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Article

Relationship Between Social Connectedness and Quality of Life in Older Adults: An Examination of Sex Differences

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ABSTRACT

Background. Despite the literature supporting the important role of social connectedness in older people's Quality of Life (QoL), study of this association has been scarce, especially sex-specific social mechanisms. This study aimed to examine how social connectedness related to QoL in community-dwelling older adults, considering sex differences. **Method**. 709 people from Spain, aged 60 and over participated in the study and completed a survey that included sociodemographic characteristics, social connectedness, psychological resources, mental health and QoL. Path analysis was performed to test the hypothesized model. Associations between the assessed variables were tested separately for men and women. **Results**. The relationship between family function and QoL was fully mediated by psychological resources and mental health, but the direct paths used by women were different from men. The relation between loneliness and QoL was partially mediated, with gratitude and resilience playing a more prominent role among women. **Conclusions**: The critical role of social factors is highlighted, as humans are inherently social beings. The study found sex differences in the relationship between social connectedness and QoL, mediated by psychological resources, well-being, and distress. Men and women cope with adversity differently. It is important to consider sex differences when designing interventions for older adults.

Relación Entre la Conexión Social y la Calidad de Vida en Personas Mayores: Un Análisis de las Diferencias por Sexo

Palabras clave:
Soledad
Función familiar
Envejecimiento
Resiliencia
Gratitud

RESUMEN

Antecedentes: A pesar del apoyo de la literatura al importante papel de la conexión social en la Calidad de Vida (CV) de las personas mayores, el estudio de esta asociación es escaso, especialmente en los mecanismos sociales específicos de cada sexo. Este estudio analizó la relación entre conexión social y CV en adultos mayores que vivían en la comunidad, considerando diferencias por sexos. **Método:** Participaron 709 personas de 60 años y más. Se utilizó un modelo de ecuaciones estructurales para probar el modelo hipotetizado. Las asociaciones entre las variables evaluadas se probaron por separado para mujeres y hombres. **Resultados:** La relación entre función familiar y CV fue completamente mediada por recursos psicológicos y salud mental, pero los resultados difirieron en mujeres y hombres. La relación entre soledad y la CV fue mediada parcialmente, siendo la gratitud y la resiliencia más relevantes en mujeres. **Conclusiones:** Se destaca el papel crítico de los factores sociales, ya que los seres humanos somos inherentemente sociales. El estudio encontró diferencias por sexos en la relación entre conexión social y CV, mediada por recursos psicológicos, bienestar y angustia. Hombres y mujeres enfrentan las adversidades de manera diferente. Es importante considerar estas diferencias al diseñar intervenciones.

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Quality of Life (QoL) is an expression of how people perceive their attitude towards life considering their culture, targets, expectations, lifestyles and interests (WHO Quality of Life Assessment Group, 1996). The Social Determinants of Health (SDOH) play a decisive role in older people's QoL (Gu et al., 2019).

The SDOH are grouped into five dimensions: economic stability, social and community context, education access and quality, health care access and quantity and quality, and neighborhood and built environment (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2025). Although all the SDOH dimensions can impact QoL, the interest in social and community context, i.e., social connectedness, has received more attention globally, especially after the COVID-19 pandemic (National Academies of Sciences, Engineering, and Medicine [NASEM], 2020).

Older people consider social connectedness to extend beyond the objective social dimension (quantity). It is a multilevel concept that also encompasses the subjective aspect and the perceived quality of social support (Morgan et al., 2021). This subjective dimension of social connectedness has been considered the opposite of loneliness (Morgan et al., 2021). On the one hand, the literature indicates that the social relationships older adults have in general are essential for QoL. The relationship with their closest relatives is especially important for older adults (Kousha et al., 2022) and family support is the main and primary source of social support for most older people and is related with better QoL (Nakhodaeezadeh et al., 2017).

On the other hand, the physical and psychological short and long-term negative consequences of isolation and loneliness are well documented (NASEM, 2020). Research has also supported the significant relationship between lack of social connections and mortality risk, poor physical and mental health, such as depression and anxiety (Park et al., 2020). As a result, health and well-being could be directly or indirectly explained by social connection from 40% to more than 80% (Hood et al., 2016). Older adults´ social connections are related to better health, successful aging and longevity and decreased rates of depression (NASEM, 2020; World Health Organization, 2015).

The stress and coping model (Lazarus & Folkman, 1984) highlights the importance of the person´s resources and coping strategies buffering the impact of stress on people´s health. Some examples of psychological resources acting as mediators between stress and health indicators have been resilience, acceptance and gratitude (Pérez-Rojo et al., 2021). First, resilience protects older adults from stressful and potentially traumatic events and increases older adults' adaptability, which maintains a better QoL (Ratanasiripong et al., 2022). Second, acceptance is the capacity to actively open oneself to experiencing private events or internal stimuli/world/environment, particularly those perceived as negative due to the suffering they cause, without the intention of escaping from them or changing their form or frequency (Hayes et al., 2011). Older adults with higher levels of acceptance exhibit higher QoL in the domains of health, safety, community participation, and emotional well-being (Butler & Ciarrochi, 2007). Third, gratitude is a feeling of thankfulness and joy in response to the receipt of a gift regardless of whether it is something tangible or not (Emmons, 2004). Gratitude promotes social interactions and satisfaction with them and has shown beneficial effects on emotional well-being. Empirical evidence supports a positive relationship between gratitude and overall QoL (Jans-Beken et al., 2020).

Moreover, sex differences should be considered when analyzing older adults' QoL. Men tend to report higher levels of QoL compared to women (Beridze et al., 2020). A longitudinal study using three waves of the Survey of Health, Ageing and Retirement in Europe also found lower levels of QoL in women across all time points (Torres et al., 2024). Women' life expectancy is higher than that of men, and the risk of facing challenges that may compromise QoL is also greater in women.

Men and women may also differ in how they perceive, cope with, or respond to challenges, influenced by culturally shaped socialization processes (Beridze et al., 2020). Torres et al. (2024) observed lower levels of loneliness and QoL in women, although the relationship between these variables remained consistent across sex over time. These authors attributed their findings to different social mechanisms in men and women that may moderate the relationship between loneliness and QoL. However, Mayerl et al. (2024) found similar levels of loneliness in male and female older adults, but women tended to respond to loneliness with depressive symptoms more often than men. Tobiasz-Adamcyk et al. (2017) reported that men benefited more from social support, whereas women benefited more from social participation in relation to QoL. Furthermore, older women who were more resilient and who showed greater gratitude and acceptance also reported higher well-being and lower emotional distress compared to men (Pérez-Rojo et al., 2021). Nevertheless, specific social mechanisms by sex that influence QoL remain understudied and warrant further exploration (Mayerl et al., 2024; Torres et al., 2024).

Previous studies focused on the overall relationship between older adults' QoL and diseases, but the association between older adults' QoL and SDOHs is scarce. Within SDOHs, social connectedness shows an important relationship with older adults´ QoL, but the paths by which these two variables relate to each other are understudied neither the sex-specific social mechanisms. Therefore, the aim of this study was to examine how social connectedness (family function and loneliness) relates to QoL in community-dwelling older adults considering differences by sex. We also included psychological resources (acceptance, gratitude and resilience) and indicators of distress (anxiety and depression) and well-being (life purpose and personal growth).

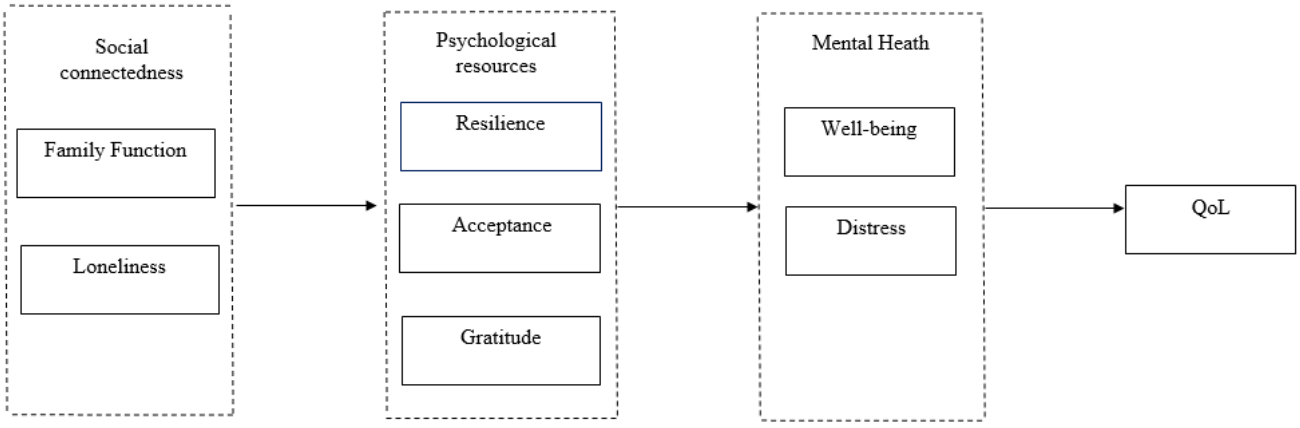
We hypothesized that loneliness would associate negatively with QoL while family function will show positive relations with QoL. However, these relationships are not expected to be direct, but rather indirect through psychological resources and indicators of distress and well-being. In addition, men and women are expected to differ in QoL (higher in men), loneliness (higher in women), and in the psychological resources they utilize (greater acceptance and gratitude in women) (see Figure 1).

Method

Participants

The inclusion criteria to participate in this study were: being 60 years or older, residing in Spain, and without a diagnosis of a neurological disease, severe psychopathological disorder, or any other condition incompatible with completing the questionnaires. Participants were 709 community-dwelling older adults aged 60 and above from Spain. Their mean age was 68.40 years (*SD* = 6.52), with

Figure 1
Hypothesized General Model for Men and Women



ages ranging from 60 to 94. Of the total sample, 55.4% were female and 44.6% male. Most participants were married (65.2%), while 13.8% were divorced, 12.3% were widowed, and 8.3% were single.

Instruments

Sociodemographic Data

Sex (men and women), age and marital status.

Loneliness

We used the Three-Item Loneliness scale (TIL-scale; Hughes et al., 2004). It consists of three items with response options on a three-point Likert scale. The scale achieved good psychometric properties in our sample (Cronbach's α=.84)

Family Function

It was assessed with the Family APGAR (Smilkstein, 1978). It is a 5-item scale that measures family adaptability, partnership, growth, affection and resolve which are scored in a 3-point Likert scale. It showed good reliability in our sample (Cronbach's α=.79).

Resilience

We used the Brief Resilient Coping Scale (Sinclair & Wallston, 2004). It is a 4-item scale in which participants are asked to score on a 5-point Likert scale. Good reliability in our sample was found (Cronbach's α=.84).

Gratitude

We used the gratitude subscale of the Values in Action Inventory of Strengths-Short Form (Littman-Ovadia, 2015). It is a 5-item scale with 5-point Likert scale response options. Good reliability in our sample was found (Cronbach's α=.97).

Acceptance

This variable was evaluated with the Acceptance and Action Questionnaire - II (AAQ-II) (Bond et al., 2011). This scale measures experiential avoidance and psychological inflexibility (the opposite of acceptance) with 7 items. This scale showed good internal consistency (Cronbach's α=.88).

Psychological Well-Being

We used Ryff´s psychological well-being scale (1989). Of the six subscales, we included personal growth (7 items) and purpose in life (6 items). Both subscales consist of a 7-point Likert scale. Personal growth (Cronbach's α=.69) and purpose in life (Cronbach's α=.79) achieved good reliability.

Distress

The Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) was used. This is a 14-item scale with 4 response options divided into two subscales: anxiety (7 items) and depression (7 items). For this study we used the total score of distress which showed good reliability (Cronbach's α=.86).

Quality of Life

We used the 12 item CASP Scale (Higgs et al., 2003). This scale derives from the theory of human need satisfaction, including four domains in which each item is answered on a four-point Likert scale: control, autonomy, self-realization and pleasure. For this study we included the total score of the scale that achieved good reliability (Cronbach's α=.82).

Procedure

The study was first approved by Ethics Committee of Universidad San Pablo-CEU University Ethics Committee (reference 436/20/26).

The sample was collected through older adults' associations and organizations from several backgrounds and social networks using a non-probability snowball sampling strategy. Staff from the different associations and organizations facilitated first contact with the participants who met the inclusion criteria. Data was collected through a self-administered web-based survey. Participants were also offered a printed version of the questionnaire in case they preferred this other option.

All participants agreed to participate in the study and signed informed consent. They were informed of the aims of the study, the anonymous treatment of their data and the possibility of withdrawing the study anytime. They did not receive any incentive for participation.

Data Analysis

The variables were not normally distributed as shown by the Kolmogorov-Smirnov test. To analyze sex-based differences in the study variables, we conducted chi-square tests for categorical variables and Mann-Whitney U tests or independent samples *t*-tests for quantitative variables. Although some variables showed slight deviations from normality, the large sample size (n = 709) justifies the use of parametric tests based on the Central Limit Theorem, which states that the sampling distribution of the mean approaches normality as sample size increases, regardless of the shape of the population distribution. Furthermore, the *t*-test is considered robust to violations of normality and heteroscedasticity, particularly in large samples, and allows for the estimation of effect sizes (Cohen's *d*), which facilitates the interpretation of the magnitude of group differences (Field, 2013). We also conducted Spearman correlation coefficients (rho) to analyze possible associations between age and the outcome variables. To test whether the associations between variables differed significantly by sex, we conducted comparisons of correlation coefficients using Fisher's Z transformation.

We then performed a Path analysis to test the model hypothesized (figure 1). The associations between the assessed variables were tested separately for women and men. Following Byrne (2001) suggestion when having non-normal data, we used the Bollen-Stine (B-S) bootstrap test statistic. We used the fit indexes chi-square statistic (χ^2), the ratio of chi-square to degree of freedom (χ^2/gl), the goodness-of-fit index (GFI), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the normed fit index (NFI) and the Root Mean Square Error of Approximation (RMSEA). Direct and indirect effects were tested with bootstrapping as recommended by Preacher and Hayes (2004) for testing mediation, using 2,000 bootstrap samples and bias-corrected 95% confidence intervals. Separate models were specified for loneliness and family functioning as independent variables. Multigroup analysis was used for testing differences in the obtained paths across women and men, both for direct and indirect effects. The statistical packages SPSS 30 and AMOS 29 were used to do the analysis.

Results

Sex Differences in the Assessed Variables

The chi-square test revealed significant associations between sex and marital status in all categories except "widowed." Standardized residuals indicated that women were overrepresented in the "single" and "divorced" categories and underrepresented in the "married" category. Conversely, men were overrepresented in the "married" category and underrepresented in the "single" and "divorced" categories (Table 1).

Table 1
Descriptive Statistics and Group Comparisons by Sex (Categorical Variables)

Variable	Women		Men		χ^2 (gl)	*p*
	(n, %)	*SR*	*(n, %)*	*SR*		
Marital Status						
Single	51 (82.3)	2.8	11 (17.7)	-3.2	51.696 (3)	<
Married	212 (45.9)	-2.8	250 (54.1)	3.1		.001
Divorced	70 (71.4)	2.1	28 (28.6)	-2.4		
Widowed	60 (69)	1.7	27 (31)	-1.9		

Note. SR = Standardized Residual; Chi-square test includes degrees of freedom and p-value.

In addition, women reported higher levels of loneliness and lower scores on QoL compared to men, with small to moderate effect sizes. Although group differences in gratitude, acceptance, and family functioning were statistically significant with higher scores in men, the corresponding effect sizes were small (Table 2). In contrast, sex was not significantly associated with resilience, distress, or well-being.

Association Between the Assessed Variables by Sex

Table 3 shows the relationships between the assessed variables for men and women. Among men, older age was associated with greater resilience and lower well-being and QoL. Family function was positively and significantly associated with resilience, acceptance, well-being and QoL, and negatively with loneliness, gratitude and psychological distress. Loneliness was positively associated with distress and negatively with resilience, acceptance, well-being, and QoL. Gratitude was negatively related to resilience and well-being, and positively to QoL. Resilience was positively related to acceptance, well-being, and QoL, and negatively to distress. Acceptance was positively associated with well-being and QoL, and negatively with distress. Well-being was positively associated with QoL, and negatively with distress. Finally, distress and QoL were negatively associated.

Among women, older age was associated with lower levels of gratitude and QoL. Loneliness was related positively to gratitude and distress while negatively to resilience, acceptance, well-being and QoL. Gratitude was positively associated with distress, and negatively with resilience, acceptance and well-being. The remaining associations between variables mirrored those found in men, including the relationships between family function, loneliness, resilience, acceptance, distress, and QoL.

Of all the associations examined, only two showed statistically significant sex-based differences: the correlation between gratitude and acceptance (Z = -2.04; p < .05), and the correlation between gratitude and distress (Z = -0.34; p = .01), both of which were stronger among women.

Path Analysis

The hypothesized model (figure 1) did not show a good fit (χ^2 = 342,031; χ^2/gl = 13; p = .001; GFI = .90; CFI = .74; TLI = 44;

Table 2
Descriptive Statistics and Group Comparisons by Sex (Quantitative Variables)

Variable	*M*	*SD*	*Median*	*t(df)*	*p (t)*	*Cohen's d*	*Z (U)*	*p (U)*
Age								
Women	68.46	6.39	67	-.298	.383	-.022	.595	.552
Men	68.32	6.67	67	(707)				
Family Function								
Women	8.48	2.01	9	2.130	.017	.160	-2.387	.017
Men	8.79	1.88	10	(691.242)				
Loneliness								
Women	4.40	1.42	4	-5.203 (693.232)	<.001	-.390	5.725	.001
Men	3.86	1.29	3					
Acceptance								
Women	28.89	7.09	29	2.988	.001	.226	-2.979	.003
Men	30.47	6.82	32	(707)				
Gratitude								
Women	11.29	6.77	9	2.567 (649.29)	.005	.196	-2.019	.044
Men	12.67	7.34	10					
Resilience								
Women	15.08	3.29	15	-1.234 (707)	.109	-.093	1.03	.304
Men	14.77	3.48	15					
Well-Being								
Women	57.80	7.93	58	-.011	.496	-.001	-.289	.772
Men	57.99	9.15	58	(707)				
Distress								
Women	10.51	6.29	9	1.445 (598.501)	.075	.112	-.391	.696
Men	11.29	7.74	9					
QoL								
Women	32.49	7.34	32	3.931	<.001	.297	-3.561	.001
Men	34.77	8.13	34	(707)				

Table 3
Spearman Correlations Among the Assessed Variables

Variable	1	2	3	4	5	6	7	8	9
Men									
1. Age	—								
2. Family Function	.039	—	.						
3. Loneliness	-.001	-.375***	—						
4. Gratitude	-.033	-.149**	.048	—					
5. Resilience	.181***	.163**	-.174**	-.126*	—				
6. Acceptance	-.104	.163**	-.343***	-.060	.369***	—			
7. Well-Being	-.219***	.216***	-.156**	-.118*	.546***	.420***	—		
8. Distress	.042	-.291***	.236***	-.089	-.249***	-.276***	-.289***	—	
9. QoL	-.253***	.190***	-.289***	.204**	.364***	.357***	.429***	-.384***	—
Women									
1. Age									
2. Family Function	-.059	—							
3. Loneliness	.047	-.408***	—						
4. Gratitude	-.138**	-.149**	.130**	—					
5. Resilience	.088	.104**	-.192***	-.210***	—				
6. Acceptance	-.007	.343***	-.402***	-.155***	.342***	—			
7. Well-Being	-.082	.258***	-.261***	-.192***	.417***	.378***	—		
8. Distress	.039	-.226***	.319***	.191***	-.337***	-.498***	-.397***	—	
9. QoL	-.104*	.330***	-.301***	-.058	.274****	.391***	.421***	-.361**	—

***$p < .001$; **$p < .01$; *$p < .05$

NFI = .44; RMSEA = .189; *B-S bootstrap* was significant, $p = .001$; 95% *Confidence Interval*). To increase the degrees of freedom, we eliminated non-significant paths and included modifications in the model following the suggestions of the modification indices, which were applied based on theoretical justification. At each step, we removed one parameter at a time, prioritizing those that most improved model fit, until a satisfactory fit was achieved (Jöreskog, 1993). Each modification was evaluated in light of the theoretical framework of the study, ensuring that the changes were not solely data-driven but also conceptually coherent. The final model showed an excellent fit for both groups ($\chi^2 = 12.006$; $\chi^2/gl = 9$; $p = .213$; *GFI* = .99; *CFI* = .99; *TLI* = 99; *NFI* = .99; *RMSEA* = .022; *B-S bootstrap* was non-significant, $p = .249$; 95% *Confidence Interval*), explaining 43% of the QoL variance for women and 45% for men (figure 2).

For men, all associations included in the final model were significant, except for the relationship between family function and acceptance. For women, the relationships between family function and resilience, family function and distress, and distress and well-being were not significant. Regression weights for men and women are presented in Table 4.

We then constrained the individual paths to test for group differences. Results showed a significant decrease in model fit between the unconstrained and the constrained models for the following paths suggesting differences between men and women: 1) The association between family function and distress was significant for men but not for women (*CMIN* = 84.99; $p = .004$); 2) The relationship between acceptance and distress was significant in both groups but stronger in women (*CMIN* = 6.045; $p = .014$); 3) Family function and resilience were significantly associated in men but not in women (*CMIN* = 6.519; $p = .011$); 4) the relationship between resilience and well-being was significant in both groups but stronger in women (*CMIN* = 4.135; $p = .042$). No other significant differences between direct paths when comparing the unconstrained model with the structural weights model.

Table 4

Differences Between Women and Men in Unstandardized Regression Weights

			Women		Men	
			RW	*SE*	*RW*	*SE*
Family function	→	Resilience	.017	.091	.386***	.112
Loneliness	→	Resilience	-.407**	.129	-.324*	.164
Family function	→	Acceptance	.761***	.170	.265	.199
Loneliness	→	Acceptance	-1.176***	.244	-1.768***	.287
Resilience	→	Acceptance	.636***	.095	.568***	.098
Family function	→	Distress	-.222	.143	-1.012***	.229
Acceptance	→	Distress	-.330***	.043	-.136*	.066
Resilience	→	Distress	-.402***	.088	-.292*	.128
Family function	→	Well-Being	.630***	.180	.460*	.232
Acceptance	→	Well-Being	.201***	.058	.295***	.065
Distress	→	Well-Being	-.094	.063	-.109*	.055
Resilience	→	Well-Being	.814***	.113	1.160***	.127
Resilience	→	Gratitude	-.327***	.103	-.238*	.118
Loneliness	→	QoL	-.690**	.220	-.907***	.282
Acceptance	→	QoL	.103*	.051	.232***	.057
Well-Being	→	QoL	.314***	.040	.263***	.040
Distress	→	QoL	-.299***	.053	-.181***	.044
Gratitude	→	QoL	.351***	.043	.468***	.044
Family function	→	Loneliness	-1.269***	.158	-1.092***	.149

Note. *RW* = regression weights; *SE* = standard error.

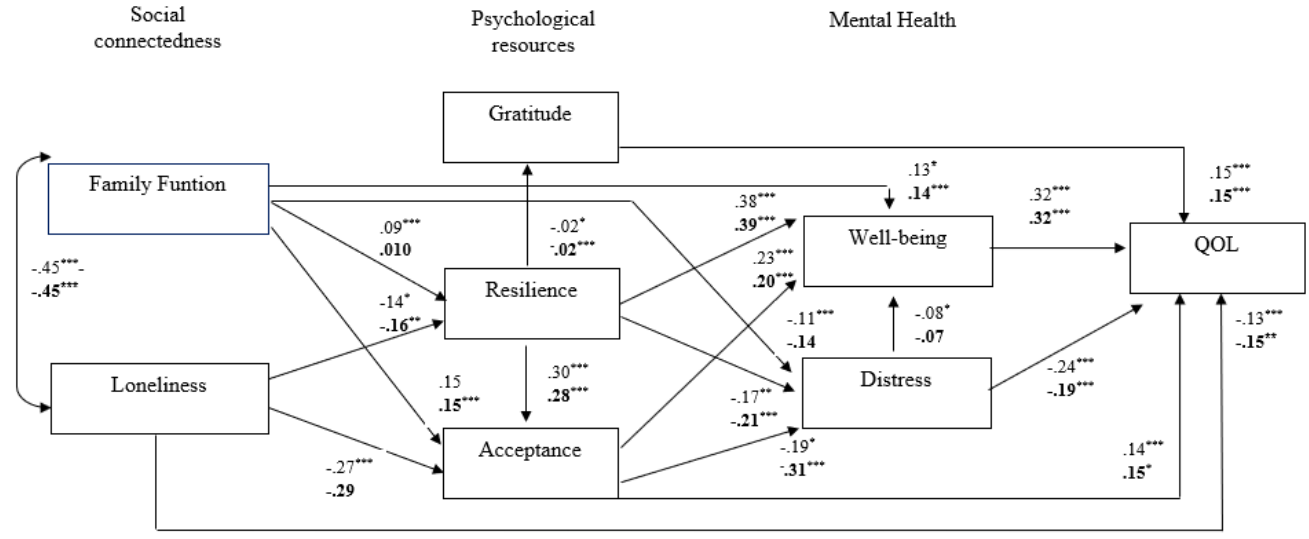
***$p < .001$; **$p < .01$; *$p < .05$

The bootstrap analysis was conducted at two levels to examine the mediating mechanisms linking key predictors to QoL. The first level focused on the mediators between family function and QoL, while the second level explored the mediators between loneliness and QoL. Results for each model are presented separately (tables 5 and 6).

Family function showed a total indirect effect on QoL, with no direct effect in either group. In women, the most prominent mediating pathway was through well-being (41.34%) and acceptance (16.28%). In addition to their individual effects, combined mediational pathways involving acceptance and distress (15.66%), as well as acceptance and well-being (10.02%), also showed significant contributions to the overall model. In men, the strongest mediators

Figure 2

Path Analysis With Standardized Regression Weights for Women (in bold) and Men.



Note. The errors have been omitted for ease of presentation.

Table 5
Distribution of Effects and Mediated Pathways from Family Function to Quality of Life (Standardized Effects)

	Family Function effects on QoL for women					Family Function effects on QoL for men				
	Bootstraps		IC95%			Bootstraps		IC95%		
	Effect	*SE*	*LL*	*UL*	*%*	*Effect*	*SE*	*LL*	*UL*	*%*
Total Effect	.479***	.105	.286	.700	100	.550***	.139	.307	.868	100
Direct Effect	.000	.000	.000	.000	0	.000	.000	.000	.000	0
Indirect Effect	.479***	.105	.286	.700	100	.550***	.139	.307	.868	100
Indirect Effect Pathways										
1. Family function → Well-being → QoL	.198***	.061	.096	.341	41.34	.121	.079	-.021	.296	22
2. Family function → Distress → QoL	.066	.046	-.013	.170	13.78	.183***	.058	.090	.319	33.27
3. Family function → Distress → Well-being → QoL	.000	.003	-.009	.004	0	-.011*	.008	-.034	-.001	2
4. Family function → Resilience → Well-being → QoL	.004	.022	-.035	.052	.84	.118***	.048	.047	.246	21.45
5. Family function → Resilience → Distress → QoL	.002	.011	-.018	.026	.42	.020*	.014	.003	.064	3.64
6. Family function → Resilience → Distress → Well-Being → QoL	.000	.001	-.002	.004	0	.003*	.003	.000	.016	.55
7. Family function → Resilience → Acceptance → QoL	.001	.007	-.009	.020	.21	.051**	.028	.012	.132	9.27
8. Family function → Resilience → Acceptance → Well-Being → QoL	.001	.004	-.006	.009	.21	.017**	.010	.005	.046	3.09
9. Family function → Resilience → Acceptance → Distress → QoL	.001	.006	-.009	.014	.21	.005**	.004	.001	.018	.90
10. Family function → Resilience → Acceptance → Distress → Well-Being → QoL	-.001	.003	-.009	.005	.21	-.005	.004	-.020	.000	.90
11. Family function → Resilience → Gratitude → QoL	-.002	.010	-.026	.016	.42	-.043*	.030	-.125	-.003	7.82
12. Family function → Acceptance → QoL	.078*	.047	.006	.186	16.28	.062	.058	-.025	.214	11.27
13. Family function → Acceptance → Well-Being → QoL	.048***	.021	.018	.103	10.02	.021	.024	-.009	.093	3.82
14. Family function → Acceptance → Distress → QoL	.075***	.026	.036	.145	15.66	.007	.008	-.002	.035	1.27
15. Family function → Acceptance → Distress → Well-Being → QoL	.007	.005	-.002	.021	.001	.001	.002	.000	.009	.18

Notes. SE = Standard Error; *95% CI* = 95% Confidence Interval of the effect; *LL* = Lower Limit of the CI; *UL* = Upper Limit of the CI; *%* = Percentage of the effect attributed to each source.

Table 6
Distribution of Effects and Mediated Pathways from Loneliness to Quality of Life (Standardized Effects)

	Loneliness effects on QoL for women					Loneliness effects on QoL for men				
	Bootstraps IC95%					Bootstraps IC95%				
	Effect	*SE*	*LI*	*LS*	*%*	*Effect*	*SE*	*LI*	*LS*	*%*
Total Effect	-1.260***	.276	-1.791	-.698	100	-1.693***	.285	-2.255	-1.138	100
Direct Effect	-.690*	.249	-1.148	-.160	54.76	-.907**	.290	-1.449	-.301	53.57
Indirect Effect	-.569***	.140	-.147	-.056	45.16	-.786***	.178	-1.177	-.485	46.43
Indirect Effect Pathways										
1. Loneliness → Acceptance → QoL	-.121*	.071	-.297	-.297	9.60	-.411***	.166	-.828	-.150	24.28
2. Loneliness → Acceptance → Distress → QoL	-.116***	.041	-.216	-.216	9.21	-.044*	.025	-.111	-.007	2.59
3. Loneliness → Acceptance → Distress → Well-Being → QoL	-.011	.009	-.033	-.033	0.79	-.007*	.006	-.028	.000	0.41
4. Loneliness → Acceptance → Well-Being → QoL	-.074***	.031	-.151	-.151	5.87	-.137***	.060	-.275	-.044	8.09
5. Loneliness → Resilience → Distress → QoL	-.049***	.026	-.119	-.119	3.89	-.017*	.014	-.063	-.001	0.41
6. Loneliness → Resilience → Well-Being → QoL	-.104***	.043	-.212	-.212	8.25	-.099*	.059	-.242	-.003	5.85
7. Loneliness → Resilience → Distress → Well-Being → QoL	-.005	.005	-.022	-.022	0.39	-.003*	.003	-.017	.000	0.18
8. Loneliness → Resilience → Gratitude → QoL	.047**	.026	.012	.012	3.73	.036	.031	-.001	.134	2.13
9. Loneliness → Resilience → Acceptance → QoL	-.091***	.039	-.191	-.191	7.22	-.086*	.052	-.212	-.001	5.08
10. Loneliness → Resilience → Acceptance → Well-Being àQoL	-.016***	.009	-.043	-.043	1.27	-.014*	.012	-.049	.000	0.82
11. Loneliness → Resilience → Acceptance → Distress → QoL	-.026***	.012	-.059	-.059	2.06	-.005*	.004	-.020	.000	0.29
12. LonelinessàResilience → Acceptance → Distress → Well-Being → QoL	-.003	.002	-.009	-.009	0.24	-.001*	.001	-.006	.000	0.06

Notes. SE = Standard Error; *95% CI* = 95% Confidence Interval of the effect; *LL* = Lower Limit of the CI; *UL* = Upper Limit of the CI; *%* = Percentage of the effect attributed to each source.

were distress (33.27%) and resilience (21.45%). Notably, resilience acted as a mediator in close association with well-being.

In both groups, the total effect of loneliness on QoL was similarly distributed between the direct effect (54.76% in women; 53.57% in men) and the indirect effect (45.16% in women; 46.43% in men), indicating that mediation processes play a substantial role in the relationship.

Among the mediators, acceptance stood out, especially in men, where it accounted for 24.28% of the total effect, compared to 9.60% in women. Distress (through acceptance) carried significantly more weight in women (9.21%) than in men (2.59%). Well-being emerged as a relevant mediator in both sexes, although through different pathways. In men, it was mainly linked to acceptance (8.09%), whereas in women it was associated with both acceptance and resilience (5.87% and 8.25%, respectively). Resilience played an important mediating role in women, with several active pathways that together accounted for more than 20% of the total effect, while in men its contribution was more limited and concentrated. However, in men, the effect was channeled primarily through fewer but stronger pathways, notably acceptance. In contrast, women exhibited a more distributed and multifaceted mediation structure, involving resilience, distress, and gratitude.

When analyzing the distribution of pathways suggests that men relied more on psychological well-being and acceptance, whereas women showed stronger mediation through distress, and resilience combined with well-being. Several compound pathways involving resilience, acceptance, and distress contributed modestly to both groups, with slightly more diversity in women´ mediation structure.

Discussion

This study aimed to analyze sex differences in the associations between social connectedness (loneliness and family function) and QoL in a dwelling community sample of older adults in which psychological resources (i.e., acceptance, resilience and gratitude) and mental health indicators (i.e., well-being and distress) were considered mediators. The model suggests a possible theoretical direction in line with the stress and coping model (Lazarus & Folkman, 1984) and enhances the association between SDOH older people's functioning and QoL (Gu et al., 2019). However, this cannot be empirically confirmed with the current design as this is a cross-sectional study.

In line with previous literature, our results support that women are more vulnerable than men by reporting lower levels of Qol (Beridze et al., 2020; Torres et al., 2024) and more loneliness (Beridze et al., 2020), with small to moderate effect sizes. Family function (Lu et al., 2017), acceptance (Panayiotou et al., 2017) and gratitude were also significantly higher in men but here the effects were small, indicating that the practical impact of this difference may be limited. In contrast, distress, well-being and resilience were not associated with sex.

In older adults, sex-based differences tend to be more pronounced in variables such as loneliness and QoL, likely due to the cumulative impact of gendered life experiences over the lifespan. These findings can be also attributed to the larger proportion of older women within the social structure in the later stages of life, mostly widowed, divorced and/or living alone which, in turn, is associated with more vulnerability (Tobiasz-Adamczyk et al., 2017). In our sample there was overrepresentation of single and divorced women and married men. Moreover, Eagly's (1987) social role theory, in which social behaviors are related to social roles, enhances that women are more expected to behave in the interest of the family over their self-care and well-being and tend to develop more often caregiving roles, interfering with other social roles. Therefore, married men generally tend to receive more emotional and health behaviors support. In contrast, variables such as gratitude, acceptance, and family functioning may be more influenced by individual traits, coping styles, or cultural norms that are less sharply divided by sex in later life. Although statistically significant, the smaller effect sizes suggest that these differences, while present, may not reflect substantial disparities in lived experience or well-being.

When comparing the correlations among the study variables between men and women, most patterns of association were consistent across groups. However, stronger correlations were observed in women between gratitude and acceptance, and between gratitude and distress. These results indicate that gratitude may play a more central role in emotional regulation and psychological adjustment among older women. The stronger association between gratitude and acceptance in women could reflect a greater tendency to integrate positive emotional experiences with psychological flexibility. Similarly, the stronger inverse relationship between gratitude and distress among women may indicate that gratitude serves as a more effective buffer against negative emotional states in this group. These sex-based differences highlight the importance of considering sex as a moderating factor in the study of positive psychological constructs (Yue et al., 2017).

After adjusting the model to improve fit, a significant association emerged between social connectedness, measured through family function and loneliness, and QoL. We then identified different mediation pathways in the model, first, those in which family function acted as the independent variable, and second, those in which loneliness served as the predictor. Additionally, differences in the specific paths were observed between men and women.

The first set of pathways that examined the role of family function on QoL and its mediators showed a positive association with QoL, and this relationship was fully mediated by psychological resources and mental health for both women and men.

Regarding the role played by psychological resources, acceptance was directly related to family function in women while in men it wasn't. Moreover, acceptance emerged as the mediator with the highest percentage of effect in women, compared to the other psychological resources analyzed (i.e., gratitude and resilience). In men, acceptance also showed an indirect effect, but only when combined with resilience. In fact, resilience was the main psychological resource mediating the relationship between family function and QoL in men. In contrast, no direct association between resilience and family function was found in women.

These differences may reflect gendered patterns of socialization and how men and women perceive and utilize family support. Women are typically socialized to value family and interpersonal support more positively, while men are often socialized to prioritize economic provision over emotional engagement and caregiving (Aranda et al., 2001). Therefore, men may need to strengthen their resilience before translating family support into effective coping strategies.

Regarding the role of mental health indicators (i.e., distress and well-being), they showed direct and indirect associations with QoL. First, men exhibited a direct negative association between family function and distress, while in women there wasn´t any direct association. Second, both groups showed direct and positive

relations between family function and well-being. These findings align with gendered expectations: women who fulfill social roles related to maintaining social connections may experience increased well-being, while men lacking social support may experience heightened distress and decreased well-being (Aranda et al., 2001). Third, distress associated with well-being in men but not in women. This may be due to men being less likely to seek help or express emotional needs, thereby amplifying the impact of distress on their well-being (Seidler et al., 2016).

Additionally, distress and well-being acted as mediators but always combined with resilience or acceptance, with differences by sex. On the one hand, the combination of resilience with well-being as mediators, between family function and QoL, and resilience and distress were only significant for men. On the other hand, the combination of acceptance with distress and acceptance with well-being were only significant mediators for women. As we mentioned before, resilience seems to be more relevant for men when analyzing the relationship between family function and QoL, while acceptance was more relevant for women.

The second set of pathways explored the role of loneliness on QoL, considering its mediators**.** Results revealed partial mediation with comparable proportions of direct and indirect effects.

On the one hand, analysis showed a negative direct effect of loneliness on QoL for both women and men. This finding is consistent with previous studies showing that loneliness negatively affects QoL (Gerino et al., 2017).

On the other hand, analysis of the indirect effects revealed acceptance as the most relevant mediator between loneliness and QoL in men. In women, however, the mediation structure was more complex and distributed, with resilience playing a prominent role alongside other psychological resources.

When mental health indicators were considered, both well-being and distress showed significant associations in both groups, although the pathways differed. First, the combination of resilience and well-being as mediators showed a significantly stronger relation in women, suggesting that these resources jointly contribute to buffering the negative impact of loneliness. Second, the path combining acceptance and distress, the effect was significant in both groups, but notably stronger in women. indicating that acceptance may help women manage the emotional burden of loneliness more effectively. Third, the combination of acceptance and well-being was associated with improved QoL in both sexes, reinforcing the role of acceptance as a general protective factor.

These findings suggests that while both acceptance and resilience are beneficial for older adults, women may benefit more from acceptance in reducing distress, and from resilience in enhancing well-being (Krok-Schoen et al., 2023), whereas men may benefit more directly from acceptance as a cognitive coping strategy.

Differences in these mediation patterns may be explained by socialization processes and life course experiences of the two sexes. Women, traditionally socialized to value emotional expression and interpersonal relationships (Eagly, 1987), may experience loneliness more intensely due to the disruption of social networks (Torres et al., 2024), which in turn may affect their perceived resilience. In this context, acceptance may serve as a key emotional resource to cope with loss and changes in social connections, helping to mitigate distress and maintain well-being (Zarling et al., 2023). Given that social networks are more valued by women due to gender socialization (Eagly, 1987), older women may be more negatively affected by loneliness (Torres et al., 2024), which in turn may reduce their perceived resilience. Acceptance may help older adults cope with aging-related challenges such as loss and changes in social connections (Zarling et al., 2023).

Overall, these findings highlight the importance of tailoring interventions to pathways of psychological adjustment in older adults by sex, particularly in promoting resilience and acceptance to enhance their QoL.

Limitations should be noted. First, this is a convenience sample of older adults from Spain. Therefore, caution is advised when generalizing the results, as they may not be applicable to larger populations or from different backgrounds. Second, this is a cross-sectional study, which does not allow us to establish causal or directional relationships between variables. Therefore, the results should be interpreted as associations between constructs rather than as predictive or explanatory effects. Future longitudinal studies are needed to examine the temporal and potentially causal relationships among the variables, enabling a more robust evaluation of the proposed mediation pathways and the directionality of effects. Third, the survey was self-administered, which can be associated with biases in the interpretation of the items or that the older adults who responded were those more motivated or who had fewer issues with social connectedness or QoL. Fourth, the number of sociodemographic variables (age, sex and marital status) was limited. Educational level, socioeconomic status, income and gender identity could provide a more comprehensive understanding of participant characteristics. Future research must incorporate a broader range of sociodemographic indicators to better contextualize sex-based differences in psychological and well-being outcomes and more inclusive measures to better capture the complexity of gender.

Although Social Determinants of Health (SDOH) play a decisive role in older people's QoL, there is a gap in the analysis of the association between older adults' QoL and SDOHs. While social connectedness, one of the SDOH factors, shows a relevant association with older adults' QoL, the paths by which these two variables relate to each other are understudied, particularly the different social mechanisms by sex. Our findings aim to help clarify some of these relationships. One of the main contributions of this article is to show how women and men perceive and cope with social connections differently.

Another significant contribution of this study is the focus on personal resources that play a key role in social connectedness and QoL in older adults, highlighting the differences in these relationships by sex. There are different studies that highlight the importance of sex in the study of quality of life. For example, Jeong and Lee (2020) found the importance of sex-specific interventions to improve quality of life in older people with chronic musculoskeletal pain. Stalling et al. (2024) showed that although women had higher life expectancy, they had also more physical and functional problems and as result less QoL.

Finally, the study underscores the importance of developing specific interventions by sex, as the relationship between social connectedness and QoL is mediated by different personal resources in older women and men. While acceptance and well-being can be promoted in women, resilience and distress should be aims to work in

men to increase the impact of family function on QoL. Interventions that aim to reduce the impact of loneliness on QoL, gratitude and resilience promotion seem to be especially relevant for women.

Author Contributions

Cristina Noriega: Conceptualization, Data curation, Methodology, Formal analysis, Investigation, Methodology, Writing - Original draft, Writing - Review and editing. **Gema Perez-Rojo:** Study conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing - Original draft, Writing - Review and editing. **Pablo Medrano-Martínez:** Investigation, Methodology, Writing - Original draft, Writing - Review and editing. **Javier Lopez:** Study conceptualization, Formal analysis, Investigation, Methodology, Writing - Original draft, Writing - Review and editing.

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Declaration of Interests

The authors declare that there is no conflict of interest.

Data Availability Statement

Data analyzed herein are available in https://osf.io/azx9j/.

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