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The Interplay of Personality Traits and Social Network Characteristics in the Subjective Well-Being of Older Adults

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Abstract

Using data from the Survey of Health, Ageing and Retirement in Europe, we regressed three well-being measures (CASP, life satisfaction and Euro-D depressive symptoms) on indicators of personality and social network. Personality was indicated by the Big-Five personality traits, while social network was measured in terms of size, contact frequency and emotional closeness. The analysis also considered personality—network interactions, controlling for confounders. The sample was comprised of 35,145 adults, aged 50 and older, from 24 European countries and Israel**.** The results revealed that the personality traits explained more variance in the well-being outcomes than the social network characteristics did. However, the interactions showed that the social network characteristics, particularly size and mean emotional closeness, offset the effects of dysfunctional personality attributes on subjective well-being in late life. Hence, social network characteristics were shown to modify the potentially ill effects of personality on key well-being indicators.

Keywords

Big-Five, network size, CASP, life satisfaction, SHARE

Introduction

It is well established that personality and social network are both related to subjective well-being in late life (Etxeberria et al., 2019; Rafnsson et al., 2015). Little attention has been paid, however, as to the comparative relative contribution of each of these two domains to the perceived well-being of older people. There is also scarce consideration in the literature as to the effect of social network characteristics on the personality—well-being nexus. The current study addresses these concerns in an empirical analysis of unique relevant data from the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2013).

We look specifically at the Big-Five personality traits—openness, conscientiousness, extraversion, agreeableness and neuroticism (John & Srivastava, 1999), in relation to three well-being measures: perceived quality of life, life satisfaction and depressive symptoms. Quality of life refers to the emotions and feelings one has, reflecting an overall affective balance (Theofilou, 2013). Life satisfaction, on the other hand, is a global judgment of one's life and it represents the cognitive component of subjective well-being (Prasoon & Chaturvedi, 2016). Finally, depressive symptoms measure negative affect (Kircanski et al., 2012).

As for social network, we examine the most intimate of interpersonal relationships of older people, namely, their confidant networks (Cornwell et al., 2009; Litwin & Stoeckel, 2014). Moreover, we consider three key social network characteristics: size, contact frequency and emotional closeness. This distinction is important because different measures of social connectedness may have different effects on one's well-being (Beller & Wagner, 2018).

Literature Review

In general, personality is a strong predictor of quality of life (Cheng et al., 2014) and of life satisfaction (Tharp et al., 2020) among older adults. The literature shows a number of consistent associations between specific personality traits and the well-being indicators that are addressed in the present inquiry. Thus, for example, extraversion correlates positively with perceived quality of life (Cheng et al., 2014) and life

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satisfaction (Navarro-Prados et al., 2018), and negatively with depressive symptoms (Weber et al., 2012). Conversely, neuroticism is related to lower quality of life (Chapman et al., 2007), less life satisfaction (Anglim et al., 2020), and more depressive symptoms (Sadeq & Molinari, 2018; Weber et al., 2012). Conscientiousness correlates with greater quality of life (Chapman et al., 2007) and life satisfaction, while agreeableness has been found to associate with life satisfaction (Navarro-Prados et al., 2018). Openness, on the other hand, was found to mediate between network characteristics and depression (Hall et al., 2020).

Social network is also known to correlate with the subjective well-being of older people (Pinquart & Sorensen, 2000; Rafnsson et al., 2015) and with their mental health (Flori et al., 2006; Harasemiw et al., 2019; Park et al., 2018), although the association may be bi-directional (Schwartz & Litwin, 2019). We note, however, that networks are complex entities (Huo et al., 2020; Litwin, 2011). Recent studies in Holland (Domenech-Abella et al., 2021) and the United States (Santini et al., 2020) have found, for example, that small network size is associated with greater loneliness or perceived isolation, which, in turn, predicts greater depressive symptoms. Two studies of network types found that older people in resourceful network constellations (i.e., networks that are larger, more diverse and with more frequent contact) reported less presence of depressive symptoms (Litwin, 2011; Windsor et al., 2016). A study using SHARE data, in turn, revealed that social network quality and network size were both related to fewer depressive symptoms. In contrast, greater contact frequency correlated, in that same study, with the reporting of more depressive symptoms, but only among those aged 80 and older (Litwin et al., 2015).

Network size has been found to associate with life satisfaction among older people, whether directly or indirectly (Dumitrache et al., 2015; Fuller-Iglesias, 2015; Lee, 2021). A British study revealed that network size was positively related to reported life satisfaction even after taking demographic, social and health variables into account (Rafnsson et al., 2015). A study of European older adults underscored, moreover, that the positive correlation between network size and life satisfaction prevailed across countries (Tomini et al., 2016).

As for perceived quality of life, as measured by the Control, Autonomy, Self-realisation and Pleasure Scale (CASP) (Stoner et al., 2019), another study that utilized data from SHARE revealed that emotional closeness with newly added confidants correlated positively with the quality of life scores (Schwartz & Litwin, 2017). Emotional closeness was related to fewer depressive symptoms as well. Correspondingly, losing frequently contacted confidants was associated with a greater number of depressive symptoms. Analysis of an Eastern European sample, in another study, revealed a significant association between the frequency of contact with friends and relatives and CASP scores at follow-up, controlling for sociodemographic characteristics, health variables and baseline CASP scores (Luna et al., 2020).

Consideration of the relative effect of personality and social network on well-being in late life is complicated by the potential interrelationship that may exist between these two domains. Studies of younger people seem to suggest that those high on extraversion have more social connections, while those high on agreeableness are selected more as friends (Selden & Goodie, 2018; Selfhout et al., 2010). However, others maintain that little is known about the main effects of personality traits on the characteristics of social ties (Rapp et al., 2019). To the best of our knowledge, the interrelationship of personality and social network vis a vis well-being in late life has not been addressed in the literature.

It is also difficult to explain the antecedents of subjective well-being. Some see well-being as the result of top-down factors, particularly personality, while others view bottom-up factors (that is, situational circumstances) as the determining factors (Heller et al., 2004). Social networks are included among the situational factors (Tharp & Parks-Stamm, 2021). Although Lucas and Diener (2009) maintain that personality is more strongly associated with well-being than are situational circumstances, there are empirical studies that support both top-down and bottom-up models (Feist et al., 1995).

Lastly, we note that well-being in late life is influenced by one's sociodemographic background as well as by functional health status. The three well-being outcomes that are considered in the present analysis have been found to be variously related to such factors as age, gender, socioeconomic status, living arrangements and physical function (disability) (Godin et al., 2019; Khodabakhsh, 2021; Moreno-Agostino et al., 2021; Tomini et al., 2016). Consequently, these variables need to be taken into account as possible confounders.

Given the complexity of the current topic of inquiry, we constructed our analysis around two main research questions:

1. Are personality traits and social network characteristics associated with subjective well-being outcomes in late life to the same degree?
2. Do social network characteristics intervene in the association between personality traits and subjective well-being?

Method

Our analysis made use of data from two waves of SHARE, a biennial longitudinal survey of adults aged 50 and over, and their spouses of any age, in 27 European countries and Israel (Börsch-Supan et al., 2013). Wave 7 of the survey (2018) provided the personality data. Wave 8 (the data collection for which began in October 2019 and ended in March, 2020, prior to the COVID outbreak) added the social network data, as well as the background and health variables. We limited the study sample to respondents aged 50 and over who had data on all the requisite variables from both waves in question. We note

that respondents who reported having no confidants at all were excluded from the main analysis insofar as they necessarily lacked data on two of the three network measures. (However, we report the results of a supplementary analysis that does take into account those with no reported confidants as well). The main sample thus numbered 35,145 persons from 25 SHARE member countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Slovakia, Slovenia, Spain, Sweden and Switzerland.

Variables

Subjective well-being was examined by means of three outcome measures that were queried in SHARE Wave 8: perceived quality of life, life satisfaction and depressive symptoms. Perceived quality of life was measured by the CASP-12, a scale that has been found to be a robust indicator among older Europeans (Oliver et al., 2021). Higher scores on the CASP reflect greater perceived quality of life. Life satisfaction was measured on a ten-point global self-reported scale, the higher the score, the greater one's satisfaction from life. Depressive symptoms were counted on the 12-item Euro-D scale, an inventory that is widely used in comparative research (Prince et al., 1999). A higher Euro-D score indicates a greater number of depressive symptoms. (All the scale items and study variables may be viewed at http://www.share-project.org/home0.html). The scores for life-satisfaction and the EURO-D were entered in the current analyses as standardized z-scores because of the skewed distributions of these variables, as frequently occurs in samples of community dwelling older people.

The first of the two independent variables of particular interest to the present study was personality, measured by means of the Big-Five personality traits: 1) openness, 2) conscientiousness, 3) extraversion, 4) agreeableness, and 5) neuroticism. Rammstedt and John (2007) introduced the BFI-10 as an ultra-short measure of personality suitable especially for multi-theme surveys in which assessment time and questionnaire space are limited. Their studies have clearly shown that the BFI-10 possesses psychometric properties that are comparable in size and structure to those of the full-scale. Moreover, results from multiple samples indicate that the BFI-10 scales retain significant levels of reliability and validity (Rammstedt, 2007). We note that dimensionality analyses of the BFI-10 data from SHARE Wave 7 found a strong congruency in the pooled sample between the idealized Big-Five structure and the actual scores (Levinsky et al., 2019). The BFI-10 includes one direct indicator and one reverse indicator of each personality trait. To illustrate, the direct indicator of neuroticism is "I see myself as someone who gets nervous easily." The corresponding reverse indicator is "I see myself as someone who is relaxed, handles stress well." The score on each personality trait variable is the mean of the respective items (one reverse-coded), range = 1–5.

The second key independent variable—social network characteristics—was examined in terms of the confidants that were identified by a name generator that is employed in SHARE (Litwin et al., 2013). The tool asks the respondent to cite up to six people with whom he or she discussed matters of importance in the past year, and a seventh person important for any other reason. The number of persons cited is capped at seven because the name generator solicits "confidants," that is, members of one's intimate personal social network (rather than listing a wide range of general contacts). SHARE employed this particular approach to network delineation following the successful implementation of a very similar name generator that was introduced by the National Social life, Health and Aging Project in the United States, where the average number of confidants was found to be 3.5 (Cornwell, et al., 2009).

From these data, we derived three network variables: network size, mean contact frequency and mean emotional closeness. Specifically, network size was a count of the named confidants, range = 1–7. Contact frequency was tapped for each cited confidant on a 7-point scale, coded from a low of (1) "never" to a high of (7) "daily." The extent of emotional closeness with each confidant was obtained on a 4-point scale ranging from (1) "not very close" to (4) "extremely close." For each of these two latter network measures, the analysis used the mean scores.

We also controlled for background sociodemographic variables and health, all retrieved from SHARE Wave 8. Age was divided into three groupings: 50–64, 65–74 and 75+. For the multivariate regressions, this variable was converted into three dichotomous dummy variables, as follows: (50–64 = 1, other = 0; 65–74 = 1, other = 0; and 75 += 1, other = 0). Gender was also a dichotomous dummy, (male = 0, female = 1), and living arrangement (no live-in partner = 0, live-in partner = 1). Country of residence was also taken into account by means of dichotomous dummy variables. Education was measured on a seven-point scale (0–6), according to the International Standard Classification of Educational Degrees (ISCED-97). Financial capacity was measured on a 4-point scale, on which a higher score indicates fewer difficulties in making ends meet (Litwin & Sapir, 2009). Health was measured in terms of functional status, that is, by the number of reported mobility difficulties (0–10; the higher the score the greater the difficulty).

Analysis

After the requisite univariate description and bivariate examination of the well-being outcome measures vis a vis the study variables, the main analyses regressed the respective outcome measures on the other variables in multi-stage OLS regression procedures. Thus, the CASP scores, life satisfaction and depressive symptoms were regressed, first, on the

background and health measures. The second stage added the personality traits (measured in 2018) and the third stage entered the three social network characteristics measured in 2020: size, contact frequency and emotional closeness. The final stage considered interactions between selected personality traits and the network variables, based upon the findings of the previous stage of the regression. We centered the relevant personality traits and the social network characteristics to the grand mean for the analyses of the interactions.

In the graphs of the interactions, we plotted three lines for each of the social network characteristics, one at the mean level of the characteristic, a second at one standard deviation above the mean level, and finally a third at one standard deviation below the mean level. The resultant cut off points for the respective network characteristics were as follows: 1) social network size (1.2, n = 8,576, 24.4%; 2.8, n = 16,581, 47.2%; and 4.4, n = 9,988, 28.4%), 2) mean contact frequency (5.2, n = 5,722, 16.2%; 6.1, n = 17,615, 50.1%; and 7.0, n = 11,808, 33.6%), 3) mean emotional closeness (2.7, n = 5,117, 14.5%; 3.3, n = 20,490, 58.3%; and 3.9, n = 9,538, 27.1%). The analyses were executed by means of STATA 15.

Results

More than a third of the sample was aged 50–64, while slightly less than a third was aged 65–74 or aged 75, respectively. There were more women (58%) in the sample relatively to the men. A bit more than two thirds of respondents had a live-in partner. The mean education level was 3, corresponding to an upper secondary education (3 years of schooling: grades 10, 11 and 12). In relation to financial capacity, the average sample member was able to make ends meet somewhat easily. Regarding functional health status, respondents reported having less than two mobility limitations, on average.

Conscientiousness emerged as the most prevalent personality trait among participants while neuroticism was the least so. In terms of social network characteristics, respondents reported having almost three confidants, on average. Frequency of contact was quite high, as was emotional closeness. As for the well-being outcomes, quality of life (CASP) was moderately high, on average, and self-rated life satisfaction was quite high. The average respondent had about two depressive symptoms. A more specific breakdown of the study variables is shown in Supplementary Table 1 (see Table S1 published as supplementary material).

As for the bivariate correlations, we first ran an analysis of variance by age groups. The findings indicated that the youngest age group reported the greatest mean quality-of- life score (38.43) followed by those aged 65–74 (38.11) and those aged 75+ (35.97). Scheffe tests for inter-group differences revealed significant differences across each of the groups. The greatest life-satisfaction score was reported by the 65–74-year-olds (7.93) followed closely by the youngest age group (7.90; not significant). The oldest group, which indicated the lowest degree of life satisfaction (7.73) differed significantly from the other two groups. Finally, the two younger age groups indicated a similar degree of depressive symptoms (2.19 and 2.16, respectively), while the oldest age group reported significantly more (2.79).

The other bivariate associations may be seen in Supplementary Table 2 (see Table S2 published as supplementary material). The analysis revealed that all the variables in the table were related to each of the well-being outcome measures. Women reported lower quality of life and life satisfaction, and more depressive symptoms. Education, financial capacity and partner status were positively related to quality of life and life satisfaction, and negatively related to depressive symptoms. Mobility difficulties had the opposite association. Almost all of the country dummy variables were associated, positively or negatively, with the respective mental health scores (countries not shown).

In addition, all the personality traits were positively related to quality of life and life satisfaction, except for neuroticism, which was negatively related. Correspondingly, the personality traits were mostly negatively related to depressive symptoms. Only neuroticism was positively related. The social network characteristics, on the other hand, showed some mixed results. Network size and emotional closeness correlated positively with quality of life and life satisfaction, and negatively with depressive symptoms. However, contact frequency was negatively related to all three of the mental health measures at the bivariate level.

We also looked at the bivariate associations between the personality traits and the social network indicators, all of which were significant (see Table S3 published as supplementary material). Network size and emotional closeness both correlated positively with openness, conscientiousness, extraversion and agreeableness, and negatively with neuroticism. Contact frequency showed a different pattern. This network measure correlated negatively with openness and agreeableness (and to a lesser degree with extraversion). However, positive associations were observed between contact frequency, on the one hand, and neuroticism and conscientiousness, on the other hand.

Tables 1–3 present the results of the regressions of the respective well-being outcomes. As may be seen, the associations with the background and health variables were mostly consistent in all the regressions, in all the models. Thus, education, financial capacity and living arrangements all correlated with well-being (better quality of life, greater life satisfaction, fewer depressive symptoms). Mobility difficulties showed the opposite. Female gender was positively related to quality of life and life satisfaction, but also to more depressive symptoms. Age, entered as dichotomous dummy variables, showed mixed results. The oldest group had lower reported quality of life and more depressive symptoms than the reference category (age 50–64), but greater life satisfaction. The 65–74-year-olds had fewer depressive symptoms than the youngest age category and greater life satisfaction, but less quality of life. In all cases, the background and health

Table 1. Background, Health, Personality, and Network Predictors of Quality of Life Among Europeans Aged 50+: OLS Regressions.

	Quality of Life			
	Model 1A	Model 1B	Model 1C	Model 1D
Backgrounds[a]	β	β	β	β
Age 65-74[b]	−0.009	−0.013**	−0.010*	−0.010*
Age 75+[b]	−0.070***	−0.079***	−0.074***	−0.075***
Gender (F)	0.021***	0.021***	0.011*	0.011*
Living arrangement	0.036***	0.039***	0.021***	0.021***
Education	0.065***	0.055***	0.053***	0.053***
Financial capacity	0.226***	0.208***	0.203***	0.203***
Mobility difficulty	−0.356***	−0.328***	−0.329***	−0.330***
Big-five personality traits				
Openness		0.050***	0.045***	0.045***
Conscientiousness		0.088***	0.081***	0.081***
Extraversion		0.085***	0.078***	0.078***
Agreeableness		0.037***	0.031***	0.031***
Neuroticism		−0.139***	−0.136***	−0.136***
Social network				
Network size			0.066***	0.068***
Contact frequency			0.009	0.010
Emotional closeness			0.098***	0.096***
Interactions				
Conscientiousness*Size				−0.008
Conscientiousness*Contact mean				0.004
Conscientiousness*Close mean				−0.002
Extraversion*Size				−0.015**
Extraversion*Contact mean				−0.004
Extraversion*Close mean				−0.001
Neuroticism*Size				0.009*
Neuroticism*Contact mean				0.009
Neuroticism*Close mean				0.004
Observations	35,145	35,145	35,145	35,145
R-squared	0.375	0.425	0.435	0.436

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
[a]All models controlled for country.
[b]Reference category = Age 50–64.

variables accounted for most of the explained variance in the respective well-being outcomes.

The personality traits also behaved consistently vis a vis the well-being indicators, across all models, with one exception. Conscientiousness, extraversion and agreeableness were all positively associated with the positive well-being measures (quality of life and life satisfaction), and negatively associated with the negative well-being measure (depressive symptoms). The trait of openness also positively associated with the positive well-being measures, but was unrelated to depressive symptoms. Neuroticism showed the opposite trend. That is, it was related to poorer quality of life, lower life satisfaction and more depressive symptoms, considering everything. The personality traits taken together added a modest amount of additional explained variance in the three outcome variables.

Turning to the social network characteristics, we see that they behaved uniformly and mostly consistently. All three of the characteristics (network size, contact frequency and emotional closeness) were positively related to life satisfaction and negatively related to depressive symptoms, net of the other variables in the analysis. They also mostly correlated positively with the quality-of-life measure (except for contact frequency, which was unrelated). The addition of the network variables added only a small amount to the explained variance, however, one percentage point or less.

In order to underscore the size of the relative contribution of the personality variables and the network indicators to the respective well-being outcomes, we ran additional regressions that included the background, health and social network variables, but not the personality traits (see Table S4 published as supplementary material). Comparing the respective regressions sets, we were then able to observe that the net contribution of the social network variables to the explained variance in the well-being outcome measures was $R^2 = .018$

Table 2. Background, health, personality, and network predictors of life-satisfaction among Europeans aged 50+: OLS regressions.

	Life-Satisfaction			
	Model 2A	Model 2B	Model 2C	Model 2D
Backgrounds[a]	β	β	β	β
Age 65-74[b]	0.019**	0.016**	0.021***	0.021***
Age 75+[b]	0.039***	0.032***	0.039***	0.038***
Gender (F)	0.032***	0.035***	0.025***	0.025***
Living arrangement	0.093***	0.098***	0.074***	0.074***
Education	0.028***	0.019***	0.020***	0.020***
Financial capacity	0.181***	0.167***	0.162***	0.162***
Mobility difficulty	−0.236***	−0.214***	−0.216***	−0.216***
Big-five personality traits				
Openness		0.040***	0.036***	0.036***
Conscientiousness		0.048***	0.040***	0.040***
Extraversion		0.072***	0.064***	0.065***
Agreeableness		0.033***	0.028***	0.028***
Neuroticism		−0.123***	−0.118***	−0.118***
Social network				
Network size			0.063***	0.063***
Contact frequency			0.041***	0.042***
Emotional closeness			0.097***	0.096***
Interactions				
Conscientiousness*Size				−0.005
Conscientiousness*Contact mean				0.003
Conscientiousness*Close mean				0.000
Extraversion*Size				−0.014**
Extraversion*Contact mean				0.003
Extraversion*Close mean				−0.002
Neuroticism*Size				0.017**
Neuroticism*Contact mean				0.012*
Neuroticism*Close mean				0.005
Observations	35,145	35,145	35,145	35,145
R-squared	0.186	0.218	0.229	0.230

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.
[a]All models controlled for country.
[b]Reference category = Age 50–64.

(quality of life), R^2 = .016 (life satisfaction), and R^2 = .005 (depressive symptoms). In comparison, the net contribution of the personality traits to the explained variance in the respective well-being outcome measures was consistently greater: R^2 = .042 (quality of life), R^2 = .027 (life satisfaction), and R^2 = .037 (depressive symptoms).

Moreover, we reported earlier that the personality traits and the social network indicators were interrelated at the bivariate level. Consequently, we examined the potential concern of multicollinearity in the regressions. The VIF scores for the personality traits ranged from 1.12–1.23, while the range for the network variables was from 1.34–1.64. The low VIF scores indicate that the relationships between the personality traits, the social network indicators and other variables were sufficiently independent.

In the final models of the respective regressions (Models 1D, 2D, and 3D), we added interaction terms between three of the personality traits and the three network characteristics. We focused on conscientiousness, extraversion and neuroticism as these traits showed the most robust results in the analyses. First of note is that the interaction of extraversion and network size was significant in relation to all the well-being outcomes: negatively vis a vis quality of life and life satisfaction, and positively with respect to depressive symptoms, (the direction of the coefficients of the interaction terms will be explained in the next paragraphs). The interaction of neuroticism and network size was significant (and positive) in relation to quality of life and life satisfaction, as was the interaction of neuroticism and contact frequency vis a vis life satisfaction. Finally, the negative interaction of neuroticism and emotional closeness was significant as well. The addition of the interaction terms hardly increased the explained variance, but served to underscore the most salient interactions between personality and social network.

Table 3. Background, health, personality, and network predictors of depressive symptoms among Europeans aged 50+: OLS regressions.

	Depressive Symptoms			
	Model 3A	Model 3B	Model 3C	Model 3D
Backgrounds[a]	β	β	β	β
Age 65-74[b]	−0.022***	−0.017**	−0.020***	−0.020***
Age 75+[b]	0.011	0.022***	0.019**	0.019***
Gender (F)	0.104***	0.088***	0.091***	0.090***
Living arrangement	−0.036***	−0.044***	−0.034***	−0.034***
Education	−0.040***	−0.038***	−0.040***	−0.040***
Financial capacity	−0.104***	−0.087***	−0.085***	−0.085***
Mobility difficulty	0.381***	0.356***	0.356***	0.356***
Big-five personality traits				
Openness		0.008	0.008	0.008
Conscientiousness		−0.032***	−0.028***	−0.028***
Extraversion		−0.027***	−0.024***	−0.024***
Agreeableness		−0.027***	−0.025***	−0.025***
Neuroticism		0.191***	0.189***	0.189***
Social network				
Network size			−0.013**	−0.014**
Contact frequency			−0.018**	−0.019**
Emotional closeness			−0.049***	−0.048***
Interactions				
Conscientiousness*Size				0.005
Conscientiousness*Contact mean				−0.003
Conscientiousness*Close mean				0.006
Extraversion*Size				0.016**
Extraversion*Contact mean				0.007
Extraversion*Close mean				−0.000
Neuroticism*Size				−0.000
Neuroticism*Contact mean				−0.003
Neuroticism*Close mean				−0.014**
Observations	35,145	35,145	35,145	35,145
R-squared	0.231	0.271	0.273	0.274

Notes: ** $p<0.01$, *** $p<0.001$.
[a]All models controlled for country.
[b]Reference category = Age 50–64.

In order to illustrate these results, we present graphs of selected interactions. The first graph in Figure 1, for example, shows life satisfaction by extraversion according to the size of the network (small, medium or large). As may be seen, as extraversion increases, so does life satisfaction. We also see, however, that regardless of extraversion, large networks are always related to more life satisfaction than are medium and small size networks. The effect of the interaction is apparent when comparing the slopes of network size. Post-estimation tests for the slopes revealed that the *p*-values of the three slopes were significant. Small network size has a greater slope for the correlation between extraversion and life-satisfaction, followed by the medium size and large size networks**.** This shows that as network size increases, the positive effect of extraversion on life satisfaction is reduced (hence the negative coefficient). Stated differently, network size minimizes the risk of poor life satisfaction among those with low scores on extraversion.

This same dynamic can be seen, in reverse, in the first graph in Figure 2, which shows life satisfaction by neuroticism according to network size. Here too, we see that regardless of neuroticism, large network size is always related to more life satisfaction than is medium network size and, in turn, medium size is always related to more life satisfaction than is low network size. We also see that as neuroticism increases, life satisfaction decreases. As for the interaction, post-estimation tests for the slopes revealed that the *p*-values of the three slopes were significant. Small network size has a greater slope for the correlation between neuroticism and life-satisfaction, followed by the medium size and large size networks**,** meaning that as network size increases, the negative effect of neuroticism on life satisfaction is reduced (hence the positive

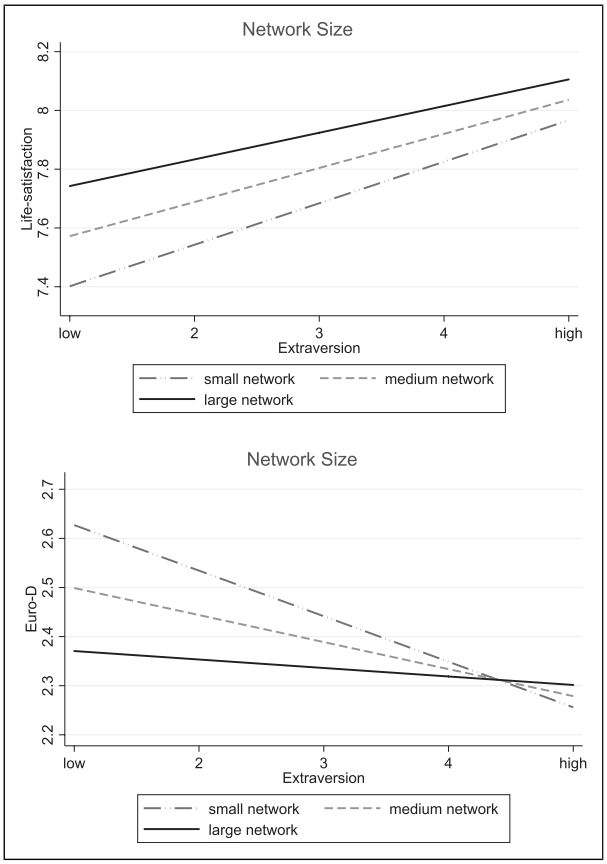

Figure 1. Life satisfaction and depressive symptoms by social network size according to level of extraversion.

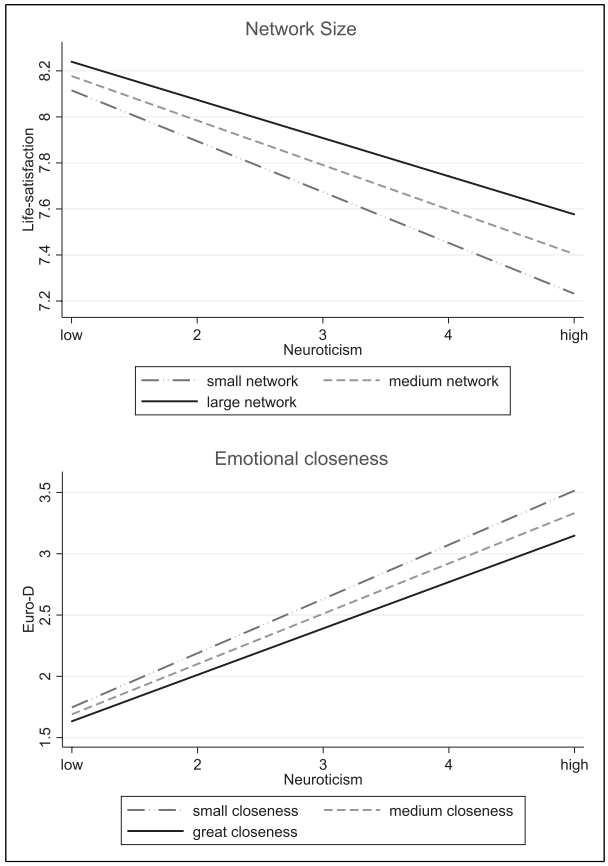

Figure 2. Life satisfaction by social network size and depressive symptoms by emotional closeness, according to level of neuroticism.

coefficient). That is, increased network size enhances the chance of greater life satisfaction among those having high levels of neuroticism.

The second graph in Figure 1 presents the number of depressive symptoms by extraversion, according to social network size. Here, again, we see, that the effect of the interaction is demonstrated by the smaller slopes as network size increases. Post-estimation tests for the slopes revealed that the *p*-values of small and medium network slopes were significant, but not large. That is, the effect of extraversion on depression is reduced and even disappeared as social network size increases, and accordingly, the risk of experiencing more depressive symptoms at low levels of extraversion is minimized.

Finally, the second graph in Figure 2 shows the inverse of what was shown in the first graph within that same figure. The graph shows depressive symptoms by neuroticism according to the level of emotional closeness of the network. Post-estimation tests for the slopes revealed that the *p*-values of the three slopes were significant. As may be seen, the slopes become smaller as the level of emotional closeness increases. That is, the effect of neuroticism on depressive symptoms is reduced as the levels of emotional closeness of the social network increases, albeit to a lesser degree than in the graphs presented thus far. Graphs of other significant interactions may be seen in Supplementary Figure 1 (see figure S1 published as supplementary material). They show similar trends, but with slightly more modest differences.

As a final caveat, we ran a supplementary regression analysis in which we included also the respondents who reported no confidants ($N = 918$). As noted earlier, they were not included in the main analysis because they lacked key network data. But we did want to see whether their entry into the analysis changed the contribution of the personality traits to the well-being outcomes. Toward this end, we ran a dichotomous network variable in which a score of zero meant no reported confidants, and a score of one reflected one or more confidants.

The results of this regression (see Table S5 published as supplementary material), revealed that the inclusion of the group with no confidants did not change the associations between the personality traits and the well-being outcomes that emerged in the main analysis, except for some minor modifications in the strength of the respective coefficients. Moreover, the dichotomous network variable that was employed in the supplementary analysis showed that those with one or more confidants had greater quality of life, greater life

satisfaction and fewer depressive symptoms than those who reported having no confidants at all, above and beyond the effect of personality.

Discussion

Although personality and social network have both been linked to the subjective well-being of older adults (Etxeberria et al., 2019; Rafnsson et al., 2015), there is still little information regarding the complex inter-relationships of these three respective domains. Moreover, work in this area of inquiry is complicated by the nature of each such domain, mainly because they are all multi-faceted. In order to bring some degree of clarity to the interplay of personality and social network in relation to perceived well-being, therefore, the current inquiry considered five personality traits and three social network characteristics vis a vis three different well-being measures in late life.

Our analysis was made possible by the special data capacity of the SHARE longitudinal survey of adults aged 50 and over. SHARE has recently collected data on personality traits (Wave 7) and ego-centered (or personal) social networks (Wave 8), as well as on a wide range of sociodemographic, health and well-being variables from a very large sample of older people in a wide range of European countries (and Israel). Consequently, the data that we needed to address our specific research questions were newly available.

First of note is that the personality traits proved in our analysis to be significant predictors of subsequent well-being, net of the other study variables. Moreover, they worked primarily in the directions that have been variously reported in the literature (Anglim et al., 2020; Chapman et al., 2007; Cheng et al., 2014; Navarro-Prados et al., 2018; Weber et al., 2012). Thus, conscientiousness and extraversion were related in our study to better well-being while neuroticism correlated consistently with poor well-being. Agreeableness and openness were also related to better well-being, but to a somewhat lesser degree. The findings confirm, therefore, that personality does indeed affect subjective well-being in late life.

The social network characteristics were also significant predictors of the well-being outcomes, that is, greater quality of life and life satisfaction and fewer depressive symptoms. Among the network characteristics, the mean emotional closeness of the confidant network was the most predictive of better well-being, followed by network size and mean frequency of contact, respectively. We thus reconfirm in our study that one's closest interpersonal milieu is related to one's perceived well-being in later life, as has been noted by Carstensen and others (English & Carstensen, 2014; Lang et al., 1998). Curiously, mean contact frequency was inversely related at the bivariate level with openness, agreeableness, extraversion, and life satisfaction, and positively associated with neuroticism and depressive symptoms, which is not what one might expect. It could be that older adults with greater life problems require more visits from confidants checking up on them.

The first research question that we considered in the analysis was whether personality traits and social network characteristics associate with subjective well-being outcomes to the same degree. That is, both are important, but are they equally important for well-being in late life? The multi-stage regression analyses showed that the personality traits explained more variance than the network variables did. It seems, therefore that personality is the stronger predictor of the two.

Our second research question queried whether social network characteristics intervene in the association between personality traits and subjective well-being. The results of the present analysis show that they do. Generally, we can summarize that social network variables, particularly size and mean emotional closeness, offset the effects of dysfunctional personality attributes on well-being in late life. This is an important insight from the present research.

We should note that sociodemographic background and functional health status accounted for the largest part of the explained variance in each of the well-being outcomes. The analyses showed that the two most associated variables, generally, were financial status and poor functional health (mobility difficulties). Better financial capacity was related to greater quality of life and life satisfaction, as well as to fewer depressive symptoms. Poor functional health had the reverse association: poorer quality of life and life satisfaction alongside more depressive symptoms. This finding underscores that financial insecurity and poor functional health are major threats to subjective well-being in late life. They are factors, however, that society can and should prevent, or at least limit.

Among the age groupings in our analysis, we saw that the oldest age group (75+) was the strongest relative age predictor of lesser well-being. This reminds us why mental health care for older people must be a priority within the helping professions. They are the older adults who are most at risk.

From a theoretical point of view, our study generally supports the contention by Lucas and Diener (2009) that personality traits are more strongly associated with well-being than are situational circumstances, in this case social network characteristics. The results from the present study, thus, underscore the top-down paradigm of subjective well-being. However, our findings of a moderation of the personality trait effects by the social network characteristics lends some limited support to bottom-up models of subjective well-being as well (Feist et al., 1995), reflecting the dynamic and multi-faceted nature of the well-being outcome.

A few limitations of the present study should be noted. First to mention, is our reliance on a brief version of the Big-5 Inventory. This prevented a deeper analysis of the various facets of each of the personality traits. This shortcoming is countered, however, by the advantage of having a very large sample with sufficient personality data that allowed systematic consideration of the effects of the respective five personality traits.

A second possible shortcoming is that the network characteristics and the well-being outcome variables were measured in the same wave (Wave 8 of SHARE). Hence, we cannot singularly determine the direction of the relationships between these two sets of variables. It might be that well-being shaped respondents' social network, in some cases. Additional research on this topic is warranted, therefore, when data from future waves of SHARE are released for public use.

A third limitation is the use of mean scores for two of the network characteristics, which may yield ambiguous results. For example, different network size and contact frequency combinations might nevertheless produce similar contact frequency means. To check this potential discrepancy, we reran the regressions using the maximum contact frequency and maximum emotional closeness scores for each respondent instead of the means. The results of these analyses were generally quite similar to those reported earlier in this report, with only a few minor changes. Thus, in the present study, this particular methodological concern was negligible.

In sum, this study revealed that social network characteristics do, indeed, intervene in the personality—well-being nexus. Social networks tend to modify the ill effects of personality, in whatever manner they are expressed, on key well-being indicators. As such, the most intimate personal milieus of older people—their confidant networks—should be the focus of additional study and research in the domain of subjective well-being and its promotion.

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Supplemental Material

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