a term covering affective states, different valuations people make regarding the quality of their lives, events happening to them, and the circumstances in which they live (Steptoe, Deaton, & Stone, in press). Much progress has been made in documenting well-being across the life course and in studying its contextual determinants in old age (George, 2010). Subjective well-being levels may remain stable or even increase past middle age, indicating effective adaptation in response to aging (Gana, Bailly, Saada, Joulain, & Alaphilippe, 2013), although different well-being domains may be affected differently (Hansen & Slagsvold, 2012). Steep deterioration in well-being levels may also occur in the oldest old (Jivraj, Nazroo, Vanhoutte, & Chandola, 2014). The combined influence of age and other demographic variables, including income, on well-being levels tend to be modest (Larson, 1978). Negative influences of pension inadequacy and poor health on quality of life of older people have also been reported (Wiggins, Higgs, Hyde, & Blane, 2004), although published associations often tend to be cross-sectional and poorly replicated (Diener, Suh, Lucas, & Smith, 1999; George, 2010).

Good social relationships have been consistently related to better well-being in old age (Diener et al., 1999; Larson, 1978); the impact of social ties may be direct (e.g., positive social feedback) or indirect (e.g., protection against stress via social support; Seeman & Berkman, 1988). Having fewer or weaker relationships can negatively influence health and well-being, including mortality risk (Holt-Lunstad, Smith, & Layton, 2010) and cognitive function (Shankar, Hamer, McMunn, & Steptoe, 2013; Zunzunegui, Alvarado, Del Ser, & Otero, 2003). A large body of data exists linking different aspects of people's social networks with well-being in old age. Both the quantity (e.g., assessed by the number of contacts) and quality (e.g., assessed by contact frequency as proxy measure) of social networks have been studied extensively in relation to health and well-being, but significant between-study differences with respect to definitions and measurements have often led to conflicting findings (Diener et al., 1999; Larson, 1978). Although a large meta-analysis of 286 empirical studies concluded that the quality of older people's networks had a stronger influence on determining well-being than the number of contacts, several methodological issues also became apparent: The majority of studies were cross-sectional surveys; more than 80% had a sample size of fewer than 1,000; 70% were judged to have low

understanding and potential efforts that aim to promote quality of life in later life through improved social relationships.

The primary aim of this study was to determine the longitudinal relationships between three major social network domains—network size, network diversity, and frequency of contact—and subsequent subjective well-being of older participants in the English Longitudinal Study of Aging (ELSA). Each of these domains may influence health and well-being through one or more psychosocial, behavioral, and physiologic pathways (Berkman, Glass, Brissette, & Seeman, 2000). Moreover, two key dimensions of subjective well-being were included in this study, reflecting current conceptual understanding of older people's well-being and its assessment (Stone & Mackie, 2013), that is, evaluative well-being, which involves a reflective assessment of life as a whole based on a judgmental process, and eudemonic well-being (also called "psychological flourishing"), which goes beyond reflective evaluations to focus on the person's functioning in life and realization of potential.

Method

Study Participants

The ELSA is a large nationally representative panel study of persons aged 50 years and above. Sampling and data collection procedures in ELSA have been detailed previously (Steptoe, Breeze, Banks, & Nazroo, 2013). Our baseline data on social network characteristics, confounders, and subjective well-being come from Wave 2 (2004/2005), as this was the first time a measure of life satisfaction was included; identical follow-up data on subjective well-being were available at Wave 5 (2010/2011). Wave 2 included 8,774 participants of whom 6,674 had complete outcome data at Wave 2 and 4,737 had complete data at Wave 5. The analytical sample ($n =$ 4,116) includes those with complete data at both waves.

Social Network Domains

Network diversity. We combined three questions regarding whether respondents had any children, other immediate family, or friends (each scored as 1 if yes, otherwise 0) to form a scale score ranging from 0 to 3, with higher scores representing greater social network diversity.

Network size. We summed three questions that asked participants about the

Network contact frequency. We derived this variable in two steps. First, we re-scaled and then combined (across kinship/relationship type) questions on how often respondents meet up with, speak on the phone to, or e-mail/write to their children, other family, or friends, with response options less *than once a year or never*, *once or twice a year*, *every few months*, *once or twice a month*, *once or twice a week*, and *three or more times a week*. This resulted in three kinship-specific scales (each ranging from 0 to 6), which, in a second step, we combined to form a total contact frequency scale score, ranging from 0 to 18, with higher scores indicating greater network contact frequency.

Subjective Well-Being Dimensions

We assessed evaluative well-being using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The scale consists of 5 items examining how satisfied the individual is with his or her life, with response options on a 7-point scale (ranging from *strongly disagree* to *strongly agree*). Responses were reversed and re-scaled, then summed for a total scale score ranging from 0 to 30. Higher scores indicate greater overall satisfaction with life (Cronbach's α = .90 at each wave).

Eudemonic well-being was assessed using the CASP [AQ4] 19 scale, a measure of quality of life in old age, which is a summative scale of 19 items, tapping four domains: control, autonomy, pleasure, and self-realization (Hyde, Wiggins, Higgs, & Blane, 2003). Each item is scored on a 4-point scale: "never," "not often," "sometimes," and "often." Items were added to create a total score, ranging from 0 to 57, with higher scores suggesting a greater quality of life (Cronbach's α ranged from .59 to .87 across the 2 waves).

Confounding Variables

The following characteristics were included as potential confounding factors: participant's age (50-59, 60-69, 70-79, and 80+) and gender, relationship status (classified as married and cohabiting vs. neither, that is, single, divorced, or widowed), highest education level completed (three categories were used, that is, no qualification, intermediate, degree, or higher), and current work participation (based on whether respondents were currently working full-time/part-time or not). Total (non-pension) wealth, divided into quintiles for the present study, was used as an indicator of respondents' socioeconomic status. Respondents were also asked whether they had any

Data Analysis

All three social network scale scores had skewed distributions. We used the median value to classify study participants as having high or low network diversity, whereas the divisions of the network size and the contact frequency scores roughly corresponded to the tertiles of these distributions. We compared mean SWLS and CASP-19 scores at each wave across dichotomous (gender, relationship status, work participation, long-standing limiting illness) and multi-category (age, education, ~~personal~~ non-pension wealth, and social network variables) confounders using *t* test or one-way ANOVA test for trend as appropriate.

We initially regressed each of the social network variables separately onto well-being measures: Model A using network diversity, Model B for network size, and Model C for contact frequency. The final model, Model D, was mutually adjusted for all network measures. All analyses were fully adjusted for confounders and the baseline score for either life satisfaction or quality of life. Using regression in this way, with the baseline score on a particular measure as covariable, is superior to using raw change scores; as an example, it obviates the spurious correlation between baseline and change scores (Campbell & Kenny, 1999). All statistical tests were two-tailed, with $p < .05$ taken as significant; the data analyses were performed using IBM SPSS Statistics 20.

Results

The baseline characteristics of the study sample are shown in Table 1. Compared with ELSA participants excluded from the present analysis, due to not having complete follow-up data on subjective well-being, the analytical sample was found to be comparatively younger, to include more women, to have a more favorable socioeconomic profile, and to experience less limiting illness. In addition, the study sample members also had higher well-being levels at baseline and more favorable social network characteristics compared with the non-participants.

Table 1. Baseline Characteristics of the Analytical Sample and Non-Participants Without Complete Follow-Up Data on Subjective Well-Being.

	Analytical sample ($n =$	Non-participants ($n =$

80+	3.8 (156)	20.6 (959)
Sex, % male (*n*)	44.8 (1,845)	45.2 (2,104)
Relationship status, % (*n*)		
Married or cohabiting	74.9 (3,082)	61.7 (2,873)
Neither	25.1 (1,034)	38.3 (1,785)
Highest education level completed, % (*n*)		
No qualification	27.0 (1,111)	49.5 (2,303)
Intermediate	56.2 (2,312)	42.4 (1,970)
Degree or higher	16.8 (693)	8.1 (376)
Current work, % (*n*)		
Neither in full-time or part-time work	62.9 (2,587)	77.8 (3,622)
Full-time or part-time work	37.1 (1,529)	22.2 (1,035)
~~Personal~~ (N~~n~~on-pension~~)~~ wealth, % (*n*)		
1st quintile	11.6 (470)	24.4 (1,120)
2nd quintile	17.0 (691)	22.3 (1,026)
3rd quintile	20.0 (811)	20.2 (930)
4th quintile	23.4 (952)	17.7 (815)
5th quintile	28.0 (1,136)	15.3 (704)
Long-standing limiting illness, % (*n*)		
Yes	55.4 (1,192)	68.9 (1,999)
No	44.6 (961)	31.1 (904)
Life Satisfaction Scale score (0-30), *M* (*SD*)	21.0 (6.2)	20.8 (6.4)
Quality of Life Scale score (0-57), *M* (*SD*)	41.5 (8.7)	41.2 (9.2)
Social network diversity (0-3), % (*n*)		
Low (<3)	22.2 (913)	27.6 (1,013)
High (=3)	77.8 (3,202)	72.4 (2,652)
Social network size (0-30), % (*n*)		
Lowest (<5)	27.7 (1,131)	34.3 (1,208)
Middle (5-8)	43.1 (1,761)	40.6 (1,430)
Highest (>8)	29.2 (1,190)	25.1 (885)
Social network contact frequency (0-18), % (*n*)		
Lowest (<6)	26.6 (1,028)	35.3 (1,096)
Middle (6-9)	42.5 (1,643)	39.4 (1,225)
Highest (>9)	31.0 (1,198)	25.3 (786)

Table 2 shows the relationship between subjective well-being levels, individual social network characteristics, and other covariables. In particular, both subjective well-being outcomes were found to be positively and statistically significantly associated with each of the social network

Results from our multivariable regressions on life satisfaction are shown in Table 3 (upper panel). In separate models (A-C), each of the network variables was positively and significantly related to life satisfaction levels at follow-up. In the final model (D) that included all three social network variables, however, only network size and contact frequency turned out to be independently and significantly related to higher life satisfaction scores. The regressions on quality of life (Table 3, lower panel) showed similar results. When examined simultaneously (Model D), only network size and contact frequency continued to exert independent influences on quality of life at follow-up.

Discussion

The effective promotion of subjective well-being for improving public health depends much on the understanding of what particular life circumstances, beyond age itself, predict well-being levels in the older population (Netuveli, Wiggins, Hildon, Montgomery, & Blane, 2006). This study investigated the longitudinal relationship between major dimensions of people's social networks and subsequent subjective well-being in a sample of older survivors characterized by generally high levels of well-being, a favorable socioeconomic profile, and relatively extensive and varied social ties. Our results showed that particularly people's social network size and frequency of contact with others in their network seemed to be related to how satisfied people rated their lives and how they perceived the quality of their lives 6 years later. These associations were independent of each other and survived adjustment for several potential confounding factors, including relationship status, different socioeconomic characteristics, and long-standing illness.

Especially in young old (60-69 years) and middle old (70-79 years) people, [AQ5] network size has been found to be positively related to subjective well-being (Baxter et al., 1998; Cooper et al., 2011) and inversely associated with mortality (Brummett et al., 2001), disability (George, 2010; Mendes de Leon, Gold, Glass, Kaplan, & George, 2001), and depression (Kawachi & Berkman, 2001). Similarly, frequency of interaction with social network has been inversely associated

Table 2. Unadjusted Mean (*SD*) Subjective Well-Being Levels in Relation to Baseline Sociodemographic, Health, and Social Network Characteristics (*n* = 4,116).

Characteristics	Life satisfaction (baseline)	*p* for difference[a]	Life satisfaction (follow-up)	*p* for difference	Quality of life (baseline)	*p* for difference	Quality of life (follow-up)	*p* for difference
Age								
50-59	20.9 (6.4)		20.9 (6.3)		43.4 (8.4)		42.6 (8.8)	
60-69	21.9 (5.7)		21.3 (5.9)		44.4 (8.1)		41.9 (8.3)	
70-79	22.1 (5.4)		21.0 (6.2)		43.5 (7.8)		39.4 (8.4)	
80+	21.7 (5.4)	NS[b]	19.1 (6.6)	<.001	42.2 (7.7)	<.05	36.5 (8.0)	<.001
Sex								
Female	21.4 (6.1)		20.8 (6.2)		43.9 (8.3)		41.4 (8.7)	
Male	21.7 (5.8)	NS	21.3 (6.1)	<.01	43.6 (8.1)	NS	41.5 (8.6)	NS
Relationship status								
Married or cohabiting	22.4 (5.4)		21.8 (5.8)		44.4 (7.7)		42.2 (8.4)	
Neither	18.9 (6.9)	<.001	18.8 (6.7)	<.001	41.9 (9.1)	<.001	39.4 (9.0)	<.001
Highest education level completed								
No qualification	21.3 (6.0)		20.6 (6.3)		42.1 (8.7)		39.2 (9.1)	
Intermediate	21.4 (6.1)		21.1 (6.2)		44.1 (8.0)		42.0 (8.4)	
Degree or higher	22.3 (5.5)	<.01	21.6 (5.5)	<.001	45.3 (7.3)	<.001	43.4 (7.9)	<.001
Current work								

3rd quintile	21.4 (5.9)			20.9 (6.0)			43.7 (8.0)			41.1 (8.5)		
4th quintile	22.1 (5.3)			21.6 (5.9)			44.6 (7.4)			42.4 (8.2)		
5th quintile	23.1 (4.9)		<.001	22.3 (5.5)		<.001	46.3 (6.7)		<.001	44.0 (7.5)		<.001
Long-standing limiting illness												
Yes	19.5 (7.0)			18.8 (7.0)			39.0 (9.1)			36.7 (9.1)		
No	22.0 (5.3)		<.001	21.6 (5.8)		<.001	44.8 (6.9)		<.001	42.4 (7.9)		<.001

[a]Derived using either a *t* test (test for difference between two means) or one-way ANOVA (test for trend).
[b]NS indicates a statistically non-significant (i.e., *p* > .05) difference.

Table 3. Multivariable[a] Associations Between Baseline Social Network Domains and Subjective Well-Being at 6-Year Follow-Up.

	Life satisfaction											
Social network characteristics	Model A			Model B			Model C			Model D		
	B	95% CI	β	*B*	95% CI	β	*B*	95% CI	β	*B*	95% CI	β
Network diversity (0-3)												
Low (<3)	Ref.	—	Ref.	—	—	—	—	—	—	Ref.	—	Ref.
High (=3)	0.56	[0.04, 1.08]*	.04							0.17	[−0.43, 0.76]	.01
Network size (0-30)												
Lowest (<5)	—	—	—	Ref.	—	Ref.	—	—	—	Ref.	—	Ref.
Middle (5-8)				0.36	[−0.16, 0.89]	.03				0.18	[−0.38, 0.75]	.01
Highest (>8)				1.21	[0.63, 1.79]***	.08				0.87	[0.23, 1.51]**	.06
Network contact frequency (0-18)												

Social network characteristics	Model A B	95% CI	β	Model B B	95% CI	β	Model C B	95% CI	β	Model D B	95% CI	β
						Quality of life						
Network diversity (0-3)												
Low (<3)	Ref.	—	Ref.	—	—	—	—	—	—	Ref.	—	Ref.
High (=3)	0.77	[0.13, 1.42]*	.04							0.19	[−0.55, 0.92]	.01
Network size (0-30)												
Lowest (<5)	—	—	—	Ref.	—	Ref.	—	—	—	Ref.	—	Ref.
Middle (5-8)				0.70	[0.05, 1.35]*	.04				0.44	[−0.26, 1.13]	.02
Highest (>8)				1.39	[0.67, 2.11]***	.07				0.96	[0.17, 1.74]*	.05
Network contact frequency (0-18)												
Lowest (<6)	—	—	—	—	—	—	Ref.	—	Ref.	Ref.	—	Ref.
Middle (6-9)							1.34	[0.66, 2.03]***	.07	1.15	[0.43, 1.86]**	.06
Highest (>9)							1.54	[0.79, 2.28]***	.08	1.15	[0.32, 1.97]**	.06
Total R^2		.52***			.53***			.53***			.53***	

Note. CI = confidence interval.

[a]All regression models (A-D) adjust for baseline age, sex, either life satisfaction or quality of life score at baseline, relationship status, education, work participation, non-pension wealth, and long-standing limiting illness.

p < .05. **p* < .01. ***p* < .001.

with mortality (Olsen, Olsen, Gunner-Svensson, & Waldstrom, 1991) and mental distress (Phongsavan et al., 2013), and found to positively influence subjective well-being (Baxter et al., 1998). In another recent study of ELSA, we found that individuals with infrequent social contact were at higher risk of dying over the next 7 years, even after controlling for baseline illness, health behaviors, depression, and loneliness (Steptoe, Shankar, Demakakos, & Wardle, 2013). Frequent face-to-face contact with other network members may be especially important in terms of availability of social support (Seeman & Berkman, 1988); social support may indeed be one major pathway through which these social network characteristics influence health and well-being of older people, because multiple social ties can provide a larger pool from which to obtain assistance with various tasks or problems. Having such support may help older people experience greater control of their lives, which is likely to enhance satisfaction with existing conditions and circumstances (Higgs, Hyde, Wiggins, & Blane, 2003). Our measure of network size relates to the number of close relationships the individual has and hence also taps into aspects of relationship quality, which have been associated with greater well-being in older age (Pinquart & Sorensen, 2000).

Our results show that both the size of social networks and the frequency of contact with members of the network independently predict future well-being and quality of life. This indicates that the fact that someone has a large social network is not sufficient if it is not utilized effectively; but in addition, regular contact with a small circle of contacts is less efficacious than communication with a wider network.

In contrast, the diversity of people's networks was not associated independently of other network characteristics with subjective well-being in this investigation, but at least one previous population-based study observed an inverse influence of network diversity on all-cause mortality and incidence of ischemic heart disease (Barefoot, Gronbaek, Jensen, Schnohr, & Prescott, 2005). Diverse social ties may possibly benefit older people by providing wider access to important resources and support that help them maintain their health. Older people's relationships with their adult children, for instance, are thought to be important for accessing material support, whereas close connections with friends or relatives constitute major sources of emotional support (Seeman & Berkman, 1988). Simply having an adult child, a friend, or other family (the measure used in the current study) may, however, not

A notable strength of this investigation is the prospective design of the ELSA study, which allowed us to examine subjective well-being levels over a period of 6 years. Our determination of subjective well-being was based on using two established measures, whereas some previous studies have been limited by using proxy indicators (e.g., health status) or not having robust scales. However, attrition reduced the size of the sample available for this analysis. Previous analyses of well-being in ELSA used multiple imputation for missing data, which, although increasing the sample size, led to results that were similar to those based on the complete sample (Netuveli et al., 2006). However, a comparison with ELSA members without complete follow-up data showed that these non-participants had lower well-being levels and less favorable social network characteristics than their participating counterparts (i.e., our analytical sample). In other words, participation in the 6-year follow-up seemed to be related to both well-being levels and social network quality and quantity at baseline. Assuming similar influence of social network characteristics on subjective well-being in participants and non-participants at follow-up, it is likely that the effects reported here underestimate the true magnitude of the association between individual social network characteristics and levels of well-being in older people.

Conclusion

We observed that especially social network size and contact frequency were positively and independently related to future subjective well-being in older people. Maintaining close relationships and frequent contact with children, family, and friends may help preserve levels of life satisfaction and quality of life in old age. Social relationships are also subject to change over the life course, and future research should focus on determining how changes in specific aspects of people's social networks may be related to levels of and change in subjective well-being in later life.

Declaration of Conflicting Interest

Funding

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